SVENDBORG BRAKES™
A REGAL REXNORD BRAND

Streamlining maintenance, maximising reliability and reducing the environmental impact of onshore wind turbines with aftermarket solutions

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As with any rapidly adopted technology, wind power presents distinct challenges for which solutions need to be developed to short time frames. Innovative wind turbine experts, Svendborg Brakes, offers aftermarket solutions that can overcome problematic maintenance procedures, reduce local environmental impact and maximise reliability for onshore wind turbines. These advantages help the fulfil energy potential of onshore wind power, while further improving sustainability.

Svendborg Brakes offers three decades of experience in wind turbine braking systems. In fact, Svendborg Brakes installed braking systems at the pioneering Danish Vindeby Offshore Wind Farm in 1991. The business offers solutions to meet the needs of the entire wind turbine lifecycle - with an emphasis on aftermarket support.
Onshore wind turbines present multiple challenges with regards to maintenance: tall, large and often installed in remote locations. Maintenance and repair services for power transmission assemblies located in the nacelle are notoriously difficult to schedule and costly to achieve. For turbine operators, it is imperative to have access to a specialist who can provide turnkey solutions quickly and with minimal disturbance to energy production. Furthermore, operators and service providers must be sympathetic to local residents and the surrounding eco-system.

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Overcoming problematic maintenance procedures

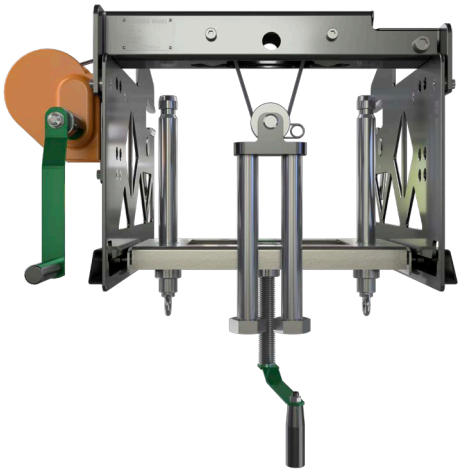
As the modern development and adoption of onshore wind power has increased exponentially, the tools required to carry out turbine maintenance have struggled to keep pace. Every operator wants maintenance to be completed quickly and safely. However, maintenance teams are required to work at height repairing or replacing heavy equipment, which is risky, difficult work.

The Yaw Brake Lifting and Installation Tool

For example, a small yaw brake calliper can weigh up to 60 kg, whereas a large yaw brake can reach 200 kg. With some turbines featuring up to twenty yaw brakes to control their position, this places great strain on maintenance personnel, especially given the scale of modern wind farms. Many turbines do not have

in-built elevators either, so maintenance personnel may have to climb a 100 m high ladder before repairs can even commence.

To improve the speed and ease of yaw brake replacement, Svendborg Brakes offers its Yaw Brake Lifting and Installation Tool. This patented solution enables the easy interchange of yaw brakes in-situ. Brakes can be attached to the tool and lowered down to the floor for maintenance work, then reassembled units raised and installed quickly. This condenses several repair steps, while also eliminating the need for heavy lifting by personnel. Personnel work conditions and speed are consequently improved. The tool is available in various configurations to suit multiple turbines. Weighing in at around 40 kg, it can be easily transported too.



The Yaw Brake Lifting and Installation Tool is patented solution that enables the easy interchange of yaw brakes in-situ.

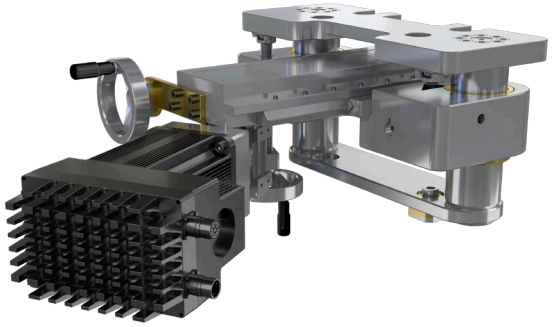
Resurfacing brake discs

Yaw brake discs are large in size and weight. In the past, servicing them required the complete disassembly of the large turbine nacelle. Discs naturally suffer wear as the turbine turns to face the wind and small imperfections can grow to compromise the smoothness of the disc surface. Braking performance then deteriorates until failure occurs. Replacing the disc can be a time-consuming procedure involving cranes, which increases costs, downtime and reduces energy output. Resurfacing the disc uptower is another option, but that requires specialist equipment.

The portable Disc Resurfacing Tool enables uptower operation to be carried out on site with increased speed while not compromising the refurbishment. Featuring a milling machine that quickly replanes the disc, the tool can operate inside the turbine nacelle, thanks to a compact and lightweight design. Simply mounted onto a yaw brake mounting position, the tool eliminates the need for nacelle disassembly. This eases maintenance work, while maximising energy output via reduced downtime and minimising cost.

Reducing local impact

One of the barriers to the widespread adoption of onshore wind turbines has been local resistance to installations. While an exceptionally green technology, wind turbines do have an environmental impact. Problem areas include noise and dust from turbine yaw brakes. Two aftermarket solutions from Svendborg Brakes tackle these issues head on.



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Before

After

Removing glazing

Noise created by onshore wind turbine brakes can disturb both local residents and wildlife. Often this noise is a result of the glazing phenomenon. Like the brakes on a car, when there is no wind and low usage, yaw brake discs begin to collect dirt, rust and moisture as temperatures fluctuate. When the wind returns and braking begins again, this detritus is collected by the brake pad. Under braking force, it is pressed tightly into the pad, creating glazing. Eventually, the friction coefficient of the brake pad itself is compromised, while the disc becomes contaminated and slippery. Braking performance is greatly reduced and potentially produces excessive noise in operation.

Once accrued, this glazing is difficult to remove. In the past, removal would require complete brake disassembly, with the manual cleaning of each pad carried out by an angle grinder. This highly inefficient method also carries the penalty of producing even more noise. The other option is pad replacement, but with the disc already contaminated, this is only an expensive interim solution.

Svendborg Brakes has solved this problem with its Groove Tool, which reduces yaw brake noise. This device cuts grooves in the yaw brake disc, which acts like a razor as the turbine moves to meet the wind, cutting detritus from the brake pad. A brush located between brakes removes debris from the grooves, allowing the disc to clean itself, helping to safeguard braking performance.

This permanent solution is adapted to meet the specific needs of any given turbine. Taking into account wind direction, turbine diameter and disc material; Altra Renewables feeds data into computer programmes to ascertain the optimal number of grooves, groove position, shape and angle. This ensures that the technology is equally effective for preventing glazing on coastal turbines with two wind directions or turbines in the mountains where wind can come from any direction.

Cleaning up yaw brake dust

Reducing harmful dust produced by braking systems has been a focus of the automotive industry for many years. Until now, the onshore wind sector has been slow to catch up. Brake dust can contain potentially harmful substances that present a contamination risk to the local environment. The dust also presents a risk to maintenance personnel who come into close contact with it. At large installations with multiple turbines, choosing an environmentally friendly brake pad material can deliver a large improvement with regards to protecting the local environment and on-site personnel.

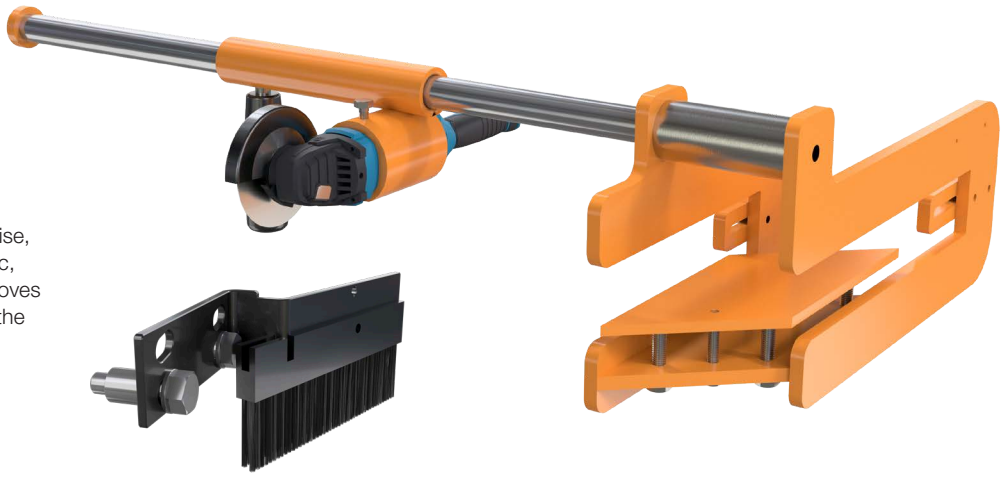
Specially developed in-house by Svendborg Brakes to solve this problem, Green Alternative yaw brake friction material meets restriction of use of hazardous substances (REACH) standards adhered to by the automotive industry. The material is asbestos free, while containing less than 0.1% mercury, less than 0.1% chromium 6+, less than 0.1% lead and less than 0.01% cadmium. Furthermore, it is corrosion resistant and produces inherently less dust than traditional friction materials. This ensures that environmental impact and risks to maintenance personnel from yaw brake dust are greatly reduced.

Maximising reliability

Onshore wind turbines can only provide return on investment (ROI) if they operate reliably. Therefore, a capable and responsive global aftermarket service partner is imperative for maximising electrical output and safeguarding profitability of installations.

The benefits of OEM equipment

Svendborg Brakes develops its products in close partnership with onshore wind turbine OEMs, shaping its components and assemblies to suit designs from the initial prototype phase. All braking systems undergo a rigorous testing regime in cold, hot and humid weather conditions to guarantee performance.

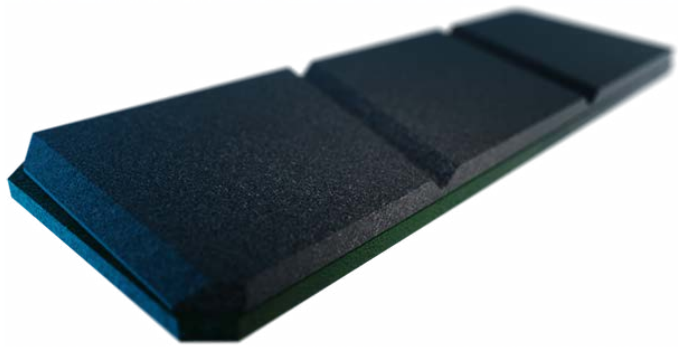


The Groove Tool reduces yaw brake noise, by cutting grooves in the yaw brake disc, which acts like a razor as the turbine moves to meet the wind, cutting detritus from the brake pad.

While this helps to promote turbine reliability in the first instance, it also guarantees that replacement components and assemblies will be of OEM quality, adhering to brake specifications, thus delivering the utmost reliability in application. Altra Renewables offers this aftermarket support for brakes, pads, pistons and seal kits among others. A truly turnkey approach, enabled by involvement in all aspects of the turbine lifecycle, allows Altra Renewables to provide exceptional product performance and quality assurance. The end result is extended service intervals, allowing for onshore turbines to spend longer producing valuable energy.

Responding quickly

As early installations grow older and the installed wind turbine fleet increases, responsive maintenance support is incredibly important for reducing unforeseen downtime. Altra Renewables offers its customers a 24/7, 365 days-a-year global maintenance support via a dedicated service app. Maintenance engineers around the world can message or call experts at any time to get access to key technical information and guidance for critical repairs. This allows Svendborg Brakes to react quickly, leveraging innovative aftermarket service tools and solutions to solve issues fast. Many solutions and services are compatible with competitor products too, ensuring that servicing, retrofitting and replacement is straightforward.



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Industrial Internet of Things (IIoT)
Svendborg Brakes has a platform available to monitor uptime, with full 24/7 IIoT solutions being offered in cooperation with customers. This is to optimise preventive maintenance work and suggest service visits, allowing maintenance personnel to make fast decisions before unforeseen breakdowns.

Smart technology service tools such as the Universal Control Case enable remote monitoring of product performance and provide important insights to maintenance assessment. Collected data is easily accessed via computer, allowing in-depth diagnosis of brake behaviour. This promotes turbine uptime by helping to prevent brake system failures.

Solving onshore wind turbine challenges
Svendborg Brakes has wind engrained in its DNA, with a proven track record in the wind sector from its very beginning. Experience working closely with OEMs to develop highly reliable products, innovative aftermarket service solutions designed to tackle specific challenges and global responsiveness allows operators to unlock energy output and sustainability advantages.

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