

Fast repairs keep wind turbine blades turning

As more and more wind farm operators are released from contractual maintenance agreements, there is an increased awareness of the importance of responsive and proactive maintenance partners. After some installations have completed more than a decade of service, continued reliability and efficiency are dependent on fast and effective repairs.

Mark Westwood, Works Manager at Sulzer's Middlesbrough Service Center, looks at some common issues and how to improve wind turbine availability.



Wind turbine generators offer a renewable source of electricity that is increasingly being adopted around the world. Located both on and offshore, these turbines are designed to deliver years of productive service, provided regular maintenance is carried out.

The expense of constructing and installing turbine fields is recovered over a number of years, during which the original equipment manufacturers (OEMs) provide maintenance services as part of the contract with the operator. During the lifetime of the turbines, reliability is key and any issues need to be resolved as quickly as possible, so parts availability is essential for continued performance.

Maintaining availability

Yaw drives are used to rotate the nacelle, relative to the tower, so that the turbine blades work as efficiently as possible. These components are designed to work in pairs, so if one fails, the other takes on all the work of rotating the nacelle. This usually causes the other drive to fail fairly quickly after the first, leaving the wind turbine out of service.



Sulzer delivers maintenance services for almost all components in the nacelle

In these circumstances, the best approach is to have spare drives or gearboxes available in stock, allowing site engineers to replace the damaged parts quickly. However, if the operator does not have their own parts stock, new parts from the turbine OEM could mean a wait of around 16 weeks. Turbine operators are looking for the most cost-effective solution and once they are released from the maintenance contract, they are able to investigate alternative avenues.

The first thought might be to contact the manufacturer of the yaw drive, but often they would offer a new part instead of a repair. Alternatively, an independent maintenance provider that has access to the OEM parts can be engaged to repair the yaw drive and re-install it.

Cost-effective solutions

Some operators have opted to source spare parts from redundant and decommissioned turbines to populate their inventory. However, having been in service for some time, these will need to be professionally reconditioned before installation if they are to provide long-term reliability.

In fact, the installation process is very important for the yaw drives. It is essential to set up these components correctly where the pinion gear engages with the ring gear on the tower. The fixing points of the drives are arranged so that the backlash of the gears can be adjusted.

Following the correct installation procedure is essential for reliable operation of the yaw drives. Unless the backlash is set the same for each pair of yaw drives, they will travel a different linear distance and effectively be working against each other. This can induce premature failure due to the increased fatigue in the materials.

At the same time, yaw drive performance is also affected by wear in the yaw brakes; as the seals start to leak, the brake effectiveness is reduced, and this puts additional stress on the equipment. As the towers age, so the components wear and unless this is resolved quickly, wear in one part can lead to further damage in others.



Comprehensive service

Sulzer has been supporting renewable energy generation for decades and throughout this time, the in-house knowledge for repairing and modifying wind turbine components has been continuously expanded. In Middlesbrough, Sulzer has the expertise and the capabilities to deliver repairs to almost all the components inside the nacelle, including generators, motors, gearboxes and controls. With engineers trained by a Global Wind Organization (GWO) accredited company, maintenance services can be delivered to both onshore and offshore installations and, where possible, repairing components on-site.

Working with original parts, Sulzer can provide complete strip down, inspection, repair and testing of all equipment. For the yaw drives, parts can be turned around in under 24 hours with a unique service exchange program that ensures customers always have components available when they are needed.

All refurbished parts are tested and supplied with a 12-month warranty. For the yaw drives, individual items, including re-engineered main shafts, are stocked and used to rebuild failed assemblies with a 25% saving over the cost of a new part. For the brakes and calipers, the seals and pistons can be replaced and re-certified in just a week, with the work carried out either on site or in the service center.

Today, operators and asset management companies are looking for high-quality repairs and preventative maintenance to promote reliability and efficiency. This can be achieved by engaging with an experienced maintenance provider that has the facilities and expertise to deliver services wherever they may be required.

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