



Rotor Blade Inspection

The rotor blades are at the beginning of the energy conversion process of a wind energy converter, and they are a major guarantee for a dependently operating converter plant. The quality of their manufacturing is decisive not only for the stand-still time in their daily use, but also for their aerodynamic characteristics. Their form and profile exactness are shown in the so-called energy coefficient. This in turn directly influences the machine's yield and, in the end, the profitability of the entire investment.

Goal

In a rotor blade inspection the condition of the rotor blades is to be documented and present damages and defects are to be identified.

Depending on the task at hand a decision must be made whether:

- the rotor blades meet the specifications in the submitted documentation,
- any technical-safety considerations exist due to the rotor blades' condition or
- any other major defects exist, which would call for a rejection from the buyer/client or, as the case may be, a demanding of warranty claims.

Scope

The state of each rotor blade is minutely examined during the course of the inspection. The inspection of the rotor blade's interior is generally limited to the area, which is accessible without the aid of extra instruments. In certain cases the use of a special camera system allows the inspection of otherwise inaccessible areas. **SV-Veltrup** works with various techniques allowing access, and these have proven themselves over many years of experience. The choice of techniques is finally decided on, depending on the local and technical particularities of a project. In many cases the inspection is aided by a lifting platform or a rope-down platform. The use of a rope-down technique is economically advisable with machines of great hub height, in inaccessible terrain or with a single converter plant.

Among other aspects, the rotor blades are inspected for:

- cracking,
- hollowing,
- delamination (by tapping),
- lightning damage,
- permeability of drainage holes,
- functioning and condition of the tilt mechanism (stall-regulation system),
- performance of sealings,
- condition of stiles and
- conspicuous noises during operation.

The **aerodynamic characteristics** are tested:

- yield values,
- maximum production values,
- air flow elements (condition, intactness, positioning),
- aerofoil profile and
- pitch angles (and their synchronisation).



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Further special services:

- ascertainment of rotor blade mass distribution, with eventual calculation of balancing weights
- materials inspection using ultrasonics,
- inspection of lightning conductor path by various means of resistance measurements,
- verification of pitch angles with the aid of a special optical measurement method,
- complete examination of rotor blade interior by means of a special camera.

In addition to this, the testing of rotor blades are a major part in a periodic inspection. In the light of operational safety, the test for structural defects have the high-est priority. The participation of the client/operator/investor is possible.

The participation of a representative of the manufacturer (for example, a service technician) is also convenient.

Results

The client/operator/investor receives a full-length condition status report for each converter plant as an original document and as a PDF (portable document format) file. Here all identified defects are named, documented (for the most part with photographs) and numerically integrated in a graph.

In accordance with the respective task, the inspection report may be submitted to the manufacturer, the builder, the insurer, potential buyers or, in the case of a periodic inspection, the official agency.



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