

DGB, Hans-Böckler-Haus, Düsseldorf Facade Modernization



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Architect/overall design: *Sadowski & Lebioda, Berlin*
Client: *Vermögensverwaltungs- und Treuhand-Gesellschaft (VTG)
des Deutschen Gewerkschaftsbundes mbH, Berlin*
Curtain wall package: *Anders Metallbau GmbH, Fritzlar*

Mission

Energy consumption, cost efficiency, occupant comfort: the Hans-Böckler-Haus in Düsseldorf had shortfalls in all points. The client, Vermögensverwaltungs- und Treuhand-Gesellschaft des Deutschen Gewerkschaftsbundes mbH, decided to change this by implementing a sustainable facade modernization scheme. Anders Metallbau accepted the challenge.

Showing its age: the Hans-Böckler-Haus building in Düsseldorf

The late 1960s witnessed a transformation not only in Germany's social structures, but also in the formal language of its architecture. As the playful mood of the 1950s subsided, slim pillars, butterfly roofs, gaudy mosaic and gold-anodized stair balustrades became passé. The previous airy elegance yielded to a compact, often angular and introverted style of architecture. Even where the facade was broken up by wide-spanning windows, these were still framed by mighty spandrels.

This is the typology that characterizes the Hans-Böckler-Haus of the Confederation of German Trade Unions (DGB), designed in 1968 by Hamburg architects Wunsch & Mollenhauer. The reinforced-concrete-framed structure is fronted by facades featuring a bold alternation of aluminium ribbon windows and natural stone spandrels.

For the DGB, the Hans-Böckler-Haus in Düsseldorf has special historic significance, having served as its head office between 1968 and 1999, prior to the move to Berlin.



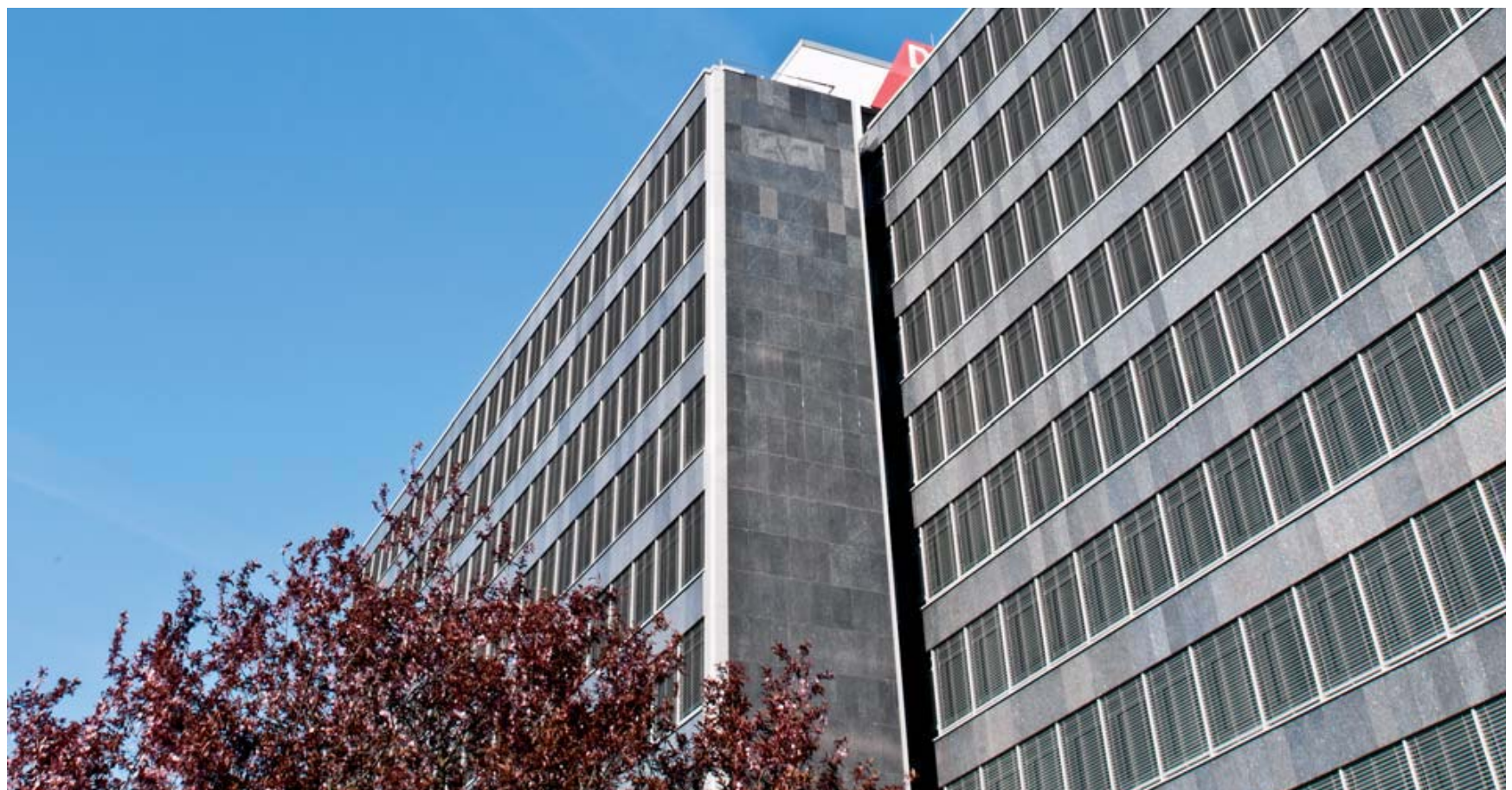
Hans-Böckler-Haus facade prior to modernization

Desired workplace satisfaction: the modernization of the DGB building

The DGB building is now used mainly by the Hans Böckler Foundation. It houses a 250-strong staff, whose working conditions – up to several months ago – were anything but comfortable. After 43 years in service, the building had major deficits in terms of energy efficiency. For the employees, this meant workplaces exposed to overheating in the summer months and only habitable in winter with the radiators on full blast. Moreover, those unfortunates who happened to sit near windows suffered draughts the whole year

round. It was thus hardly surprising that the building's energy demand far exceeded modern-day standards. Having resolved to remedy this situation, the DGB in 2011 commissioned architectural practice Sadowski & Lebioda to modernize the facade and eliminate all building physical and other functional shortcomings. The clear-cut design brief laid down by the client imposed rigorous demands: the modernization scheme was not to entail any change to the building's character nor cause any disruption to staff operations during the period of the works.

View of refurbished southern facade: existing stone panels were carefully restored and reused



Facade Design

Building facelifts and the upgrading of existing facades using advanced technologies has, for many years, been a key focus of system supplier Schüco. In 2011 the launch of its special-purpose ERC 50 modernization façade has been implemented. This system technology was adopted for the Hans-Böckler-Haus renovation.

Clearly defined concept: reaping the benefits of modernization

Identifying the cause of the heat losses from the DGB building was one of the central tasks addressed by Udo Sadowski at the start of the modernization scheme. Indeed, there was no shortage of deficiencies: some of the venetian blinds shading the ribbon windows on the building's southern front no longer worked and were practically useless. The spandrel panels were found to be completely devoid of insulation. The thermal transmittance (U-value) of the aluminium ribbon windows stood at around 3.0 W/m²K and the total solar energy transmittance (g-value) came to

around 70%. A facade system was therefore required that offered high energy efficiency while allowing rapid installation. Schüco's ERC 50 modernization facade exactly fitted the bill: comprising insulation glazing with integral sunshading, it was purpose-developed for the refurbishment of facilities where no operational interruptions are possible.

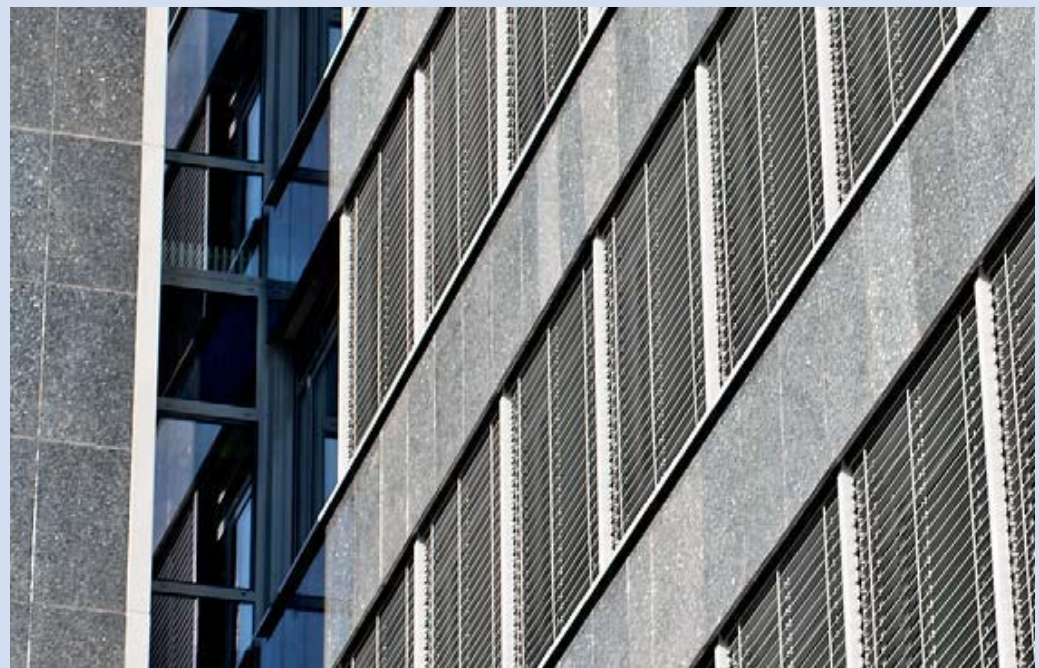
Schüco technology: making modernizations transparent

Through its high level of prefabrication, the ERC 50 system has revolutionized installation methods. A normal refurbishment of this kind would involve

insulation and cladding of the facade columns, transoms and spandrels plus replacement of the existing window units by new, high-performance insulation glass units – a time-consuming process that would put rooms and workplaces out of action for a considerable length of time.

The procedure adopted in Düsseldorf was a complete contrast: here, the existing curtain wall units, including windows, remained in place until the new modules had been mounted using an external support frame. The old windows were only dismantled when the new facade was complete.

Versatile and energy-efficient: Schüco's ERC 50 modernization facade



The ERC 50: a new dimension in facade modernization

No building from the 1960s, 1970s or 1980s can possibly meet today's energy-efficiency requirements. A low-energy renovation is always the only option. The ERC 50 modernization facade was purpose-developed for these building types and their industrial-style constructions (punched or ribbon windows alternating with spandrel sandwich panels).

The system nonetheless offers architects ample creative scope for the design of aesthetically satisfying solutions. The available modules, for instance, include units with electronically controlled aluminium windows, (concealed) sunshading systems, decentralized ventilation system and even energy-producing thin-film photovoltaic cladding panels.

The advantages of ERC 50 ...

- Minimum operational disruption: The installation process entails only negligible disruption to activities within the building – the reason being that most operations are performed outside the building, with the new envelope fully completed before any works commence in the interior.
- Planning and cost surety: The high level of prefabrication for all the incorporated components guarantees maximum planning surety. In addition, the fact that all necessary works can be exactly programmed results in high time and budget surety.
- Low noise disturbance: The ERC 50 features a new installation technique that minimizes noise and allows building users to go about their everyday routine largely undisturbed.

Fabrication & Installation

Our brief for refurbishment of the Hans-Böckler-Haus facade set out a clearly defined scheme that we fulfilled to the letter: to deliver the project in as short time as possible with minimum disruption to staff operations.

■ The mission: facade modernization during building use

In June 2011, we were contracted by Vermögensverwaltungs- und Treuhand-Gesellschaft des Deutschen Gewerkschaftsbundes mbH in Berlin to carry out an energy-efficient modernization to the facade of the Hans-Böckler-Haus in Düsseldorf. The trickiest challenge facing architect Udo Sadowski and project manager Christian Anders was to carry out the task while allowing all employees to continue working in the building with minimum disturbance. Execution of the contract without any temporary staff relocation had been a non-negotiable precondition set by the client from the very outset.

■ The engineering answer: energy-efficient technology made by Schüco

In pinpointing the best technical solution to the brief, Sadowski and Anders opted for Schüco's ERC 50 modernization facade, which was purpose-developed for 1960s and 1970s buildings. On the market since 2011, this system facade offers a host of advantages: it cuts energy costs, enhances performance, revitalizes the exterior and improves occupant comfort. Most importantly, however, the ERC 50 can be installed almost completely from the outside, thereby allowing users to carry on working in a relaxed atmosphere.

■ Logistical concept: detailed work programme

The Hans-Böckler-Haus was built in 1968 at an inner-city location. The densely developed neighbourhood offers barely parking facilities. This raised crucial questions regarding the optimization of site logistics. Specific problems concerned the location of storage and work areas, and the provision of fire service access routes. In tandem with architect Udo Sadowski, we developed a logistical concept that was supported by a detailed work programme. This specified, in advance, the system for delivering new materials

and collecting the dismantled cladding units. To minimize transportation and streamline processes, the dismantled stone panels were moved for restoration to a site in the immediate vicinity.

■ Planning of work procedures: closely co-ordinated with client and users

Staff at the Hans-Böckler-Haus work from 7 a.m. to 6 p.m. Our operatives thus had to schedule any noise-intensive works – for the ERC 50, this boils down to the mounting of wall brackets – outside these core working hours.

Prior to the start on site, we therefore drew up a firm schedule for the individual construction works and phases in close consultation with the client and users. A site manager was also on the spot throughout the contract period to attend to users' needs. These various precautions allowed all 250 employees to continue their work largely undisturbed. The only intrusion lasted two days for each corridor area in the building. During this time, the adjoining offices had to be vacated to allow removal of the old windows as well as various connection works with the existing structure.



Top: Entire building wrapped in scaffolding prior to installation;
Bottom: Fixing brackets mounted to structural fabric; new window units installed on inner face of vertical mullions

Fabrication & Installation

Lower energy costs, enhanced performance, a revitalized exterior and improved occupant comfort: the Hans-Böckler-Haus scheme met all these modernization requirements. Not only that, it also gave the client absolute cost and time surety.

■ On-site operations: short construction period with negligible operational disruption

The works kicked off in August 2011 with the dismantling of the existing stone panels. Some 720 no. additional anchors were then used to secure the precast spandrels to the existing structure. This allowed safe accommodation of the loads imposed by the new construction. Our installers then proceeded to mount approx. 1,000 no. fixing brackets to the building fabric. This marked the completion of all noise-intensive works. The next steps involved fixing the vertical mullion to the brackets and fitting the horizontal support sections needed to secure the restored natural stone panels. The pre-glazed window units were then inserted behind the mullions from the outside and fastened, and all joints with the structural elements wind- and waterproofed. At this stage, then, the new facade assembly was already fully sealed and weathertight.

The next job was to fit the sunshading devices and incorporate the 140 mm thick mineral-wool insulation in the spandrel areas. At the same time, the existing windows were removed and the necessary fire stop installed. As these two operations required access from the building interior, they were subject to prior co-ordination with the users.

The final steps entailed providing the necessary connections for the interior fit-out, cleaning the windows and removing all temporary protection from the office spaces. The users returned to their storeys, after a two-day absence, to find their workplaces fully refitted with new windows.

To speed up installation, we decided from the outset on the phased erection of scaffolding around the building perimeter. This enabled us to minimize the movement of goods within the building and to restore and reinstall the natural stonework within the allotted

time window. The materials were transferred to the point of installation externally via the scaffolding and via hoists.

■ The result: reduced energy costs, greater occupant comfort

Lower energy costs, enhanced performance, a revitalized exterior and improved occupant comfort: that is what the client expected from the Hans-Böckler-Haus facade modernization and that is exactly what we delivered.

The DGB building now reads as a modern, though timeless composition



- Improved thermal control: The spandrels, like the new aluminium sections of the ERC 50 modernization facade, are thermally insulated and have thus achieved a significant reduction in thermal transmittance (U-value). As a consequence, more heat is retained in the building and nobody has to work in draughty conditions.
- Glare-free workplaces: The motorized sunshades and glare-control devices installed on the northern and southern elevations for operation by building occupants can be used even at wind speeds up to 20 m/s.



New window units are sealed (left) and old windows dismantled from inside building (right)

that makes no attempt to conceal its historical and architectural roots – with both the dominant ribbon windows and the natural stone spandrel panels still plain for all to see.

Behind the scenes, however, there have been radical changes: the base to which the spandrel panels are attached is fitted with 140 mm mineral-wool insulation. The DGB building now offers all staff members far more agreeable workplaces for a multitude of reasons ...

The total solar energy transmittance (g-value) was cut from around 70% to approx. 30%.

- Quiet working environment: Day in, day out, building users can appreciate the far superior sound-control performance of the new facade. The post-refurbishment sound-reduction index stands at approx. 38 dB, compared to the 28 dB recorded for the old facade.

Interiors

Constant temperatures, adequate ventilation, full soundproofing and glare-free workplaces: the DGB building in Düsseldorf now enjoys all of these benefits. And the 250 employees feel very comfortable in their new, contemporary working environment.

■ Hans-Böckler-Haus in 2012: a comfortable working environment

It is hard to imagine how anyone can work normally in a building whose external skin is being modernized. Staff at the Hans-Böckler-Haus can testify to the fact that this really is possible, without any undue disturbance. But this is no accident: the ERC 50 modernization facade was custom-designed by the developers at Schüco to minimize the access needed by installers from the building interior. In Düsseldorf, the only works to be performed from inside the building were the slab and spandrel connections and the installation of sheet-steel fire stops in the spandrel areas. Additions were also needed to some of the partitioning. No other improvements had, in any case, been planned for the interior due to the client's limited budget, which pared back the refurbishment to the essentials. The previous upgrading, in the spring of 2011, of the building's services installations – which now include a recirculated-air cooling system and photovoltaic modules on the flat roof areas – had already boosted the building's performance. Apart from the electrical connections for the sunshading devices, no other alterations to the services installations were needed. The modernization has transformed the Hans-Böckler-Haus into a comfortable working environment. Not only does it offer pleasant temperatures in winter and summer, employees also value their glare-free workplaces and the newly installed tilt-and-turn units that allow local ventilation of the office spaces.



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Facts and figures: the essentials in brief

Employer/architect/project team:

Client:	Vermögensverwaltungs- und Treuhand-Gesellschaft (VTG) des Deutschen Gewerkschaftsbundes mbH, Berlin
Main user:	Hans Böckler Foundation, Düsseldorf
Architect/overall design/site co-ordination:	Sadowski & Lebioda, Falkensee

Curtain wall package: Anders Metallbau GmbH, Fritzlar

Complete stonework package: Kohlenberg Naturstein, Düsseldorf

Facade component suppliers:

Sections and hardware:	Schüco International KG, Bielefeld
Glazing:	Energy Glas, Wolfhagen
Sunshading systems:	Warema Renkhoff SE, Düsseldorf branch
Curtain wall structural engineering:	Stahlklar GbR, Kassel

Project data:

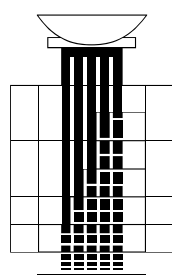
Existing facility built:	1968
Original architect:	Wunsch & Mollenhauer, Hamburg
Total gross floor area (GF-9F):	11,000 sqm
Gross floor area per storey:	Approx. 1,100 sqm
Building height:	35 m
Main storeys:	10
Modernized curtain wall area:	5,100 sqm including natural stone spandrels
Modernization contract period:	5 months
Modernization completion:	Spring 2012

Completed works:

Modernization facade:	Schüco ERC 50 system
Aluminium window units:	3,400 sqm
Support frame for stone spandrels:	1,700 sqm
Venetian blinds on 1F-9F:	721

Picture sources: The picture rights to all photos marked accordingly reside with Schüco International KG. All other photos were taken by our project managers.

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