

ROMER ABSOLUTE ARM LEICA ABSOLUTE TRACKER AT901

VESTAS NACELLES, LEM, DENMARK

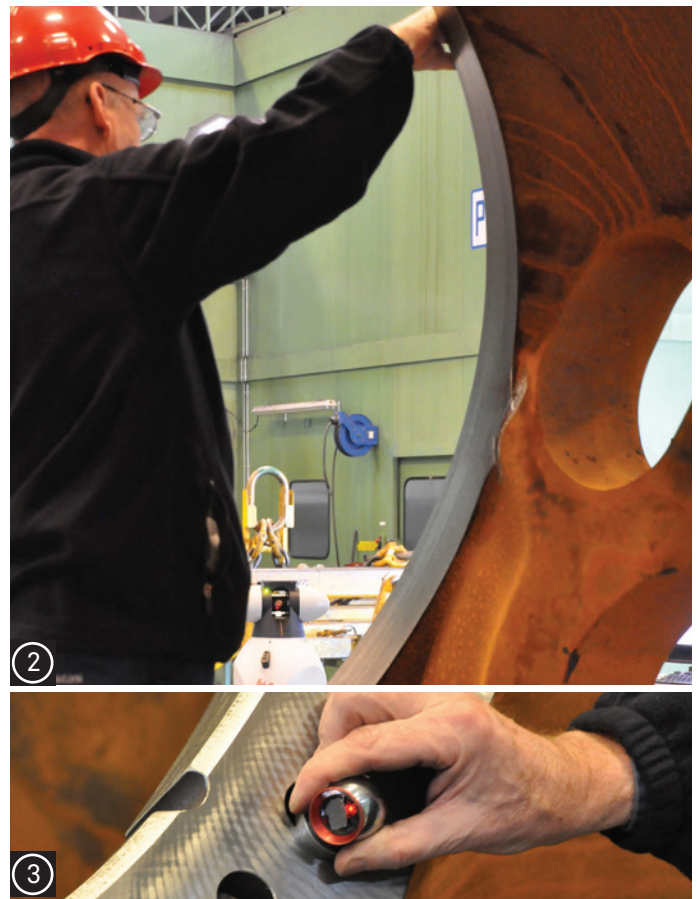


The wind of perfection

by Andreas Petrosino

How much electricity can a turbine construction of more than 100 m height above the floor generate? And how can one make sure the assembly of any wind turbine runs smoothly when there's only one chance? To make sure that the answer is not blowing in the wind, Vestas Nacelles in Lem/Denmark has a strict quality policy enabled by high-capacity portable measuring systems from Hexagon Metrology.

No small object has ever left the Vestas Nacelles factory. Hubs, housings or other steel made structure elements for wind turbine nacelles can be 3.5 m high, weighing up to 16 t. For such enormous parts, the quality policy at Vestas Nacelles relies on valid data which enables the monitoring of process performance. "That means we will be alerted if a process gets out of control by showing evidence of systematic variation", said Ingo Boysen, Production Quality Manager. "By reacting fast in these situations we have been able to extend our knowledge



① Measuring a hub is a one man job with the Leica Absolute Tracker AT901. ② Up to 200 measurement points are relevant on a wind turbine hub. ③ PowerLock automatically connects the laser beam to the reflector.

in terms of process and items. This has provided the possibility to reduce our process variation and thereby improve the process robustness while lowering cost of poor quality.” Every single part the factory produces is also measured. “We understand measurement not just as part inspection. For us, it is an integral part of the production. You could say that our production relies on measurement”, said Ingo Boysen. “Our developers define a certain number of points per object that are critical to quality, the so-called CTQs. So we measure the CTQs on each part, and a big number of additional characteristics such as the position of holes or other features on a hub. Subsequently we make sure all single components of the nacelle fit together before the wind turbine is assembled. It is very difficult to correct any mistakes once a part has left the factory, and in the case of a hub, scrap would cost us €20 000 per piece for just the material. Measurement pays off, but not only for us. We are using the measurement data actively to reduce cost to the benefit of our customers.”

Speeding measurement up

The quality team at Vestas Nacelles has a long experience in metrology. Besides a large stationary CMM, they had used two Leica LTD300 and LTD500 laser trackers for many years. “The time had come to look for new measurement systems”, said Jeppe Nielsen, Head of the Measuring Team. “The old laser trackers were still working perfectly, however we wanted to see if there was something faster. A new tool should help us with saving time and effort.” The result of the following benchmark

and testing phase led to the conclusion that laser trackers were still the ideal solution for Vestas Nacelles’ measurement challenges – thanks to their mobility, their measurement range and high accuracy under difficult shop floor conditions.

Leica Absolute Tracker causes a storm of enthusiasm

Jeppe Nielsen and his team chose the Leica Absolute Tracker AT901, a high-performance portable metrology tool from Hexagon Metrology. Two of these advanced laser trackers made measuring large parts considerably more efficient for Vestas. Jeppe Nielsen: “Besides gathering data in real-time, the PowerLock function impressed us. Because of PowerLock alone, we save two hours work time per object – in some cases, that means we cut the measurement time in half.” PowerLock is a laser beam technology that helps a laser tracker operator to automatically connect the laser beam emitted by the tracker with the reflector. “Before, every time the beam was interrupted, it was a long procedure to re-establish the connection – it could even mean we had to climb down the ladder from which we measure some points, get the beam recovered, and continue the measurement. With PowerLock and a remote control, we can now measure our parts with only one operator compared to before when it was a two-man task”, summarizes Jeppe Nielsen.

Tailwind for the measuring arm

The production of Vestas Nacelles in Lem also includes bearing housings, 100% of which undergo a measurement procedure.



④ For Vestas Nacelles, the measuring arm paid for itself in less than half a year. ⑤ Results in 10 minutes – the ROMER Absolute Arm measuring a bearing housing.

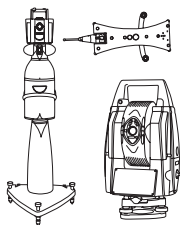
“We used to have them measured by an external supplier before, which meant transport and lead time. That was too expensive for us, so we looked for our own tool to carry out these measurements. It had to be an additional one, since our two laser trackers are already in constant use. We developed a business case and found out that the ROMER Absolute Arm from Hexagon Metrology would be the best tool for this application”, said Jeppe Nielsen. “Ordering the measurement, sending the part and getting it back eventually took us days before. Now we have the results in 10 minutes. The measuring arm paid for itself in less than half a year. In addition, wireless data transmission, the fact that no set-up time is necessary and the robust carbon fibre construction make it a very convenient and reliable measurement solution.”

Good climate thanks to local service

The five measurement specialists in Jeppe Nielsen’s team use the two Leica Absolute Trackers and the ROMER Absolute Arm every day. Without the metrology equipment, production stops at Vestas Nacelles – that makes reliable systems and efficient support essential. Ingo Boysen: “With the Hexagon Metrology systems, we’re thoroughly happy. The cooperation has been good from the beginning. We know that we can count on the arm and the trackers as well as on the local service in Denmark.”



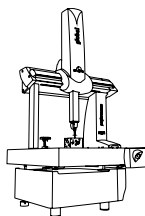
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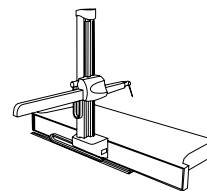
LASER TRACKERS
& STATIONS



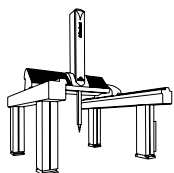
PORTABLE MEASURING ARMS



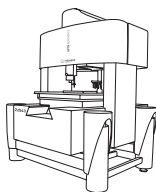
BRIDGE CMMs



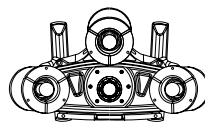
HORIZONTAL ARM CMMs



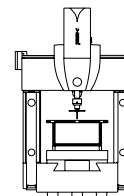
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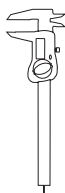
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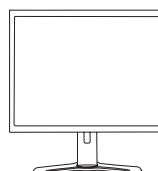
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