

Interview with Redak

Proper blade maintenance for better turbine performance

Blades have been the so-called ‘underdog’ in wind energy for a long time. Its use was practical but not seen by definition as a vital element. Only later did the industry become aware of its importance in the energy production of a wind turbine. Dutch blade inspection and repair specialist Redak has witnessed this process from the start.

Kader Benali is the owner of Redak, based in Noord-Scharwoude. His professional experience in wind energy dates back almost 30 years. After graduating from high school he worked on several jobs before joining Nedwind, a Dutch manufacturer of wind turbines. “At that time I didn’t know that much about wind turbines and actually thought they were built from wood, but as I have a passion for technique I decided to give it a try.” This decision would dictate his future career path.

Nedwind was at that time one of the main wind turbine manufacturers in the world with an international customer base. At some point the company was split. Nedwind continued with the mechanical activities while the rotor blade manufacturing activities were placed under a new entity, Rotorline. This enabled Rotorline to also sell blades to other turbine manufacturers. Benali joined Rotorline. It didn’t take long before the management of Rotorline noticed his quality and asked him to specialise in maintenance and repair of blades. For Rotorline he worked in the Netherlands, the USA and Germany.

When Rotorline was sold in 1999 to LM Windpower, Benali joined this company. He worked for LM for two years before deciding to found his own company, Redak, in 2000, offering blade service and inspections.

International reach

Even though a small company at first, he continued to work on international projects. In fact, his first assignment was in Curacao. Having Vestas as a regular client certainly helped but he was also asked by other companies to perform blade inspection work on projects all over the world. Countries where Redak worked include South Africa, Australia, Jamaica, Thailand, Curacao, Chile, Uruguay and Costa Rica. Benali: “Half of the time during my career I spent abroad.”

In the Netherlands he is involved in both onshore and offshore wind. Offshore, his company has performed inspection and repair activities on the Noordzeewind project, also known as Egmond aan Zee. Onshore, he is working for Vattenfall at their Haringvliet wind farm where 6 Nordex 117 turbines are currently being installed. Last year he signed a contract with Vattenfall for maintenance work on 36 wind turbines at the Prinses Alexia wind farm. His company is also performing inspections in the Deil wind farm which is currently being built in the province of Gelderland.

Underestimated

Regular wind turbine blade inspections are nowadays part of the operation and maintenance budget for a wind farm. This was not always the case, explains Benali. For a long time, blades were not seen as important. The focus was more on the mechanical part of



Blade damage

Benali performing blade repair

‘When the leading edge starts to wear it affects the aerodynamics, resulting in a decrease in performance’

► Blade inspector requirements

- Full GWO
- VCA
- Blade B Repair and Inspection Course
- English in spoken and written
- Medical G41 test (for offshore)
- VOP
- Irata

the turbine. The industry was not aware yet that the quality of the blades also has an influence on the production efficiency of the wind turbine. He elaborates: “When the leading edge starts to wear it affects the aerodynamics, resulting in a decrease in performance.”

Therefore in the early days, his job consisted mainly in repairing damaged blades and in the inspection of blades before transportation and before being installed on site. Blades often get damaged during transport. Not so much in the Netherlands, he stresses. Here the transportation companies are more experienced and transportation is bound to certain rules and regulations. In countries that are new to wind energy this can be different. He provides the example of South Africa where the government dictates that local input is used. “Transportation companies were not used to moving blades and often a lamp post or traffic light was hit when making a turn”, he says. It is therefore important to check the blades during transportation, for example when arriving in port.

Blades, and the leading edge in particular, are prone to several elements that can cause wear and tear like salt, lightning and the wind itself, he continues, “In several cases I was called out for an inspection overseas to find out that the blades were damaged beyond repair. This could have been prevented with regular maintenance.” He takes pride in his first project in Palm Springs, USA. Here he performed planned maintenance on twenty turbines over a period of 26 years. “In general, blade manufacturers provide a 20-year warranty but they can last longer when taken care for properly. In Palm Springs the turbines are now being replaced by more modern turbines, however, the blades were still in good shape”, he says.

It was only later on that the industry started to realise how the blade quality affects the turbine performance and regular maintenance was introduced. Benali: “Insurance companies also started to require maintenance to take place, in general once every two years.”

Inspection & Repair

“On land, first we make a preliminary observation of the state of the blades from the ground, using a camera or sometimes drones. Nowadays the cameras are of enough quality to do so. Based on the results we decide whether repair is needed”, Benali explains. Repair work can be performed in 99% of the cases with the blade still connected. This is done by using rope access, a sky climber or boom truck. “It is only occasionally that a blade is damaged to such an extent that we need the blade to be dismantled and lifted down to perform the repair work on the ground. In those cases the damage is most of the time to the interior laminating. “To repair this we would need to do new laminating. The epoxy that is used needs to dry. This is done by means of a type of heat blanket which exposes the epoxy laminate to a temperature of 60 degrees Celsius during two hours”, he elaborates.

There are some limitations to doing repair work on site. When using epoxy it is important that the air humidity is below a certain level, less than 70 to 80%, says Benali. Ideally the temperature



Roos and Cerri Ann of Redak during offshore inspections

should be above 15 degrees Celsius. New, modern blades now also require a vacuum system when performing repair work, he adds.

Offshore is a different story, both the inspection and repair are being performed using rope access. There are exceptions he says. “Once I was asked to perform repair work offshore on a blade that was hit by lightning. In this case the damage was too big to repair using rope access. We had to rent a platform which could be installed on the transition piece and lifted up by cables.”

When asked whether he thinks drones will fully take over inspections of blades offshore in the future he is doubtful. “Drones, currently being used, can only picture the external surface, they cannot provide a view on the internal layering of the blade so you won’t be able to see when delamination is taking place. The internal layering are the carriers of the blade. Do you really want to risk making decisions based purely on the results from drone images?”, he wonders.

Manpower

Since the start of the company in 2000 his company witnessed a strong growth. He started to scale up a few years ago when he realised he was growing too quickly to manage every single detail himself. “I realised I had to transfer my knowledge and let others do some management tasks. I also started to use a software system for reporting and digitalising.”

Currently he has a fixed team of four people and around forty persons working for him on-call. He can look back on a very busy year in 2019, even to the point that he had to say no to a new project. This has mainly to do with limited manpower. “It is very hard to build an experienced, qualitative team”, he explains. “It really took me a lot of time and effort to get the team I have now. There are simply not enough experts in the Netherlands so I had to attract people from other countries like Latvia and the UK. With this team I know that I can deliver quality.”

His team also includes two women. Not enough to his liking. “These women are amazing, they are not afraid to go out there offshore and take on the activities that men have always done. In fact, they are actually more meticulous than men!”, he admits. One of his wishes is to get more Dutch professionals interested but the fact that youngsters seem to prefer digital work rather than using their hands worries him. ●