Smart certification: a roadmap to reduce costs, risks and time to market for wind turbines and components

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Abstract

Wind turbine and component manufacturers are obliged to certify an increasingly overwhelming number of variants. The increase is due to larger sites, varying site conditions requiring adapted solutions, different combinations of components and wider supplier bases. Coupled with ever-stronger pressures to reduce the Levelized Cost of Energy and “time to market”, certification is often seen as a required but time-consuming impediment to putting turbines into operation.

Smart certification offers a new roadmap for the certification process, proposing both major and marginal changes. The approach simplifies the evaluation of close variants by integrating them into a single type or component certificate. A preliminary review of the core design principles and methodology vastly reduces time and costs at later phases, as well as the risk of discovering issues late in the project. Running the design and certification processes in parallel rather than sequentially slashes the time to market and helps steer the early design towards even higher standards.

Results

In a recent project involving the component certification of blades, we achieved an estimated 60% decrease in the number of comments and a 30% reduction in costs compared to similar projects.

The decrease in the number of comments – and corresponding time savings – can be largely attributed to the preliminary discussion and agreement of design principles. This gave our certification team crucial in-depth knowledge of the design approach used, and meant that comments relating to methodology were dealt with at the very beginning.

A major contributing factor to the cost efficiencies was our efficient certification of variants. A less quantifiable, but significant, result was improved risk management thanks to the early detection of an issue that would potentially not have been discovered until later.

Method

The aim is to issue a comprehensive certificate for each turbine or component, incorporating variants and third-party certificates from accredited bodies. When new variants are introduced, only changed elements need evaluation and the certificate is updated accordingly. Criteria for what constitutes a close variant or a change are mutually agreed according to IECRE guidelines.

In a new preliminary stage, the manufacturer’s fundamental design principles are reviewed and agreed by both parties. Evaluation references these principles, simplifying calculations and reducing later comments.

Design and certification processes run in parallel to reduce “time to certificate” and detect potential issues early. Inspections of production facilities and in the field are streamlined to avoid repetition of measurements and combine testing of new structures with monitoring of existing ones.

Conclusions

The wind energy industry can only stand up to market pressures by being as efficient and collaborative as possible. Smart certification includes several concrete measures that are simple to implement and have demonstrable benefits for efficiency and risk management.

Running the design and certification processes in parallel requires the certification team to be more flexible but decreases the risk of a fault being discovered late, with consequences for deadlines, costs and production. Early integration provides the design team with an extra source of support and expertise, plus a deeper understanding of the certification process.

Mutual recognition of third-party certificates is an industry-wide issue supported by a key principle of smart certification: avoid duplication of work that provides no long-term or safety benefits.

References

1. IEC 61409-22 “Wind turbines – Part 22: Conformity testing and certification”
2. IEC 61499-1 “Wind turbines – Part 1: Design requirements”

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