



Control is a Fine Art at Aarhus Art Museum in Denmark



Founded by the citizens of Aarhus in 1859, Aarhus Kunstmuseum exhibits Denmark's largest art collection outside Copenhagen. The museum owns notable collections of Danish art that span 300 years plus a noteworthy contingent of modern art.

In April 2004, the ARoS Aarhus Kunstmuseum was officially opened by the museum's Patron Her Majesty Queen Margerethe II and the 17,000m² new building sited in central Aarhus opened its doors to the public. The event marked a new era in the museum's almost 150-year history: the provincial art museum with high ambitions now emerged as a national museum with international ambitions.

The cube-shaped building contains three large galleries, each about 1,100m² in size, for permanent exhibitions and, with additional galleries dedicated for special exhibitions, the total exhibition space totals 6,775m². Besides the galleries, ARoS contains a library and a junior museum: an exiting experimental zone for children and young people wanting to learn more about art in untraditional and hands-on ways.

With the new galleries, ARoS is now in an excellent position to display its permanent collections as well as special exhibitions showing international works on loan from museums all over the world. The latter can only be done if the museum can document its ability to keep the items in a way that ensures complete safety. Damage to a work on loan can provoke substantial claims. In the past Danish museums missed out interesting opportunities as they could not meet international security standards.

The Challenge

In order to satisfy the requirements of the international art community a number of enhancements were required, including installing a climate control system that would protect the museum's permanent collection and loaned exhibits from unsafe humidity and temperature levels. System integrator, TAC of Aarhus, Denmark was hired to design and install such a system.

At the start, the ARoS project consisted of only a few lines on the architect's CAD screen and the indoor climate presented a challenge. The temperature could be allowed to swing +/- 2 degrees and the relative humidity +/- 5 percent only – the worst being any sudden changes. That demands extensive monitoring and automatic corrective measures.

The Solution

Each air conditioning unit comprises heating and cooling coils as well as a humidifier, making it possible to control both temperature and humidity to desired levels. Both supply and extract fans are pressure controlled via speed drives connected over a LONWORKS network.

All galleries and exhibition areas are equipped with mechanical ventilation. In the case of a few or no visitors at all the air is re-circulated. Should a CO2 sensor detect any deterioration of the air quality, as a consequence of increased number of visitors, the re-circulated air is mixed with fresh air in order to achieve a healthy indoor climate.



The building is equipped with natural ventilation in common areas, which is activated only when it makes economical sense. The use of natural ventilation must not result in deviations from preset temperature and

humidity limits. A weather station on the roof is constantly monitoring wind speed and direction, rain, relative humidity and level of sunlight. In addition, the control system makes sure that the air is evenly distributed, avoiding the warmer air remaining high up under the ceiling in spacious rooms.

Water damage can also present a threat to the works. In an attempt to prevent this, there are 21 well-holes in the flat roof of the museum. They are all equipped with humidity sensors. Should a leak in the roof occur, one of the wells will raise an alarm.

All critical alarms are forwarded to the mobile phone of the engineer on duty, while minor deviations will be stored in the system to be attended to when convenient.

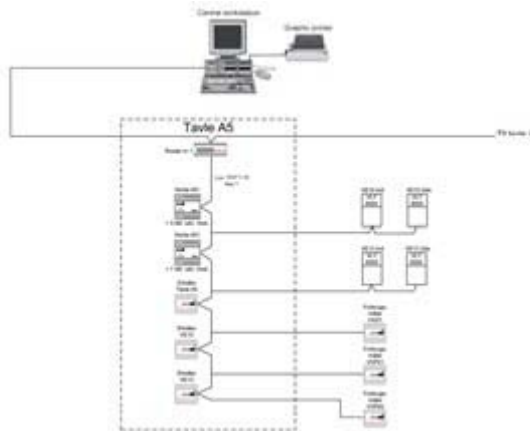
The system is equipped with a TAC Vista Workstation Professional front-end and the entire installation can also be operated remotely over the Internet via a TAC Vista web station. If the engineer on duty receives an alarm message out of normal working hours, he can easily get more information and ultimately correct the issue from the closest PC with an Internet connection.

The control system is built with a high-speed LONWORKS backbone, comprising six LonPoint® routers, for distribution of the communication to 23 control panels. In addition to TAC Xenta plant controllers and I/O modules, LONWORKS based kWh meters monitor electricity consumption and three meters monitor the consumption of heating energy. All binding on the LNS based network are carried out using the LonMaker network management tool.

The Result

With the new building and its advanced Building Automation Control system the ARoS museum provides one of world's safest environments. This factor enables ARoS to produce exhibitions comprising some of the most demanded art works in the world.

"The new system not only offers safe conditions for the artwork and a comfortable climate for our visitors and employees, but it also gives us detailed reports," says Peder Hansen, Maintenance Manager at ARoS. "We can now continuously monitor the consumption of electricity, water, and heating. Such information, when combined with museum attendance data, can make it easy, for example, to calculate the cost of a large group of visitors booking a special arrangement."



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