

MOLD PREVENTION IN LISTED CHURCH WITH THE ROTRONIC MONITORING SYSTEM RMS

*The Protestant-reformed church of Mönchaltorf is fighting mold of the genus *Aspergillus glaucus*. The fungus, which decomposes wood, is causing problems, among other things, on the ceiling of the more than 500-year-old building and to its organ. The solution: the RMS Rotronic Monitoring System, which monitors temperature and humidity continuously in order to control the quality of room air and minimize mold growth.*



“RMS is an **effective and sophisticated monitoring system** that supplies us with valuable data at low cost. Rotronic provided excellent support.”

Benedikt Ambühl

Marcel Jenny (l) from Rotronic in technical talks with Benedikt Ambühl, responsible for church upkeep at Mönchaltorf.

Benedikt Ambühl, the honorary vice-president in charge of church upkeep in Mönchaltorf, explains that mold is a well-known challenge in churches throughout Central Europe and a problem mainly in winter. Heating of the rooms probably encourages humidity and thus the formation of mold.

INITIAL SITUATION AND SUSPICION

The church in Mönchaltorf is heated on the day before mass. Before the service, the church opens its doors to visitors and cold air alike.

Although the worshippers warm up the church again quickly, their respiration, perspiration and wet clothes also introduce moisture into the room. This is not only a problem

for the late Gothic ceiling carvings and paintings, but also for the wooden seating and the gallery including organ. To clarify the origin of the problem, Benedikt Ambühl turned to Rotronic, a company known for its measurement technology, which recommended RMS.

ANALYSIS OF THE SITUATION

In cooperation with Marcel Jenny, Key Account Manager at Rotronic, a solution involving continuous monitoring of temperature and humidity was implemented to obtain up-to-date data to enable timely adjustments. The online humidity and temperature loggers were placed on the gallery and its ceiling, on the ceiling of the nave as well as at the pulpit in order to record room and ceiling measurements as best possible.



RMS wireless mini data logger records humidity and temperature.

The data can be viewed at any time and from anywhere via the Internet. Should the values rise above pre-defined limits, the system triggers an alarm for the property manager. He can then immediately take measures to regulate the humidity.

SUMMER RESULTS

It soon became clear that the humidity throughout the church rises well above 65% or even up to 75% in the summer. These high values promote the growth of mold. A measure was needed here to protect the valuable ceiling and gallery.

SUMMER MEASURES

The church has been ventilated optimally ever since the RMS monitoring system was installed. A dehumidification unit was also purchased. It starts work at a relative humidity of 65%. These measures prevent mold growth.

WINTER RESULTS

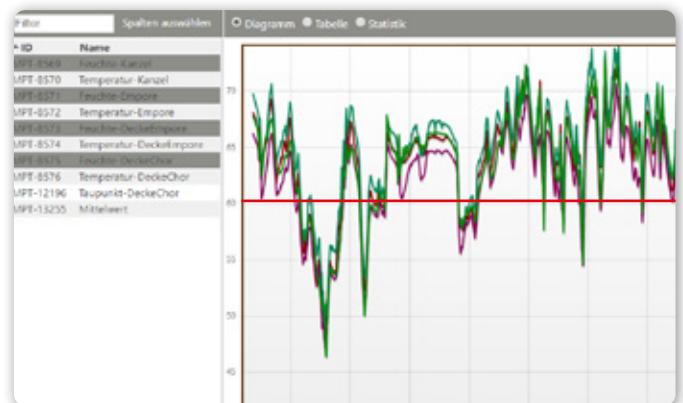
Based on the pronounced deflections in the temperature curve in the figure above, it is easy to observe how the church is heated before services and other occasions.

Old and thick church walls generally only adapt to room air very slowly. This can be clearly seen in the figure, as the room air changes by only 1.2°C after a weekend (two deflections). The temperature of the church walls thus remains between 10°C and 13°C.

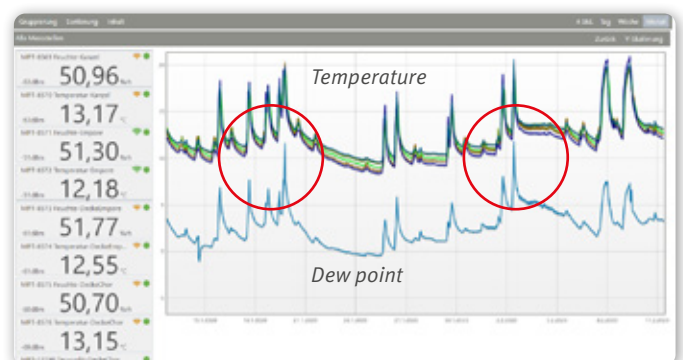
It can also be seen that the dew temperature is exceeded in every heating cycle or comes very close to it (see circles in the figure). In this situation, a local relative humidity of 70% and more can easily arise.



Marcel Jenny (l, Rotronic) and Benedikt Ambühl (r, Mönchaltorf church) busy assembling and integrating the measuring instruments.



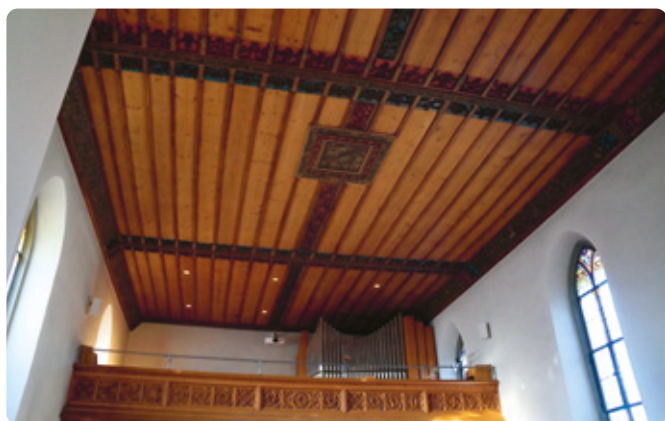
Measurement curves in summer



Measurement curves in winter

WINTER MEASURES

The church needs to be ventilated extensively after every event because cold air is drier and lowers the relative humidity. Shorter heating periods also help to minimize mold growth. Another positive side effect of this method is that it also reduces energy costs. In order to define further steps to protect the ceiling in cooperation with the cantonal monument preservation authorities and experts, the data is viewed regularly via cloud access, reported and evaluated monthly.



Gallery with organ and late Gothic ceiling carving (monument protection category IV).

THE ROTRONIC MONITORING SYSTEM (RMS)

Rotronic products used in the church

- 4 RMS mini loggers to measure temperature and humidity (used on the gallery ceiling, on the gallery, on the ceiling nave and at the pulpit).
- 1 RMS-GW-868 gateway
Interface between the wireless data loggers and server software. It can manage up to 60 data loggers simultaneously and has 5 radio channels for parallel and redundant operation.
- 1 RMS Cloud Software

RMS is one of the most flexible monitoring systems available on the market. From small applications with only one measuring point to large installations with several thousand measuring points, RMS offers tailor-made solutions. Existing hardware can be integrated into RMS easily and, vice versa, Rotronic hardware can be incorporated into existing software according to the wishes and requirements of respective customers.

