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## Wind energy: Preparing rotor blades for rain

Weather and manufacturing defects cause material erosion

Every day, the rotor blades on a wind turbine collide with raindrops, hail or grains of sand. Over time, these impacts leave traces on the blade and material erosion begins. The BINE-Projektinfo brochure "Rain can damage rotor blades" (14/2017) presents research results on this gradual material destruction. The underlying mechanisms of this type of erosion are being researched on a new test stand. The aim is to improve the protection and economic efficiency of rotor blades.

The research project focused on the design, structure and construction of the test stand. It is made of a steel-reinforced concrete shell and is 4.5 m high. On top, a rain generator produces water drops. Droplet size can vary between 1 and 5 mm, and the amount of water can vary between 6 and 24 l/min. Inside the system, a sample body rotates on a carrier device with a diameter of 2.8 m. The samples can be accelerated at variable speeds—with peak speeds of up to 600 km/h—in a circular path. The water is gathered after impact and material eroded from the samples is filtered out. Various microscopes and scanners are used to determine the exact damage patterns. The test stand is able to simulate characteristic weather and climate conditions for offshore, coastal and low mountain locations.

Rain erosion has many causes, such as rainfall, hail, UV light, the build-up of ice and temperature fluctuations; it is not a linear process. The Fraunhofer Institute for Wind Energy and Energy System Technology (IWES) in Bremerhaven is operating the test stand and conducting the research.

The BINE-Projektinfo brochure, which can be obtained free of charge from the BINE Information Service at FIZ Karlsruhe, is available online at [www.bine.info](http://www.bine.info) or by calling +49 (0)228 92379-0. The brochure cover and additional image material can also be downloaded from this web portal in the press section.

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