

## Technical inspections of wind turbine generators — a necessity, not an option!

**THREE PARAMETERS** fundamentally influence the annual energy production of a wind turbine: average annual wind conditions; technical characteristics (power performance); and turbine availability. While influencing wind speed currently lies beyond human abilities, the optimization of the technical performance of a wind farm can be a successful task.

The technical availability of a wind turbine is very much dependent on the quality of its operations management. If the components of a turbine are in good condition, fewer failures and thus fewer standstills are guaranteed. To ensure that components stay in good condition while keeping costs at a reasonable level along with low standstill durations, repairs and maintenance at proper intervals are required. This is most effectively achieved by a condition-based maintenance strategy. This strategy relies on condition monitoring (CM) techniques by utilizing CM-systems for vibration analysis, but also on periodic technical inspections of machine components and rotor blades as well as on gearbox video endoscopy. This optimizes the performance and lifetime of components while curtailing repair costs.

Germany. Early 2000's. A growing number of wind farm operators approach their respective insurance carriers with increasing frequency. The reason: failures. Some common, many catastrophic. As the number of insurance claims and the associated cost rise, the insurance carriers are beginning to seek ways to reduce the staggering payouts. One large carrier then takes the essential step and approaches a consultant to craft what is now known as the "Principles for Condition-Based Maintenance of Wind Turbines". On September 21, 2007, they are adopted by the Expert Consulting Committee of the German Wind Energy Association (BWE e.V.). Today, nearly no insurance company in Germany underwrite a policy for a wind turbine that has not been inspected according to these principles by an independent inspection body and thus comes with the associated documentation.

Today, operators in Germany are looking at technical inspections not a necessary evil, but instead as a means of guarding their assets. The longer that wind turbines operate, the more revenue for the operator, and turbines should be able to run for 20 years and longer. Through the inspection body, the operator gains the ability to gain independent insight into his assets. Hence, German operators see inspections quite positively, simply because they know all the details about their wind farm. Disadvantages of having technical inspections done

by an independent inspection body are truly negligible in the grand scheme of things. The two only things to consider are the additional cost to the operator/owner for inspections and down times during the inspection periods.

The advantages, however, clearly outweigh the disadvantages, especially over the long run:

1. Higher revenue due to higher technical availability of the assets
2. Repairs can be planned well in advance during times of low wind speeds and they do not occur randomly and, especially, unexpectedly
3. Improved asset condition awareness, leading to lower spare part inventory and lower costs
4. Assured safe operation of the assets by tracking that all required maintenance is done correctly and on time
5. Major maintenance can be scheduled early and during the low-wind season
6. Knowledge for operator/owner that their assets are technically sound and in compliance with all applicable federal and local safety requirements
7. Maintenance team performance evaluation tool, leading to improved team efficiency

Should operators hence adopt the principles outlined above? One could argue that something working for one does not necessarily work for another, but the general consensus at the AWEA Wind Project Operations, Maintenance & Reliability Seminar in La Jolla, CA, in January 2013 was clear. We cannot continue on the current path. So, as not to reinvent the wheel and to keep costs down, adopting the "Principles for Condition-Based Maintenance of Wind Turbines" seems more than the most effective way to do that. And, looking at the initial draft version of the "AWEA Operation and Maintenance Recommended Practices (O&M RPs)" developed by the AWEA Operation and Maintenance Working Group, this is exactly the path we will be taking in this country. Besides, who can argue that reliably operating wind farms are indispensable for the continued support for wind power? Continuously running WTs keep operating costs down, increase revenue and allow for affordable renewable energy to be provided to consumers.

The most important point to take away from this article is that periodic technical inspections by an independent inspection body represent the best way to guard assets, which directly translates into dollars and cents. ↵

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