

# Misalignment Caused Massive N.D. Wind Turbine Failure

Dale Wetzel, Associated Press

BISMARCK, N.D. (AP) — Experts said a North Dakota wind turbine's rotor and blades crashed to the ground because they weren't properly aligned with a power shaft atop the turbine's steel tower, which caused the rotor's connecting bolts to fail.

The March 14 accident north of Rugby will prompt more frequent inspections of other turbines, said Scott Winneguth, director of wind plant engineering for Iberdrola Renewables Inc. of Portland, Ore.

Winneguth told North Dakota's Public Service Commission that investigators were unsure whether the problem resulted from the turbine's operation or reflected an assembly flaw.

He said the accident was "very out of the ordinary" and "a singular event" that did not indicate a broader problem.

"I can assure you, for the near term, that we will check for bolt integrity and misalignment on a much more frequent basis than our normal maintenance activities would entail," Winneguth told the three North Dakota commissioners, who are responsible for regulating large wind energy projects.

Normal maintenance procedures, Winneguth said, "are not designed to detect this sort of misalignment."

Commissioner Kevin Cramer said Monday the information would be useful in evaluating future requests for locating North Dakota wind farms.

"They seem to have figured out what created the failure on the one turbine," Cramer said. "I'm certainly encouraged they didn't have a bunch of other ones to report to us."

The turbine was one of 71 that make up an Iberdrola wind energy project in Pierce County, in north-central North Dakota, that is capable of generating 149 megawatts of power.

The turbine was first put into commercial service in December 2009, Mark Perryman, an Iberdrola managing director for field services, said in an interview with The Associated Press.

The turbine's rotor, which has three long blades, is attached to its main power shaft with 48 bolts. The connecting surfaces of the rotor hub and main shaft were not properly aligned, which eventually caused the bolts to fail, said Winneguth and

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Duncan Koerbel, an executive for the turbine's manufacturer, Suzlon Wind Energy Corp.

Winneguth said the 70 turbines in the Rugby project were subsequently inspected and each of their 3,360 bolts checked. Seven bolts on four of the turbines were replaced as a precaution.

Koerbel said the 70 turbines resumed operation within a week. The affected tower was dented by a falling blade, but it should not need to be replaced, he said.

No one was injured in the accident, which happened around noon on March 14, and Iberdrola officials said the company's emergency response plan worked well.

Koerbel told the AP that the exact cause of the misalignment wasn't known, but that North Dakota's harsh winter conditions did not cause the bolt stress. He said he was not sure how long it took for the problem to develop.

"We cannot pin it on one specific thing," he said.

Suzlon has about 7,600 wind turbines in operation worldwide, including about 1,800 of the S88 model involved in the Rugby accident. There are about 1,100 S88 models operating in the United States alone, Koerbel said.

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