

Ornate organs

July 18 2013



(Medical Xpress)—When the biggest enemy of historical heritage artefacts such as organs comes from within, high-tech sensors can play an important role in helping to preserve them

The German village of Cappel is home to one of the greatest historical music instruments. The ornate baroque organ here is the work of Arp Schnitger, the grand master of German organ construction who built it in around 1680 for Hamburg. It is in this small village church in northern

Germany through an accident of history. Its obscure hideaway saved it from destruction. It escaped the fate of many other organs during World War I by remaining undiscovered by the Germany army, which would otherwise have melted its metal for military equipment.

Today, the greatest threat this organ faces is not from soldiers but from its surroundings, a situation common to many historical organs in Europe. "They can be damaged by the influence of heating but also by acid corrosion of the organ pipes, a phenomenon we only discovered in the mid-1990s," explains Henk Van Eeken, an organ builder in Herwijnen, the Netherlands, who has restored a number of historic organs and built new instruments.

Many organs were damaged in the XXth century when churches began to be heated and condensation became a problem – this happens when warm air comes in contact with a cooler surface. "As long as churches were not heated, organs could last for centuries," Van Eeken tells youris.com "but once heating came many problems started." There are thousands of organs around Europe, which represent an important musical and [cultural heritage](#).

Now science is helping to preserve these wonderful creations. Carl Johan Bergsten of the Goteborg Organ Art Center at the University of Gothenburg, Sweden, has worked on a project to develop high-tech sensors for detecting when conditions are not right for organs. The sensors are small enough to be placed inside the organ, without affecting the all-important sound from the instrument.

We developed two prototypes, Johan Bergsten tells youris.com: "the first one is for detecting organic acids such as acetic acid. We previously found in another project [called COLLAPSE] that emission of acetic acid from the wooden parts of the organ causes corrosion of the metals." Piezoelectric quartz crystals coated with lead are placed inside the organ.

If the lead starts to corrode due to acid, then the sensor changes its vibration frequency and signals danger.

A second prototype relied on fibre-optics to detect condensation inside the pipes. Light is sent through the fibres and if the amount of reflected light is changed – by condensation – again a signal is sent out. This means that organ caretakers can be informed that conditions are not right for organ preservation. Bergsten is hoping that the prototypes can be commercialised.

Moreover, high-humidity leads to more acid corrosion. "It's important we have sensors for humidity inside the organ," Van Eeken explains. He welcomes such assistance from science. "The problem now is that we organ builders and conservators do not have the right monitoring systems. We often become involved only after a problem is there, like a cracked windchest," Van Eecke comments, "then the organ builder is called in to help." He argues: "it would be better if we had a monitoring system, and I could sit behind my desk and check churches and organs remotely."

Some experts believe the biggest threats to organs come from within. "What surprised me was it was the material from which the organs were made that provided most of the atmospheric pollution that could damage the organ, not the general atmospheric effect," says Dominic Gwynn, who was involved in restoring the oldest surviving church organ in England, which is in the St. Batolph's Church, Aldgate. He cooperated with the project's work in putting sensors into its organ. He adds that this phenomenon was also seen in the historical organ in the Minor Basilica of St. Andrew the Apostle, in Olkusz, Poland.

For now the great organ of Cappel remains in fine working condition and is a place of pilgrimage for organ experts all over the world. The original church in Cappel burnt down in the XIX century and the village

had to build a new one. The fire also destroyed the church's organ, so the villagers decided to buy a second-hand organ in 1816. They chose well. The second-hand organ stayed in Cappel and plays now as the largest and best preserved Schnitger organ.

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Citation: Ornate organs (2013, July 18) retrieved 25 April 2024 from <https://medicalxpress.com/news/2013-07-ornate.html>

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