SUCCESS STORY HIGH-RISE BUILDING
TSCHARNERGUT BERN, SWITZERLAND

Smoke-free even on the 20th floor.

Smoke control for escape and rescue routes in existing buildings.

The development in the Tscharnergut district of Bern was the largest housing project in Switzerland at the end of the 1950s. As part of a comprehensive refurbishment of the property, so-called pressure differential systems (PDS) have been installed in three of the four occupied twenty-storey buildings since the end of March 2021.

A PDS is a technical device that is permanently installed in buildings. In case of fire, it has the task of keeping escape and rescue routes – e.g. stairwells or fire brigade lift shafts – smoke-free by means of controlled overpressure.

The requirements of the client were optimally fulfilled through the use of Belimo products. The client was FAMBAU Genossenschaft Bern, the PDS consulting engineer was the Enfors AG company in Sempach. Hautle Anderegg und Partner AG was responsible for the execution planning and the implementation of the fire protection concept.

BUILDING TYPE
Residential apartments

PROJECT
Renovation

TRADES
Pressure differential system according to VDMA 24188 section 6.3.

PRODUCTS
Various actuators, differential pressure sensor

BELIMO

Safety of persons through smoke control of escape and rescue routes.

The Tscharnergut neighbourhood is located in the quiet residential area of Bethlehem, about 15 minutes by tram from Bern's main railway station. It was structurally developed in 1958 and was one of the largest Swiss high-rise building project landscapes at the time – the view over Bümplitz and the many green quarters from the top floors of the twenty-storey high-rises is impressive.

Each high-rise building has 2 stairwells with a lift. A small lift and a fire brigade lift allow the fire brigade to reach 40 to 60 flats each. New building projects must be planned according to today's regulations with a lift forecourt or a lobby as well as with a separate stairwell. Although this project was only a building refurbishment, great importance was nevertheless attached to extracting the best possible protection out of the existing building fabric in terms of fire protection.

The renovation of the lift system of the three high-rise buildings on Waldmannstrasse was also accompanied by the requirement to install a pressure differential system (PDS), which was accepted by the building owner at the end of March 2021. Belimo supplied the necessary products and expertise to provide competent support for the PDS consulting engineer.

A significant challenge in this project was the existing tight space conditions, the many interfaces with the other trades within the building and compliance with the design criteria.

The air is distributed and blown into the stairwell.

In the high-rise building, the differential pressure is measured between the staircase section and the atmosphere in both the lower and upper staircase sections using in each are a 22ADP-18Q differential pressure sensor from Belimo.

The blades in the intake point in the ground-floor façade element, where the large fan is located, are opened by Belimo's SMQ24A-SR very fast running rotary actuator.

Ultimately, the outdoor air is blown into the floors via the lift shaft. Thanks to the leaks in the lift shaft, there is a homogeneous pressure distribution over the entire stairwell.

"Matching products make planning easier."

Beat Christen, Project Manager MINIMAX Zurich, c/o Gnädingers Betriebs AG

Differential pressure sensor 22ADP-18Q
Direct measurement in the stairwell compared to atmosphere

"If the large fan were only used to force air into the stairwell from below, the result might be around 100 Pascal at the bottom and around 20 Pascal at the top," says Beat Christen, Project Manager at MINIMAX. However, the aim is to generate and maintain the same air pressure on all floors. This is also against the background of the standard that an airflow of at least 0.75 m/s must be achieved on the building floor at the door of the flat, provided that a window is open in the flat. This prevents smoke from entering the stairwell from the flat.

Protection of persons comes first.

The Belimo components offer very high reliability and simplify the regular operational check of the pressure differential system. They thus make a decisive contribution to the protection of people in case of fire.

For the sake of simplicity, the abbreviation PDS has been used in the report for pressure differential system. In accordance with VDMA 24188 section 6.3, a flushing system with controlled pressure maintenance without secured air release was installed on the floor in the above-mentioned building.

PDS	Pressure differential system according to VKF
DDS	Differential pressure system
ÜDBA	Positive pressure ventilation system
SLA	Purging ventilation system according to VKF

Belimo as a reliable partner.

Belimo was convincing as a reliable supplier that not only delivers products, but also keeps the customer's added value in focus.

Very fast running actuator SMQ24A-SR
Motorised overpressure relief flap
(pressure control in the stairwell)

Rotary actuator with fail-safe SF24A-S2
Controlled fresh air intake via
Outdoor air damper

Rotary actuator with fail-safe SF24A-S2
Lift shaft ventilation (from energy
specifications)

All inclusive.

Belimo is the global market leader in the development, production, and sales of field devices for the energy-efficient control of heating, ventilation and air-conditioning systems. The focus of our core business is on damper actuators, control valves, sensors and meters.

Always focusing on customer value, we deliver more than only products. We offer you the complete product range for the regulation and control of HVAC systems from a single source. At the same time, we rely on tested Swiss quality with a five-year warranty. Our worldwide representatives in over 80 countries guarantee short delivery times and comprehensive support through the entire product life. Belimo does indeed include everything.

The "small" Belimo devices have a big impact on comfort, energy efficiency, safety, installation and maintenance.

In short: Small devices, big impact.

- 5-year warranty
- On site around the globe
- Complete product range
- Tested quality
- Short delivery times
- Comprehensive support

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