

Building Automation: extension and refurbishment of a bank building without interrupting operations

Retrofit at Appenzeller Kantonalbank

When space at Appenzeller Kantonalbank's head office became tight and customer service procedures no longer met modern requirements, the bank decided to build an expansion and refurbish the existing building without closing down its operations. Bühler+Scherler AG, the solution partner for the Swiss branch of Beckhoff Automation AG, implemented an automation solution that fully meets the expectations.

Architecturally, the head office of Appenzeller Kantonalbank perfectly matches the townscape of the cantonal capital Appenzell. The seamlessly linked expansion, which was opened in April 2009, was built in the same style as the existing building, which was comprehensively refurbished at the same time. In parallel with the construction of the expansion, the heating and cooling supply was largely converted to renewable energy based on a ground source heat pump with 31.5 kW heating capacity and 51.5 kW cooling capacity.

Replacement for proprietary solution

The project not only posed architectural, technical and banking challenges, but operations had to be maintained during the reconstruction, including the building automation networks. In the existing building, a proprietary building automation system had been used, for which neither an appropriate support contact nor up-to-date hardware was available that would have been suitable for the expansion. The existing systems were no longer able to meet current building automation demands. The building automation installation was therefore included in the retrofit, so that the existing and new building could be operated in an integrated fashion. The costs for the building automation systems were round 8 percent of the total investment cost for the renovation of the existing building and the construction of the new building.

Urs Rüegg, project manager at Bühler+Scherler, is proud of the achievement: "It was a quite a feat, both from a technical perspective and in terms of the schedule. Banking operations had to be maintained at all times, so that even after a winter night or Sunday shift the rooms had to be warm the following morning, the lighting had to work properly and customers were able to go about their normal banking business."

Bruno Streule, technical office manager at Appenzeller Kantonalbank (left), and Urs Rüegg, project manager at Bühler+Scherler, in front of a touch-panel in the counter zone, which provides an overview of all relevant building data.





Head office of Appenzeller Kantonalbank in Appenzell. The extension (rear, left) subdivides the building complex into three architecturally equivalent parts. At the same time, the existing building was extensively refurbished.



View of the customer service area at Appenzeller Kantonalbank

Bruno Streule, technical office manager for the bank, said: "Thanks to the integrated systems from Beckhoff and the competent system solution from Bühler+Scherler we never had any problems."

Integrated solution

The building automation system represents an integrated solution for HVAC, lighting, shading and busy indicators, excluding the internal security and fire alarm systems and access control. The networked solution is based on a decentralized CX system from Beckhoff. A total of five CX1010 Embedded Controllers are distributed across the two buildings. Each unit contains a CPU, internal flash memory and an Ethernet interface. TwinCAT

automation software turns the CX1010 system into a high-performance PLC and Motion Control system that was extended with a web-based visualization system. No intelligence is required in the periphery, so integrated communication from the command level right through to the sensor/actuator level is ensured. A total of 19 Bus Couplers, which are networked with the CX controllers via Ethernet, enable fully automated operation of the technical systems at the bank. All data points in the building are recorded via Beckhoff Bus Terminals. "The modular Bus Terminals significantly reduce the engineering effort and save space, material, labor time and money," said Daniel Rothenberger, who works at Beckhoff's building automation division in Zurich.



The daylight atrium is used as an internal communication zone.

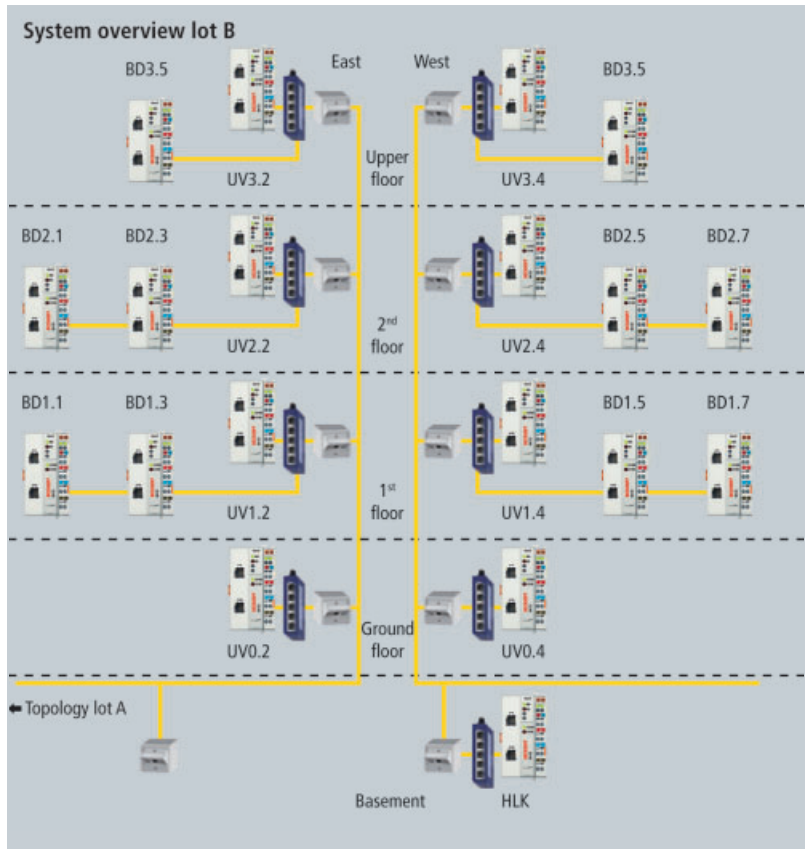
Enhanced comfort with reduced energy consumption

Energy consumption is an important criterion for Appenzeller Kantonalbank. All relevant HVAC data are therefore recorded and monitored via M-Bus. These data can be displayed at the command level or viewed from outside via the Internet.

The HVAC system in the existing building was retrofitted, resulting in enhanced comfort for staff. Each room can be controlled individually. Room sensors sample the required values and define the specifications for the indoor climate. A roof-mounted weather station supplies the basic data, which are also relevant for the shading control system.

The blinds not only serve as shading devices, but also help save energy. In the summer the shading devices protect from excessive sunlight, while in the winter the heat radiation is used for heating purposes (outside the occupied periods). The blinds are controlled automatically, although they can also be moved up or down manually.

At Appenzeller Kantonalbank, as in all office buildings, light is not only an important factor with regard to well-being, but also from an energy management perspective. All general zones are basically controlled dependent on available daylight. This also applies to the internal corridors, since the local communication routes between the offices are largely located within a large hall that is well illuminated through roof windows.



System topology at Appenzeller Kantonalbank

In the offices of the new building, daylight-dependent base lighting is generated by recessed ceiling lamps. Floor lamps with presence and daylight control are used for individual workstation illumination.

Conclusions

In contrast to a new building without design constraints, a major refurbishment of building services systems in conjunction with an expansion – all without interruption of operations – poses significant challenges for all involved. This goes double since the building automation system, which acts as the nerve center for a modern bank, coordinates all technical processes. But that’s not all. Customers and staff need light and a pleasant working atmosphere. They must be comfortable, and security must be guaranteed around the clock. Bühler+Scherler replaced the outdated, proprietary building management system with an advanced solution, including access via the Internet, to the satisfaction of all parties involved. The measured values and all recorded system data confirm the specified design data.