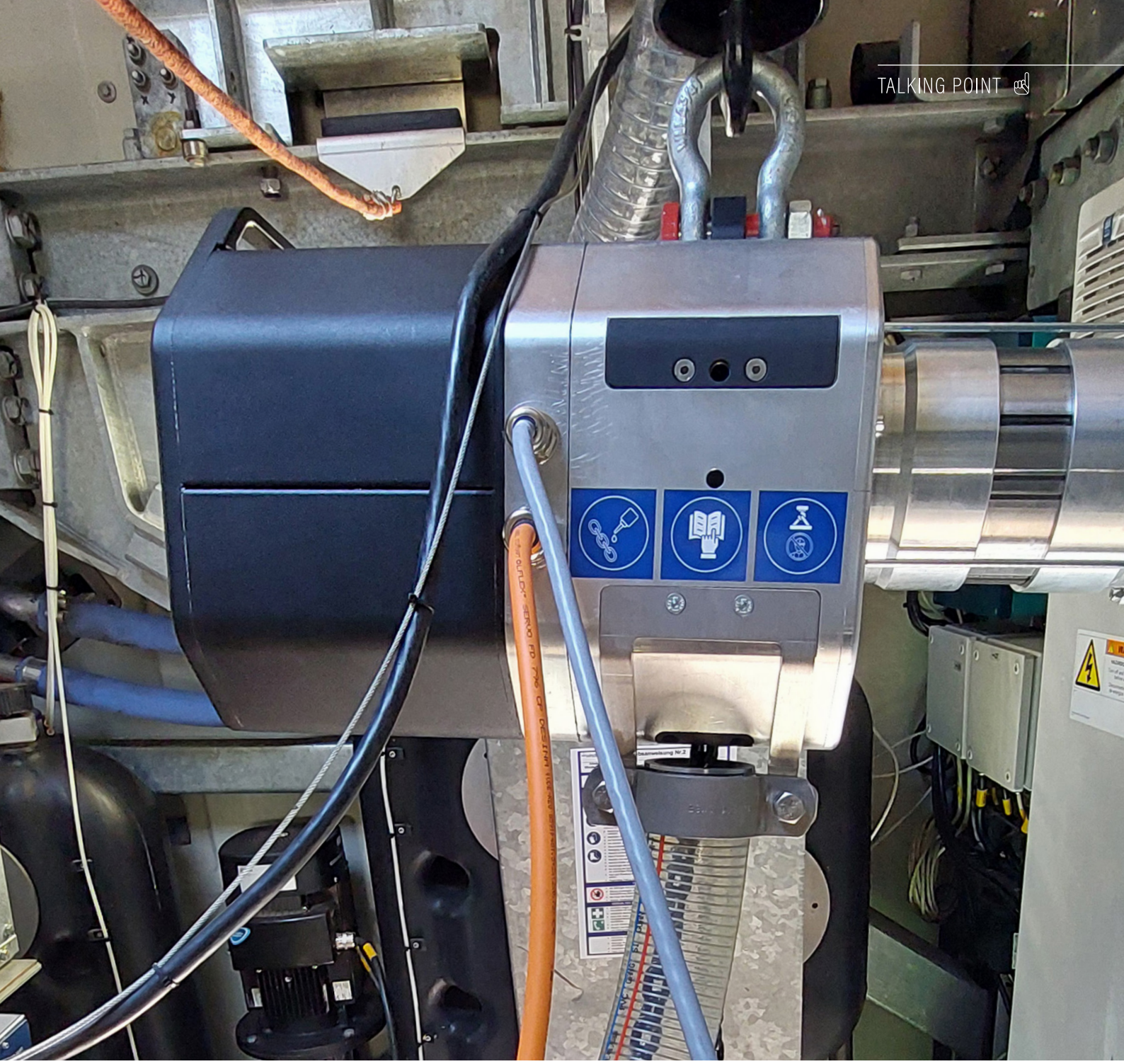

The race to the nacelle

As hub heights climb and maintenance demands intensify, new high-speed hoisting technology aims to cut servicing time, improve safety and reduce costly turbine downtime.

As wind turbines continue to scale up in both size and capacity, the practicalities of maintaining them are becoming more complex. Taller towers, heavier components and more demanding service schedules are placing increasing pressure on operators to minimise downtime while maintaining high safety standards.

Within this context, lifting equipment, often an overlooked part of turbine infrastructure, is coming under renewed scrutiny.

RUD's neXera electric hoist is positioned as a response to these changing requirements. Developed by the German manufacturer known for its chain and drive technologies, the system focuses on reducing lifting times during maintenance operations, while also addressing safety and serviceability.

Designed for loads of up to 800 kg, the hoist operates at variable lifting speeds between 24 m/min at full load and up to 80 m/min under no-load conditions. The hoist control system

automatically adjusts the lifting speed based on the measured hook load within this operating range.

According to RUD, this provides a significant performance improvement compared with conventional hoists, with lifting and lowering operations potentially completed in approximately one quarter of the time required during a typical service cycle.

At the centre of this performance is the company's patented X-Drive chain system, which is intended to enable higher speeds without compromising durability.

'RUD neXera is completely new and unique. There has never been such a fast and safe hoist for wind turbines on the market before,' says Matthias Müller, Technical Manager in Drive Development at RUD Drives.

'We developed our innovation specifically for lifting applications with lifting heights of up to 200 metres. These hub heights are now a reality in the wind power industry, whereas conventional hoists are typically designed for lifting heights of around 160 metres. With RUD neXera, we are closing this gap.'

This is broadly representative of the current market for conventional hoists, where typical systems offer maximum lifting speeds of approximately 20 m/min and lifting heights of up to 200 metres.

Adapting to a new generation of turbines

The upward trend in hub heights is particularly evident in onshore wind, where developers are seeking stronger and more consistent wind resources at higher altitudes. Offshore turbines, meanwhile, continue to grow in scale as projects move further from shore and into deeper waters. In both cases, the logistical demands of maintenance are increasing.

Traditional hoisting systems, often designed for earlier turbine generations, can struggle to keep pace with these changes. Longer lifting distances mean extended waiting times for technicians, especially when multiple lifts are required during a single service visit. Over time, these delays accumulate, affecting both operational efficiency and costs.

RUD's approach reflects an attempt to align hoisting technology with current turbine specifications. The system is designed to be compatible with a wide range of turbine types, whether deployed onshore or offshore, and to operate effectively at lifting heights of up to 200 metres.

Tests with the system were conducted on two different 3 MW class wind turbines, each maintained by a separate service provider. These trials demonstrate the system's applicability across different turbine platforms and service environments.

The X-Drive chain mechanism plays a central role here. By enabling chain speeds of up to 80 m/min, it reduces the time required to move equipment between the base and the nacelle. At the same time, the system is engineered to limit wear on the chain, an important consideration given the frequency of lifting operations in routine maintenance.

The chain pocket wheel, another feature of the design, is intended to prevent issues such as chain slack or mechanical failure during operation. While such problems are relatively rare, their consequences in a turbine environment can be significant, making reliability a key concern.

The impact of faster lifting cycles

In day-to-day turbine servicing, a considerable portion of time is spent transporting tools, spare parts and consumables. These items must often be moved multiple times over the course of a maintenance task, and not every lift carries a load.

'When performing maintenance work on wind turbines, every second lift can be an empty lift,' explains Annekatrin Strunz, Sales Area Manager Windpower at RUD. 'So it is a real advantage to be able to travel at high speeds and get from top to bottom as quickly as possible, and vice versa.'

The implications of faster lifting extend beyond simple time savings. Shorter lift cycles can reduce technician idle time, enabling more efficient work within limited weather windows, particularly offshore. In addition, faster turnaround may help reduce the overall duration of turbine shutdowns, which directly impacts energy production.

RUD estimates that its neXera 800 model can transport an 800 kg payload to a height of 200 metres in approximately eight minutes. When operating without a load, the system can reach its maximum speed of 80 m/min, further reducing cycle times.

Müller suggests that the difference becomes particularly apparent over the course of a full maintenance operation. 'With conventional hoists, lifting the necessary tools and auxiliary materials for maintenance work on wind turbines takes an average of two hours,' he says. 'RUD neXera, on the other hand, takes around half an hour, which is only a quarter of the time. And that ultimately saves money.'

While actual savings will vary depending on turbine type, location and maintenance scope, the broader principle is clear: reducing non-productive time during servicing can have a measurable effect on operational costs.

Safety considerations in turbine maintenance

Working within a wind turbine presents a unique set of safety challenges. Confined spaces, vertical access and the need to handle heavy equipment all contribute to a demanding environment for service personnel. As a result, improvements in lifting

Input		Lifting cycles
Lift height in metres	200 m	
Turbine feed-in	6000 kWh	
Feed-in tariff	0,06 €/kWh	
Services per year	1	
Faults per year	5	
Costs AZ hours (2 persons)	180,000 €	
Savings on breakdowns and servicing up to 250 kg (per year)		5x250kg
Time saving	3,50 h	10x250kg
Savings through reduction of turbine downtime in €	1.260,00 €	
Total cost savings	1.890,00 €	
Savings on breakdowns and servicing up to 800 kg (per year)		1x800kg
Time saving	3,25 h	1x500kg
Savings through reduction of turbine downtime in €	1.170,00 €	3x250kg
Total cost savings	1.755,00 €	10x250kg

Annekatrin Strunz

equipment are often evaluated as much on safety as on performance.

The hoist incorporates several features aimed at enhancing operational safety. One of these is an integrated incremental encoder, which allows operators to define precise upper and lower hook positions. By continuously monitoring the rotation of the drive shaft, the system maintains accurate positioning and repeatability during lifting operations.

Unlike some traditional control mechanisms, the encoder is designed to be resistant to tampering and mechanical damage. This reduces the risk of incorrect positioning, which can lead to accidents or equipment damage.

'These are all developments designed to reduce the risk of accidents during wind turbine maintenance,' Müller notes.

Another option is the use of a load eye in place of a standard hook. This configuration, combined with appropriate shackles, is intended to secure loads more firmly during lifting.

'With the load eye and matching shackles, the load is held securely in place,' says Strunz. 'This is a real safety advantage for the operating and service personnel on the ground.'

While such features may appear incremental, they reflect a broader industry focus on minimising risk in increasingly complex maintenance scenarios.

Serviceability and system design

In addition to performance and safety, the ease with which equipment can be maintained is an important factor for operators. Downtime related to the hoist itself can quickly offset any gains achieved through faster lifting.

RUD has addressed this through a modular system design, allowing individual components to be accessed and replaced without extensive disassembly. This approach is intended to simplify servicing and reduce repair times.

Electrical components, including the control system, are housed in a separate unit that can be positioned away from the main hoist. This not only improves accessibility for technicians but also protects sensitive elements from vibration during operation. Both the control system and the pendant control can be replaced independently, providing additional flexibility.

The system also incorporates digital data recording, capturing operational parameters such as load cycles and usage patterns. This information is stored within the frequency converter and, according to RUD, cannot be altered.

Such data is relevant for compliance with standards, including DIN EN 14492-2, which specifies inspection and servicing intervals for hoisting equipment based on usage. Accurate, tamper-proof records can support both regulatory compliance and long-term asset management.

Matthias Müller

'Thanks to precise documentation and tamper-proof operating data acquisition, plant operators and service technicians are on the safe side,' Müller says. 'This enables significantly longer use of the hoist.'

A growing need for efficient maintenance tools

The importance of efficient maintenance solutions is underscored by the continued expansion of the wind sector. Germany alone had more than 30,000 wind turbines installed by the beginning of 2025, with further additions throughout the year. Similar growth trends are evident across Europe and in other key markets.

As fleets expand and turbines age, the volume of maintenance work is set to increase. At the same time, operators are under pressure to maximise availability and reduce costs in an increasingly competitive energy market.

Within this environment, incremental improvements in maintenance processes can have a cumulative impact. Faster hoisting may not transform operations on its own, but as part of a broader strategy, it can contribute to more efficient and predictable servicing.

'There is a high demand for efficient, safe and fast lifting equipment for wind turbines,' Müller concludes. 'This is where RUD neXera comes in, taking wind turbine maintenance to a new level.'

Whether such systems become standard across the industry will depend on how operators balance upfront investment against long-term gains. What is clear, however, is that as turbines continue to grow, the tools used to service them will need to evolve in parallel.

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About the company

RUD Ketten Rieger & Dietz GmbH u. Co. KG, founded in 1875 by Carl Rieger and Friedrich Dietz in Aalen, Swabia, has over 1,700 employees in more than 120 countries and generates annual sales of over 200 million euros.

At locations in Germany, Australia, Brazil, China, India, Romania and the USA, among others, the family-owned company produces slinging and lashing technology, anti-slip chains, hoist chains, conveyor and drive technology and equipment for tool handling.

Under the Erlau brand, the long-established German company also manufactures tyre protection chains and interior and exterior furnishings.

Developed for high lifting speeds during wind turbine maintenance Photo: RUD