CNC Onsite machine starts milling Vestas tower flanges at Welcon, meeting tighter tolerance demands

Goliath machine surpasses 1 mm tolerance, 79% improvement; 7.5-m offshore flanges; Design flexibility, better quality control and maintenance cost savings

Goliath is CNC Onsite's machine that is mounted onto the flange for precision milling

VEJLE, DENMARK, May 22, 2025 /EINPresswire.com/ -- CNC Onsite, a Danish mobile machining expert, has delivered its custom-built ”Goliath” machine to tower manufacturer Welcon, where it is now milling 97 bottom tower flanges for Vestas’ 15 MW V236 turbines destined for projects in Germany and the Netherlands. Production began last month, April, and the first flanges have already exceeded flatness specifications, ensuring a perfect fit with the transition piece — enhancing reliability and design flexibility and significantly reducing costly post-production checks.

The milling process ensures that the tower and transition piece align perfectly, forming a flat, stable connection between the two flanges, a critical mechanical joint held together with bolts. By implementing CNC Onsite’s machining process, industry leading tolerances are achieved, which eliminates the need for heat straightening, a common post-production step to correct flatness issues, while also optimizing the maintenance of bolts during operation.

The precision machine,”'Goliath”, is a custom-built machine from CNC Onsite, specifically designed to ensure flat flanges for structural strength and fatigue resistance.

Bolted Connections with long-term benefits

“On the first flange, we have achieved a global flatness tolerance of 0.21 mm. The required 1 mm for this project is already well below the common industry standard of 2.5 mm, so we are of course very pleased with the machines’ performance.

”Ensuring a tolerance of 1 mm or better is a significant benefit when it comes to ensuring correct bolt tightening. With 160 bolts in a flange, reducing maintenance costs and downtime due to loose bolts, is a considerable cost saver," says Soren Kellenberger, sales director and partner at CNC Onsite.

Goliath mills the 7.5 m tower flanges under the supervision of technicians

Welcon will integrate the flange facing process as a standard manufacturing step, replacing the traditional heat straightening method, a controlled heating and cooling process used to correct flatness distortions after welding. By employing Goliath on these 97 bottom all flanges, the tower manufacturer can ensure a faster, more uniform method.

> If applied throughout the industry on all flanges, I believe this precision milling will offer many benefits. This includes eliminating the costly measurements at sea and prior to shipping”
>
> *Peter Sigfred Mortensen, Vestas*

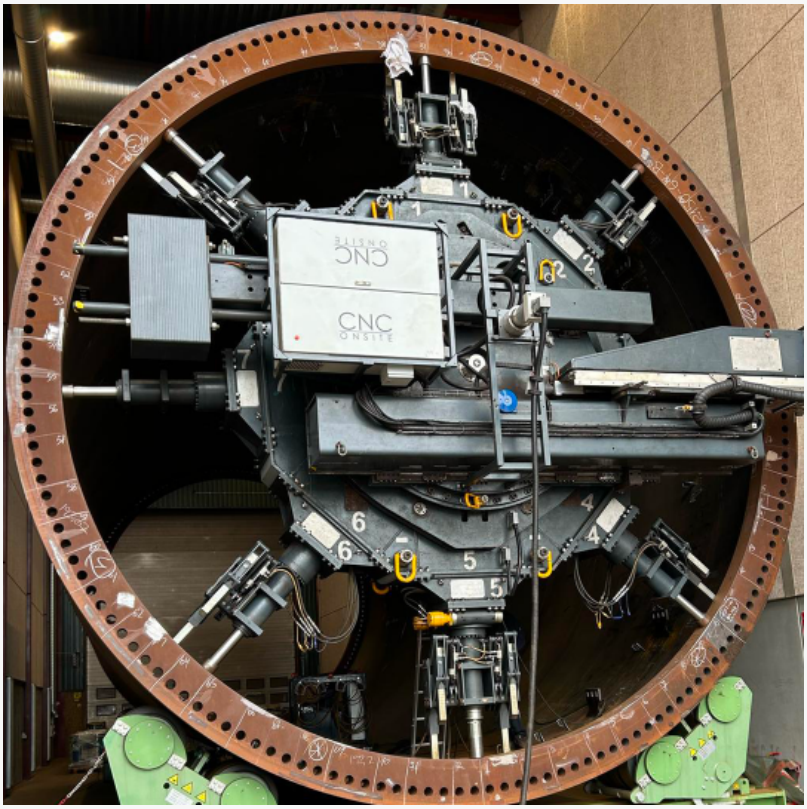
The consistent flatness across all flanges will provide Vestas, the customer of Welcon, with greater flexibility in flange designs and dimensions, as well as a broader choice of bolt sizes.

“The industry demand for fine tolerances is increasing. To meet flatness requirements, we need a machine-based process, as heat straightening cannot achieve the necessary precision.

“We also expect this to improve health and safety by eliminating manual work,” says Johnny Hauggaard Skov, Vice Director, Welcon.

“If applied throughout the industry on all flanges, from tower to transition piece, I believe this precision milling will offer a range of benefits. When all flanges are completely flat, it eliminates

the costly measurements we have seen both at sea and prior to shipping. It will also provide design freedom, including the option of smaller and even maintenance-free bolts," says Peter Sigfred Mortensen, senior specialist, Offshore Tower Structure, Towers R&D, Vestas.



The tower flange has been set up for milling

Meeting new challenges in large-diameter flanges

As wind turbine tower flanges grow in diameter— now reaching 7.5 meters for Vestas' new 15MW turbines, the demand for even finer tolerances increases.

"It is a challenge to achieve the required precision for 4-5-meter diameter flanges. But on today's seven-plus meter flanges the tolerances are even tighter. This combination of larger diameter and stricter tolerances makes it nearly impossible to meet standards with traditional methods," says Soren Kellenberger, sales director and partner at CNC Onsite.

Designed for efficient operation, the machine is mounted directly onto the flange. Using adjustable legs with hydraulic cylinders or optional electric actuators, the machine is securely positioned, allowing easy switching between different flange diameters.

Designed for Flexibility and Speed

Powerful electric motors enable fast, high-precision milling. The machine handles flanges from 6.5 to 10 meters in diameter in the standard configuration and can be adapted for larger sizes. Fully CNC-controlled, the machine can mill flat, tilted, and double-tilted flanges, as well as features like gasket grooves.

Goliath is the result of CNC Onsite's more than 12 years of expertise in machining flanges for the wind industry. Developed and built based on this extensive experience, the new machine sets new standards for precision and efficiency.

The machine for Welcon is the third custom-built Goliath machine, designed for large diameter flanges, since its launch in 2022. It can be leased or purchased and is currently in use by offshore customers in Denmark and Spain.

About CNC Onsite

Headquartered in Vejle in Denmark, CNC Onsite designs and delivers high precision mobile machining for wind turbines including offshore foundations. Machines built by CNC Onsite are designed to be flexible using its proprietary "building blocks" approach, which means machinery can be built to match a range of tasks. CNC Onsite serves the onshore and offshore wind energy sector delivering as standard solutions: machining of large diameter steel flanges and blade root ends; specialized repair services covering yaw ring, inserts in blade root, rotor lock, generator shaft, bearing housing and threaded holes. Removal and replacement of worn and broken bolts round off the offering.

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