

## **Analysis of wind turbine data with a view towards load monitoring**

While more and more effort is put into the design of large wind turbines, lagging somewhat behind is data collection from turbines in the field, e.g. to check whether assumed design loads are correct and whether failures can be predicted. Which data are collected is historically determined: some problem occurred and caused damage, a sensor was then added to detect the cause of the problem in an early phase and thus prevent or limit damage. For example excessive vibration may be detected by an acceleration sensor and the turbine will be stopped after detection.

In general, once wind turbines are installed, several questions arise:

- Are the actual loads similar to the design loads?
- Is it possible to predict when a component is likely to fail?
- Which components should be monitored and how?
- What is the best inspection & maintenance program? For example, should service be provided at fixed intervals, or based on condition monitoring?
- What is a reasonable guarantee period?

The work aims to answer these questions. Hence the main objective is:

*How to use measured wind turbine data to estimate loads sustained in the field, and on the basis of these loads predict structural failures and optimise the inspection and maintenance regime.*