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"I like to break things"

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By Jan-Henning Niediek

As Janine Schneider walks through the materials testing facility, her eyes light up; it is clear that she is comfortable between the long rows of test equipment. She knew she wanted to work here the moment she entered the premises of the DLR Institute of Materials Research in Cologne for the first time, during a trip there as a student. In our DLR Portraits series, we present the materials researcher.

It was not so long ago. Janine Schneider was 20 years old when she first visited the Institute. Today, just eight years later, she is head of mechanical materials testing at the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) in Cologne. In the testing facility at the Institute of Materials Research, technicians, scientists and engineers subject samples to loads to determine the physical properties of various materials. "We break samples and, with the scientists, analyse why and how they broke," is Schneider's somewhat casual explanation of her team's work. This enables the scientists to work out how the material behaves in tests that simulate operating conditions (testing of actual large structures under real working conditions is carried out by aircraft manufacturers, IMA Dresden or IABG).

Pressure and tension

Various test methods are employed; the materials researchers use pressure and tension in their laboratories to subject the samples to loads – up to 100 tons in two directions when using the largest machine, the biaxial test system. Other test benches enable the study of fatigue strength, which plays an important role in components subject to frequent and/or large amplitude vibrations, such as aircraft wings. Schneider and her team can also determine the way in which cracks propagate in materials. The scientists are able to observe the process from the formation of the first crack to final failure and, in so doing, discover important information that gives them a better understanding of a material. Without such experiments the use of new materials or some manufacturing methods in science and technology would not be possible.

High loads, like those present in aerospace and fundamental research experiments, require precise data concerning the behaviour of materials. The inability of the materials to withstand the loads in the long term could have adverse consequences for safety and might incur high costs for companies. Janine Schneider and her team know how important their work is. The testing itself is just a part of this work; the team plans the tests jointly with clients from DLR or industry, prepares the samples and the relevant laboratories, develops test procedures and prepares the data acquired for subsequent analysis. Given that the tests are highly complex and often differ from standard procedures, Janine Schneider and her colleagues give internal clients and external industry customers detailed advice and define the test processes and best methods with them. A large part of the administrative work is assigned to Schneider, such as planning the allocation of the facilities and generating documentation and reports for the clients.

Applied immediately for an internship

It is becoming more and more common for young people to take on leadership at DLR. But Janine Schneider's career is somewhat unusual – even though she has little interest in the attention that she has since received. When the former student met her predecessor during her visit eight years ago, she knew immediately that this was the job she wanted to do too. At the time she thought she might have a chance when she was 40 or 45 – and immediately applied for an internship at the Institute. Her dissertation was about tests with the large biaxial testing facility, the largest test bench for mechanical materials testing. When she completed her degree

in materials technology at Bonn-Rhine-Sieg University of Applied Sciences in Rheinbach in 2006, she was already more than familiar with the processes and machines. She started working at the DLR Institute straight away.

Janine Schneider was surprised when she was offered leadership of the group just two years later. She had to think hard about accepting the offer, she says. Because of her age (25), she had no leadership experience, and was unsure about how a female would be accepted as a leader in a male dominated field. "But I had a lot of support and was well prepared for the job," says the materials engineer. Today she is more than pleased to have taken on the challenge: "I am grateful to the Institute for this unique opportunity!"

"We are constantly learning from each other"

Because the engineer started out as a student trainee in the group she now heads, she has always got on with her colleagues very well – as is evident in private conversation. "We maintain a very friendly atmosphere here," says Schneider. When she has to assert her authority, she tries to find the best possible compromise for the project: "The phrase 'We have always done it this way' does not apply here at all," she explains, "not for me, or the others." Each member of her team has a specific task and specialises on one machine or test method. There are also some synergies: "We are constantly learning from each other, and if we notice that we can improve something, we are all the more pleased."

Schneider's duties have changed too. Previously, she frequently worked on the machines herself, but today she rarely does so – although, ideally, she would like to be involved in every test. "It's a pity, but leading the group also gives me great satisfaction." For this reason she has been happy to trade the test laboratory for her 'Post-It' strewn office, where the telephone rings incessantly. Nevertheless, when the machines are running and the noise level is high, Janine Schneider is truly in her element. The large biaxial testing facility has recently been fitted with new software and controls, so she is looking forward to the first experiments. Being there when the sample yields to the forces and breaks with a loud crack was and still is the most exciting moment for the young engineer.

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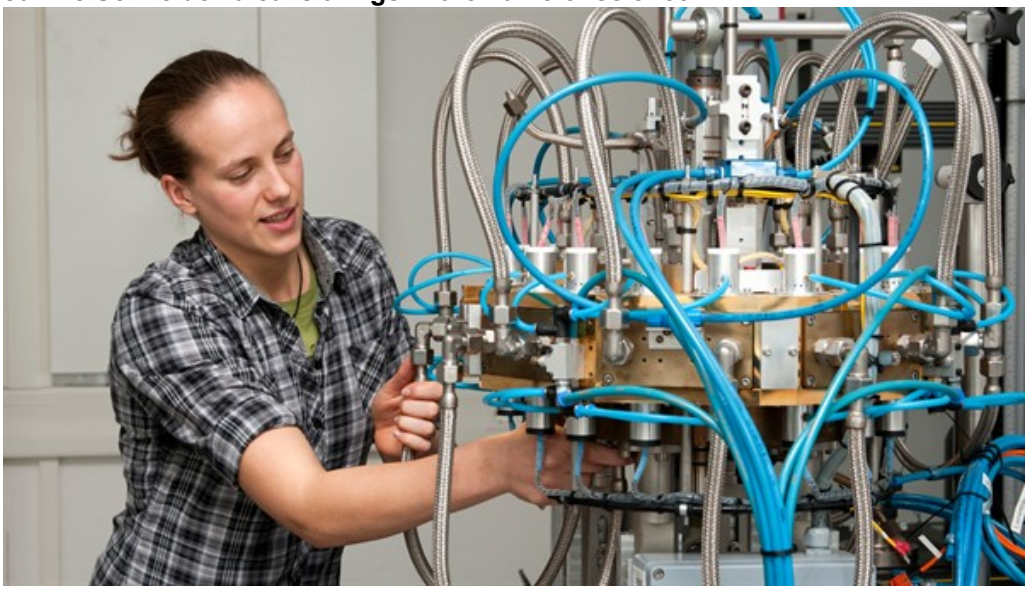
Janine Schneider breaks things in the name of science



"We break samples and, with the scientists, analyse why and how they broke," is Schneider's somewhat casual explanation of her team’s work. This enables the scientists to work out how

the material behaves under realistic test conditions. Here, Janine Schneider investigates materials for turbine blades using a radiative furnace.

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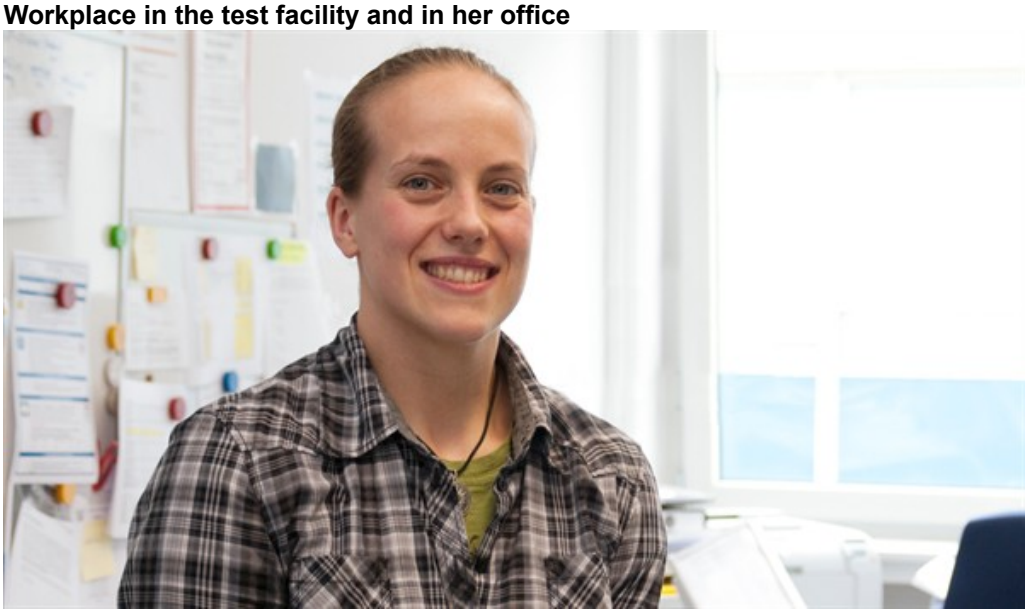
Workplace in the test facility and in her office



When the machines are running and the noise level is high, Janine Schneider is truly in her element. However, as group leader, she must coordinate her team's activities, usually from her office.

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Janine Schneider in the large biaxial testing facility

Janine Schneider with the largest test bench for mechanical materials testing, the large biaxial testing facility.

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