



Lift off for efficient, cost-effective turbine assembly



How do you make sure that safety, effectiveness, price-performance ratio and service are all in good shape in wind turbine installation? Manfred Eberhard, CEO of Germany based ematec AG, enlightens PES on how a new generation of rotor blade lifters may be about to revolutionise single blade assembly from the ground up.

PES: It's great to have you with us Manfred and to learn more about where ematec sits within the wind industry. Could you start with a brief overview of what you do?

Manfred Eberhard: It's great to be here. ematec AG is a leading supplier of rotor blade lifters for single blade assembly of wind turbines. Using innovative solutions, we have revolutionized the assembly process of wind turbines in recent years.

Our current RBC and RBC-D generation lifters offer a unique concept; thanks to the automatic adaptive blade interface, the ematec yokes can handle all blade shapes on the market, regardless of the manufacturer and blade dimensions. The blades can be tilted up to ± 30 degrees and pitched up to a maximum of ± 8 degrees.

PES: You have repeatedly caused a stir with your lifters in recent years. What is the secret behind your success?

ME: Our goal is to be recognized as an innovator for single-blade assembly of rotor blades. We want to be the best in all areas; in work safety, effectiveness, price-performance ratio and, of course, in service and after-sales service. We are really proud of our success so far and it is not in vain that we recently invested over 1.6 million euros in the development of the new RBC-D Greenline.

PES: You mention the price: Your yokes are sometimes twice as expensive as solutions from other suppliers, is that right?

ME: That's true, but we are still more economical in the end. You just have to consider the complete life cycle. Our yokes, such as the current RBC-D Greenline, are not just designed for one or two generations of rotor blades, but for a lifespan of more than 20 years or even beyond.

The adaptive blade support allows customers to use the yokes on several generations of wind turbines in a row. With other manufacturers, the yokes are always limited to a specific blade and they therefore have a very short life cycle.

The installation companies always have to adjust to new equipment and train their personnel. These recurring preparation and training costs must be included in the overall

calculation. With us, this is only a one-off cost and you can continue to work with your usual equipment in the long term. This not only increases quality on the construction site, but also efficiency. The fact that our concept works can be seen with our customers: Siemens Gamesa or Nordex, who have 17 ematec lifters and now Enercon is joining them too.

PES: Enercon has ordered six RBC-D Greenline systems. Is this a record order for you?

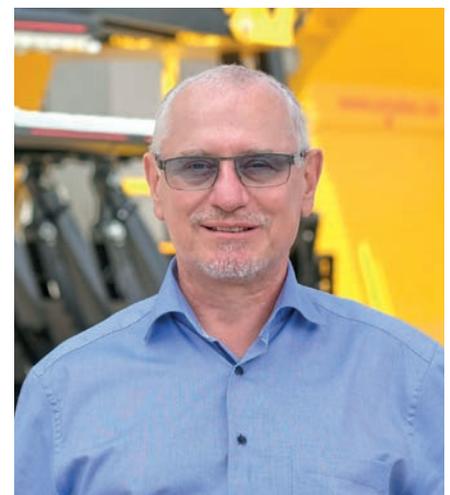
ME: Indeed, this is the largest single order in our company's history and a definite vote of confidence.

PES: What benefits did Enercon see in choosing your yokes?

ME: We benefit from the fact that we manufacture almost all components in our own production facility in Memmingen; the vertical range of manufacture is extremely high. Even the hydraulic cylinders for the gimbal-mounted grip pads are developed by us and produced entirely in-house.

All hydraulic cylinders are equipped with integrated safety valves that make it impossible for the rotor blade to slip out, even if it is operated incorrectly. You can see from this.

On the one hand, we pay attention to all details to optimize work and process safety.



Manfred Eberhard



The rotor blade lifter RBC from ematec which is able to take on and handle all blade shapes available on the market. Picture: ematec

And on the other hand, we have full control over our own production process and are not dependent on the quality and delivery capability of others. Enercon is convinced of our overall package, and we are very grateful for that.

PES: What makes the RBC generation so unique?

ME: We have succeeded in combining a whole range of important features in one yoke. The highlight, of course, is that the yoke can accommodate all blade shapes on the market, including future ones, without any conversion work. This is made possible by an automatic adaptive blade support system that allows the yoke to adapt automatically and precisely to any rotor blade shape and we have applied for a patent for this technology.

The current yokes can support and handle blade weights of up to 42 tons. The double variant RBC-D can handle blade weights of up to 35 tons.

In addition, the RBC series impresses with a tilt angle of ± 30 degrees. All in all, the new traverse system can be used universally in the wind power industry, both onshore and offshore. With a headroom of around 3.5 meters, the RBC series makes crane

management significantly easier. This is a major advantage, especially in view of the steadily increasing hub heights of wind turbines. We all know about the price jumps when you have to change to another crane class for installation.

PES: What does the D stand for in RBC-D?

HG: It stands for Double, which means that in addition to the lower telescopic part of the gripper, the upper telescopic part is also equipped with 14 hydraulically moved and gimbal-mounted grip pads. These adapt to the shape of the blade like fingers on a hand. Therefore it doesn't grip in the classic sense. It provides a rather gentle, but nevertheless secure enclosure of the rotor blade. Thanks to a very homogeneous load distribution with a contact area of around 10 m², nothing can happen to the blade.

This wide contact area makes it possible to tilt the rotor blade ± 30 degrees without an additional safety rope.

PES: How do you ensure that the RBC yoke always remains in the center of gravity?

ME: This is ensured by two counterweights on two wings, which automatically adjust to the center of gravity, with and without the rotor blade. This means that even when the grab is opened after mounting on the hub,

there are no uncontrolled movements that could damage the blade or jeopardize the handling process.

Due to the round arc on the crosshead, the RBC and RBC-D always remain perfectly in the center of gravity, even when tilting up to ± 30 degrees. The same applies when pitching the wing up to a maximum of ± 8 degrees. This eliminates any uncontrolled movement of the unit when tilting or pitching.

PES: Speed is always at the essence. How long does it take to set up the lifters ready for use?

ME: The lifters of the RBC series are true turbos in the setup and are ready for use faster than any other lifters. Once they arrive at the construction site, they automatically move into the deployment position.

Picking up the rotor blade is also done automatically, by selecting the blade type on the display. For these two steps, the RBC lifters need just 15 to 20 minutes and then they are ready to go. This is an absolute record in make-ready time.

This enormous time and thus cost saving on the construction site alone means that our RBC yokes pay for themselves in some cases within just one year.



Perfectly balanced: By using two counterweights on the wings of the lifter, the RBC always finds the right center of gravity. Picture: ematec

PES: What about transportation, are there advantages here too?

ME: Our RBC and RBC-D are unbeatable in terms of transport dimensions. Measuring around 13.5 m x 3 m x 2.95 m and with a deadweight of approximately 25 tons, the yokes can be driven in Germany, for example, with a permanent permit.

That means there is no need for expensive special permits and long preliminary times

for logistics planning.

The RBC lifters can be on site within one day. This flexibility was very important to us, which is why we have also equipped the current generation with the Greenline battery drive. This is designed with multiple redundancies and thus offers maximum reliability, something that was very appealing to Enercon.

PES: How long do the batteries last?

ME: The RBC batteries are designed for a working time of 16 hours at temperatures as low as -20 degrees Celsius. This means that three rotor blades can be assembled in one day, even in cold temperatures. With a charging time of approximately 2.5 hours, even an empty battery is quickly ready for use again.

Another advantage is that thanks to our Green Line technology, wind turbine manufacturers bypass the stricter Euro 5 and USA EPA Tier 4 final emissions regulations that have applied to combustion engines since January 1 2019.

We also deliberately kept the electric motor below 24 volts, which makes it easy to use in the US. and meets Underwriters Laboratories requirements.

PES: Is the current RBC-D generation the definitive standard for you?

ME: No, we are always developing and trying to get a bit better. We are currently already working on the RBC-D 50, a variant that can carry rotor blades weighing up to 50 tons. In doing so, we are using the experience from the current generation and all the previous lifters we have developed.

I don't want to go into too much detail, but I can already reveal this much; the new RBC-D 50 will weigh just 27 tons, but will be able to lift 50 tons. We have once again fine-tuned the entire design to be able to achieve this quantum leap.

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Compact dimensions for the easiest possible transport: The RBC lifters can be transported with a permanent permission according to the German road traffic act § 70 StVZO. Picture: ematec