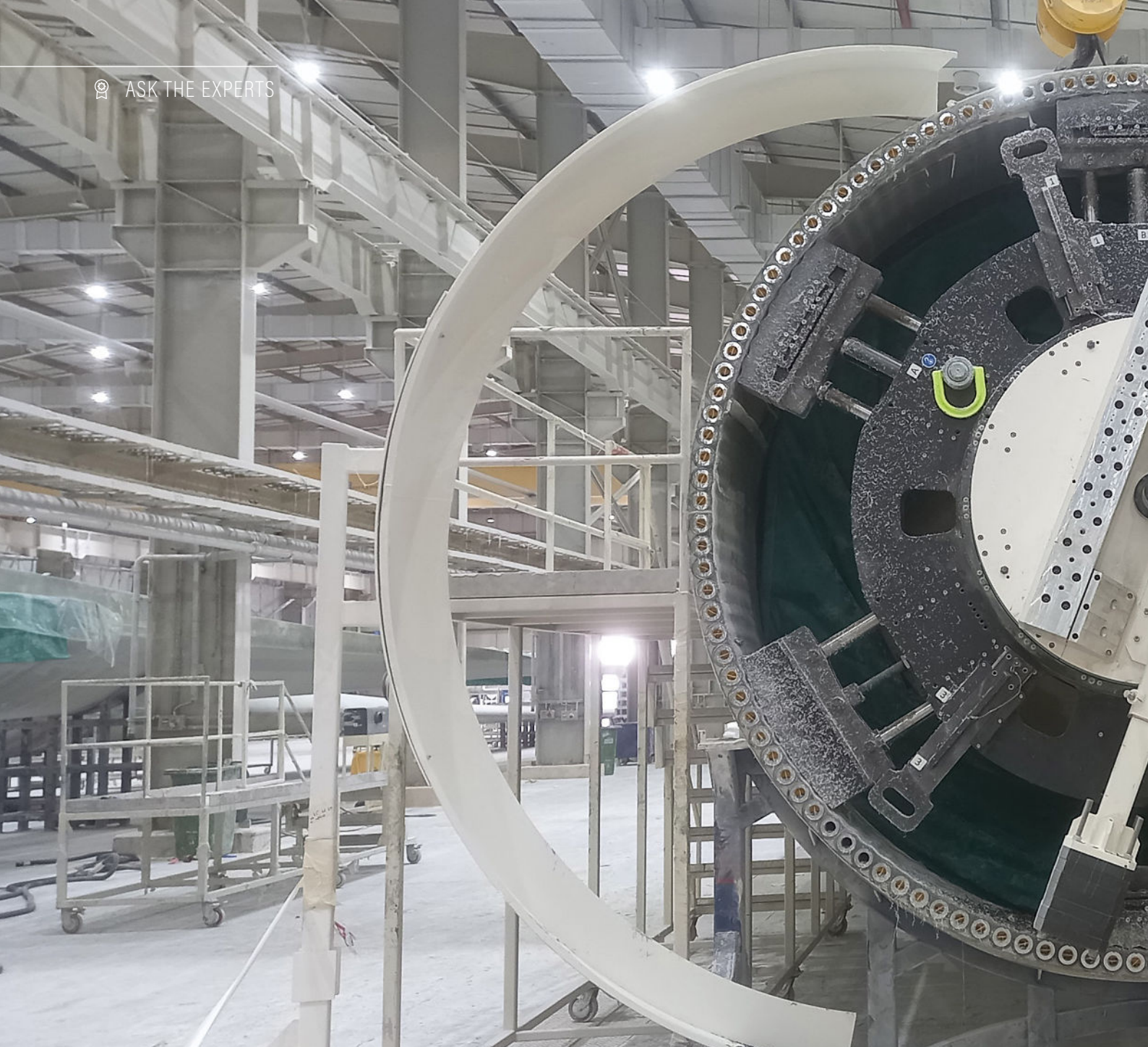




Far from run of the mill tools and solutions

From manufacturer, to installation and maintenance, having the right tools for the job at any point in the process is crucial for effective turbine and blade management. As the machinery gets bigger and the demands on the sector grow, the tool makers themselves are faced with new challenges. PES heard from Erik Roos, Director of Wind Industry Tools & Solutions at Enerpac, about how it is addressing these demands.



PES: We're pleased to welcome you back to PES Wind Erik. Enerpac has decades of experience working with wind manufacturers, with proven success. Can you tell us a little bit about these past successes to begin with?

Erik Roos: Enerpac has been a leading player in the wind industry for decades, providing innovative solutions for complex and challenging heavy lifting jobs. Our expertise is proven across all major Original Equipment Manufacturers (OEMs) in the industry, and we are committed to delivering sustainable products for wind turbine manufacturing, installations, and maintenance.

Our latest innovations include wind turbine machining tools and compatible trolleys, which enable us to bring the tool to the product, reducing the need for complex transportation and minimizing the environmental impact.

We are continuously striving to develop new technologies and solutions to meet the

evolving needs of the wind industry and are committed to helping our customers achieve their goals in a safe, efficient, and sustainable way.

PES: The wind industry brings with it many challenges of course, not least bigger blades. How are you helping to address these?

ER: The wind industry is continuously evolving, and with larger and more complex turbine components being developed, the need for specialized tools and equipment is increasing.

At Enerpac, we understand the challenges that come with handling, transporting, and installing these larger and heavier components. That's why we offer a comprehensive range of tools and solutions for all jobs between manufacturing and maintenance.

Our products are designed to provide safe, efficient, and sustainable solutions that meet



Erik Roos

the unique needs of the wind industry. Whether it's milling machines for blade root ends and tower flanges, or portable trolleys for precise positioning, we have the right tools to get the job done.

PES: How can milling machines help improve turbine blade performance?

ER: The performance and efficiency of wind turbines are heavily dependent on the accuracy and precision of their components. The blade root ends and tower flanges are particularly critical in this regard, as even minor imperfections can lead to unwanted vibrations and side loads, which can significantly impact the integrity of the turbine.

Enerpac's milling machines are specifically designed to meet these high requirements by providing fast material removal and high accuracy across large flange diameters. This allows for the precise machining of blade root ends and tower flanges, ensuring that they are smooth, even, and capable of delivering optimal milling results while minimizing manufacturing inefficiencies.

PES: Can you tell us more about your wind power milling machines for blades?



ER: Our latest innovations include blade milling machines and compatible trolleys that allow for safe and efficient movement of heavy equipment to the milling job. With these tools, the milling machines can be easily transported to the blades, eliminating the need for risky and time-consuming manual handling.

Our portable milling solution provides the ideal combination of mobility and stability for precision machining of blade root ends, tower flanges, and transition pieces. The compatible trolleys have been engineered to offer convenient and controlled movement of the milling machines, ensuring that they can be easily maneuvered into position for optimal results.

By leveraging the latest advancements in technology, Enerpac is proud to offer state-of-the-art solutions that help our customers achieve their goals safely and efficiently. We remain committed to pushing the boundaries of what is possible in the field of heavy lifting and industrial tooling, and our milling machines and compatible trolleys are just a few examples of how we are doing so.

PES: Enerpac's milling machines cover more than just the blades though, correct?

ER: That's correct. Our milling machines are not limited to just milling blades, but are designed to cover a wide range of offshore wind energy components, including transition pieces, monopiles, and towers.

We understand that each component has unique specifications and requirements, which is why we offer a range of milling

machines that can accommodate flange diameters from 2,500mm to 11,000mm. This enables us to provide efficient and precise machining solutions for the entire offshore wind turbine assembly.

Our machines are designed to deliver fast material removal, whilst maintaining high accuracy. Thus, ensuring that each component meets the required surface finish specifications to eliminate unwanted vibrations and side loads.

PES: Can you tell us more about your milling machinery for towers and transition pieces?

ER: Accuracy is of utmost importance when dealing with large and heavy steel constructions, especially in the renewable energy sector where wind turbine components are getting larger and heavier.

In addition to this, the product being machined is not always readily accessible, requiring the need for specialized portable milling machines that can be easily transported to the application.

To address this particular issue, we offer a broad selection of orbital milling machines that can mill the product with one movement, reducing downtime and increasing productivity, making them an ideal solution for the offshore wind energy industry.

PES: Can you give us one or two examples of this machinery in use within the wind sector?

ER: At Enerpac, we value the confidentiality of our customers and their projects. Therefore, we cannot disclose the names of the companies we have supplied with our large millers. However, we can say that we have provided our products to almost all major OEM companies in the industry.

Our vast customer base and long-standing reputation are a testament to our quality products and services. We take pride in our ability to meet the unique needs and demands of each of our customers, regardless of their size or complexity.

One of our most notable achievements involved a machine for machining the root end of the world's longest blade. This project highlights our ability to innovate and develop solutions for even the most challenging and unique applications. Our team of experts worked closely with the client to design and deliver a machine that met their specific needs while adhering to our strict quality standards.

PES: You also offer bespoke trolley solutions, don't you?

ER: Yes, that is correct. Since the products cannot be easily moved, we have to bring the

milling machines to them, despite the machines themselves being big and heavy.

To facilitate transportation and positioning of the machines near the blades, we equip our trolleys with advanced technology that allows for precise placement. When the machines are not in use, the trolleys can be used as safe and space-saving parking frames.

PES: What would you say are the main benefits of these?

ER: Accurate positioning towards the product is indeed essential, but so is doing it in a safe and efficient manner.

In the past, heavy lifting equipment such as overhead cranes, or forklift trucks were commonly used, but they came with inherent risks and inefficiencies. At Enerpac, we understand the importance of safety and productivity, and that's why we offer innovative solutions such as our compatible trolleys with our milling machines.

Our compatible trolleys mean easy and controlled movement of our milling machines, ensuring precise positioning without compromising safety. With our portable solution, we can bring the tool to the product, eliminating the need to move heavy and bulky components. This not only reduces the risk of accidents but also results in time and cost savings for our customers.

PES: As the wind sector matures how do you think the expertise of manufacturers such as yourselves will increase to meet changing needs?

ER: We endeavor to be a true partner by engaging in discussions about current and upcoming challenges facing the wind industry at an early stage.

We serve the industry with a dedicated organization that includes engineers and sales experts to provide superior products and solutions. We fully embrace the future of wind.

PES: In terms of milling machines, what do you think is next? What new technology can we expect to see?

ER: At Enerpac, we understand that the wind energy industry is constantly evolving, with newer and more advanced turbines being developed every year. That's why we are always looking ahead to the future and thinking about how we can continue to provide innovative solutions for the industry.

With the next generation of wind turbines projected to be even larger and more complex, we are already exploring the development of portable milling machines with diameters beyond 12,500MM. These machines will be designed to offer high accuracy and precision, while also having a low carbon footprint.

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