

Verification testing for single blade installation

Wind turbine manufacturer Senvion relies on imc measurement solutions



Increasing efficiency by using single blade installation on wind turbines - © Photo: Senvion

Installing rotor blades efficiently, safely and quickly

With the increase of rotor blade lengths and the quest for efficient assembly processes, new techniques are required when it comes to wind turbine construction.

From full rotor star to single blade installation



Traditional rotor star installation (photo) is being increasingly replaced with the single blade technique – © Photo: Senvion

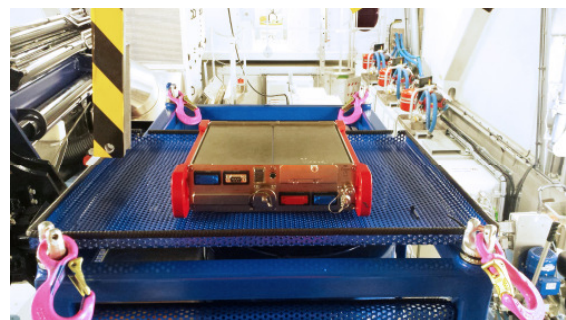
Compared to the traditional rotor star installation, the new single blade installation does not attach the rotor blades to the rotor hub on the ground and lift them up as a complete unit. Instead, each blade is installed individually onto the hub after it is already mounted to the standing structure. Advantages of using the single blade installation are, among others, reducing the overall area for storage, a much smaller space is required for installation and dispensing with the need for two large cranes (as are needed for the full rotor star installation method).

Only one smaller crane is necessary for single blade installation. With some wind turbines, even its own internal lifting device is sufficient. In addition, the single blade installation technique allows for wind speeds at up to 12 m/s, whereas during the rotor star installation, maximum wind speeds cannot be more

than 6 m/s. Therefore, single blade installation is ideal to reduce assembly times and lower costs.

Senvion choses imc measurement systems

Senvion, one of the leading wind turbine manufacturers, is characterized by their high quality and safety standards. For this reason, Senvion carries out verification measurements for each single blade installation at offshore turbines 6.2M152. In doing so, the braking forces acting on the gearbox are checked during rotor blade installation, as it must always be ensured that the limits specified by the manufacturer are not exceeded. To prevent the brake from overheating, Senvion carries out temperature measurements. The hydraulic pressures are also acquired through measurement systems. Furthermore, the gondola position as well as the wind speed and direction must be measured.



Robust imc CRONOS-SL measurement system in use. © Photo: RECASE

Requirements:

- Robust and weather-proof measurement systems suitable for harsh environmental conditions in on- and offshore applications

- High-precision amplifiers with integrated signal conditioning for all common sensors
- High sampling rates
- Wireless data transfer capabilities
- User-friendly measurement system for easy and safe operation by assembly personnel
- Creation of a customer-specific and dialog-controlled software user interface for semi-automatic measurement
- Accommodation of measurement equipment in two portable cases

Robust & proven: imc CRONOS-SL



Rugged and user-friendly: imc CRONOS-SL

Senvion has opted for the imc CRONOS-SL measurement system for performing verification tests for single blade installation because it ideally fulfills their requirements.

The compact, ultra-robust and mobile imc CRONOS-SL complies with the MIL STD810F and IP65 standards for shock resistance and operates in a wide temperature range of -40°C to +85°C. Signal conditioning, AD conversion, online processing and data storage are an integral part.

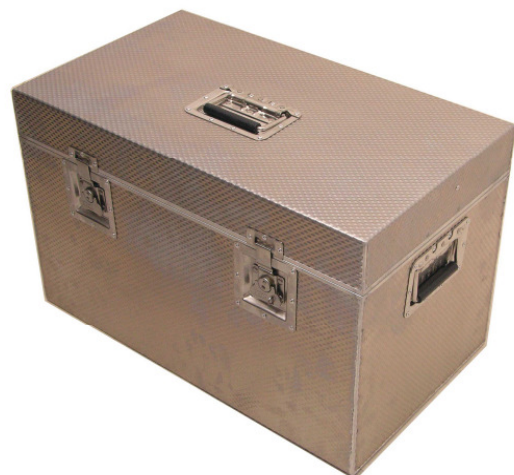
Connectors can be selected as a waterproof DSUB-15 version. Furthermore, LEMO and BNC plugs are available, as well as any other

waterproof plug. In addition to the self-sufficient, PC-free operation, including onboard memory, the user can connect the imc CRONOS-SL to a computer via an Ethernet TCP/IP interface (or optional WLAN). Establishing a measurement network with any additional synchronized imc measurement devices is also possible.



In operation: imc CRONOS-SL - © Photo: RECASE

Mobile & compact: the measurement case



The installation team always has the measurement equipment at hand.

The software solution: imc STUDIO

The imc CRONOS-SL is particularly productive thanks to the imc STUDIO software platform. Concrete measuring tasks do not have to be programmed, but are configured and automated through menus. This saves time and increases operational safety. At the end, the user has created operating panels configured from standard functions which are designed for the specific measurement and analysis task. Dialog-controlled, these panels guide the user through the entire measurement cycle.



The visualization of the measured data is also given special attention. All measurement data can be viewed and evaluated online and over multiple PCs.

With the imc curve window, a tool is available that provides user-defined 2D and 3D displays of the measurement data during the measurement. Real-time measurement cursors, markers and texts in the curve window allow direct checking of the measured data during recording. It is also possible to comment on events during a measurement by means of tagging functions as well as text and speech input. The interplay of software and hardware works flawlessly. The desired settings of the recording devices can be realized easily and comfortably via the user interface.

Conclusion

With accompanying verification measurements, a safe and efficient single blade installation of the SENVION turbine 6.2M152 is ensured. The robust and user-friendly measurement solution from imc delivers high-precision and fast results – even in harsh environmental conditions in the on- and offshore sectors.

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imc Test & Measurement GmbH is a manufacturer and solution provider of productive test and measurement systems. imc implements metrological solutions for research, development, service and production. imc has particular expertise in the design and production of turnkey electric motor test benches. Precisely outfitted sensor and telemetry systems complement our customer applications.

Our customers from the fields of automotive engineering, mechanical engineering, railway, aerospace and energy use imc measurement devices, software solutions and test stands to validate prototypes, optimize products, monitor processes and gain insights from measurement data. As a solution

provider, imc offers their customers an attractive and comprehensive range of services. These include project consulting, contracted measurements, data evaluation, specialist deployment, customer-specific software development and system integration. imc consistently pursues its claim of providing services for “productive testing”.

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