FUTURIS 7 BELLS RESEARCH

SCRIPT ANGLAIS

0.12

It´s a cold and cloudy spring afternoon in the monastic island of Reichenau, on the shores of Constanza Lake, in Southern Germany.

00.26

Climbing the bell tower, where no tourists are allowed, is an unusual visitor with a small suitcase. He's part of a European effort to preserve, restore, and improve the continent's bells, some of which are over eight hundred years old.

00.50 ITW KURT KRAMER, CAMPANOLOGIST (IN GERMAN)"This is the oldest bell here, cast in thirteen sixty one, and is part of UNESCO's world heritage site at Reichenau, whose bells are the only ones given this UN distinction"

1.13 ITW KURT KRAMER, CAMPANOLOGIST"Right from the start of christianity bells were the symbol of harmony. People were convinced that evil was repelled by the soundwaves. It was also a symbol unity, of meeting".

1.29

From his small suitcase, he takes different diapasons that help him to identify and to measure a wide array of bell tones.

1.43

Kurt Kramer has been studying bells for 40 years. He considers them to be the oldest known musical instrument, with their own "mechanical soul".

1.54 ITW KURT KRAMER, CAMPANOLOGIST

"It's only by thinking this way that I can really know this bell and its real character. If I look at the electronic measurements I can understand its physics, but I don't really understand the bell. With the diapasons, and this is now confirmed by experts everywhere, I can really get to know a bell's true sound and character".

2.12

He is not the only one to have climbed this medieval belfry today.

2.29

Mechanical Engineer Michael Plitzner is studying bells with a different and complimentary hi-tech approach; his tools include sophisticated sensors, microphones, accelorometers and computers. He is involved in Probell, a European research project aiming at unveiling the physical, mechanical and sonic secrets of historic bells... with the ultimate goal of finding ways to better protect them.

2.49

The first thing to do is analyse the quality and hardness of the bronze used to cast the bells.

2.57

ITW MICHAEL PLITZNER, MECHANICAL ENGINEER, UNIVERSITY OF KEMPTEN (IN GERMAN)

"With this process we can determine the bell's hardness. If I hit it with this measuring device, I then examine the result with this "comparison wand", and this gives me the material's hardness. i can also identify the hardness of the clapper's impact zone".

3.20

The tested bells are then tolled to measure their different ringing characteristics.

3.40 ITW MICHAEL PLITZNER, MECHANICAL ENGINEER, UNIVERSITY OF KEMPTEN "With these measurements we can analyse the intensity of the clapper impact, the acoustic pressure on and after the strike, and the partial soundwave deterioration. We can pick up on tones or half tones and with this acoustic data we can also measure the bell's expansion, or reaction to vibrations when it is struck".

4.22

Mechanical engineer Andreas Rupp has coordinated the project from this specialised laboratory at Kempten University of Applied Sciences

Bells from different European countries have been tested and analysed;

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Each country has its own specific casting and ringing techniques.

4.58

ITW ANDREAS RUPP, PROJECT COORDINATOR, PROBELL (IN GERMAN)

"So, here we have a Spanish bell, with a high suspension mount and counterweight. It's a dynamic weight system allowing the bells to fully rotate on themselves, especially to suit the Spanish way of bellringing.

5.09

This is an Italian bell. In Italy they are swung on a very high arc, but don't rotate completely.

5.17

And this is an experimental Austrian bell. On the face of it here are three similar bells, but produced with three different casting methods. With them we can examine if the casting process has any effect on the sound, and long-term durability.

5.36

And this here is a French bell. One particularity is that the campanology culture there is identical to the German way, but the casting process is different, with the bell moulded upside down".

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After three years of extensive work, the project has already yielded its first results.

5.59 ITW ANDREAS RUPP, PROJECT COORDINATOR, PROBELL (IN GERMAN)

"We can now warn if a bell is in danger of cracking for example, or if there is significant wear and tear in the impact zone, which can mean an immediate repair, and if the bell is being struck correctly to obtain optimum sound quality".

6.18

Researchers have better understood how sound vibrations are distributed along the bells thanks to complex mathematical models. Graphics have also helped them to identify the ideal way for clappers to work.

6.32 ITW ANDREAS RUPP, PROBELL COORDINATOR

"Here we can see the big problem for bells and clappers. A clapper always needs to be made to strike perfectly every time, with the right hardness and at the right moment, when the bell is at the zenith of the arc. It is only at this moment that the clapper should strike, but only just hard enough to obtain the bell's optimum resonance".

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These mechanical details should also help to define new standards for the casting of new bells. Today three small bells are being cast in this hundred year-old foundry in Central Germany, with a specific ritual that has not changed much for centuries.

7.13

The foundry´s director agrees research is necessary. But he says quality does not automatically mean harmony.

7.21 ITW HANNS MARTIN RINCKER, BELL FOUNDER (IN GERMAN)

"We just don't know enough about the casting of bells. There's been little research on the object itself in the past, but now we can establish technical standards for bell casting, where we knew nothing before. But at the same time we must avoid over-standardising. It wouldn't be good for bells, or for our common heritage. Each country must preserve soemthing specific".

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Copper and tin are mixed at 1200 °C; the resulting bronze is then poured into the cast. One week later, three new bells will have been born ; further increasing the scope of European Cultural Heritage -and the need to preserve it.

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