TROX® TECHNIK
The art of handling air

NECKERMANN COMPUTING CENTRE - FRANKFURT (ALLEMAGNE)

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The planned repurposing of the computing centre of Neckermann Versand AG, built in the 70's as a concrete-skeleton building with natural stone facade, tiltable metal windows and a central air conditioning system, raised the question of technically and economically optimal air conditioning. With old buildings, it's not unusual to have energy savings considerations, which tend away from central air conditioning systems towards decentralized ventilation systems. Architects, too, increasingly favor decentralized air conditioning and/or air conditioning designs in which the whole system is integrated inconspicuously into the window frames or double flooring.
Conventionally air-conditioned office buildings from the 70's and 80's often truly act as energy centrifuges and force reorganization-minded owners to look for economical alternatives. A systems comparison with dynamic building simulations showed substantial advantages for an exhaust air facade with axially situated air conditioning devices. Finally, the decisive factor in choice of a system was the owner's requirement to reorganize the building floor-by-floor without interrupting ongoing business.

Consistent with the task, construction in the Neckermann building commenced with decentralized undersill ventilation from the company Fassaden-System-Lueftung (FSL), part of the TROX Group: Beginning on the upper floors, two floors at a time were reorganized, and then the departments under them moved up into the finished floors. External air intakes and internal air circulation devices were alternated. Via an opening on the facade and a filter, the external air intakes suck in fresh air, then warm it or cool it according to weather and need. The exhaust air is then directed from the ceiling over the whole window surface downward into the equipment, passing through a heat recovery device before it is ejected to the outside.
The relatively warm exhaust air current improves the insulation of the building and gives part of its energy to the incoming external air in the heat recovery unit. Air currents are similar in the air conditioning units, except that the external air part and the heat recovery unit are omitted. Flow rates are regulated automatically by air quality sensors in the offices. Ambient temperature regulation can be locked with priority function. Furthermore, the whole system can be used for cooling of building zones by "pre-cooling" the building with pure outside air outside working hours – mainly at night.

A facade component and an air conditioner form a single unit. This is completed with an additional exhaust air window with outside double glazing and an inner pane, which can swing out for cleaning. On the one hand, this allows to save energy; on the other hand, the interior pane is always held at room temperature. Noise control is effective with the closed exhaust air facade and the result is comfortable workspaces with good thermal comfort, excellent air conditioning and no drafts. By removing suspended ceilings, room is freed up for the installation of a double floor, with supply ducts for the air conditioners as well as electrical and data wiring.
That means that surface area requirements for air distribution are omitted, new buildings can make up to 20 % lower building heights. In summary, the solution with FSL products offers an annual power consumption reduction of around 50% for building services. A self-sufficient heating and air conditioning of each floor makes flexible use possible. Finally, despite the numerous individual devices, maintenance costs are low: Annual maintenance costs are only approx. 1.5 % of the devices; initial costs are lower than the costs of window cleaning.