

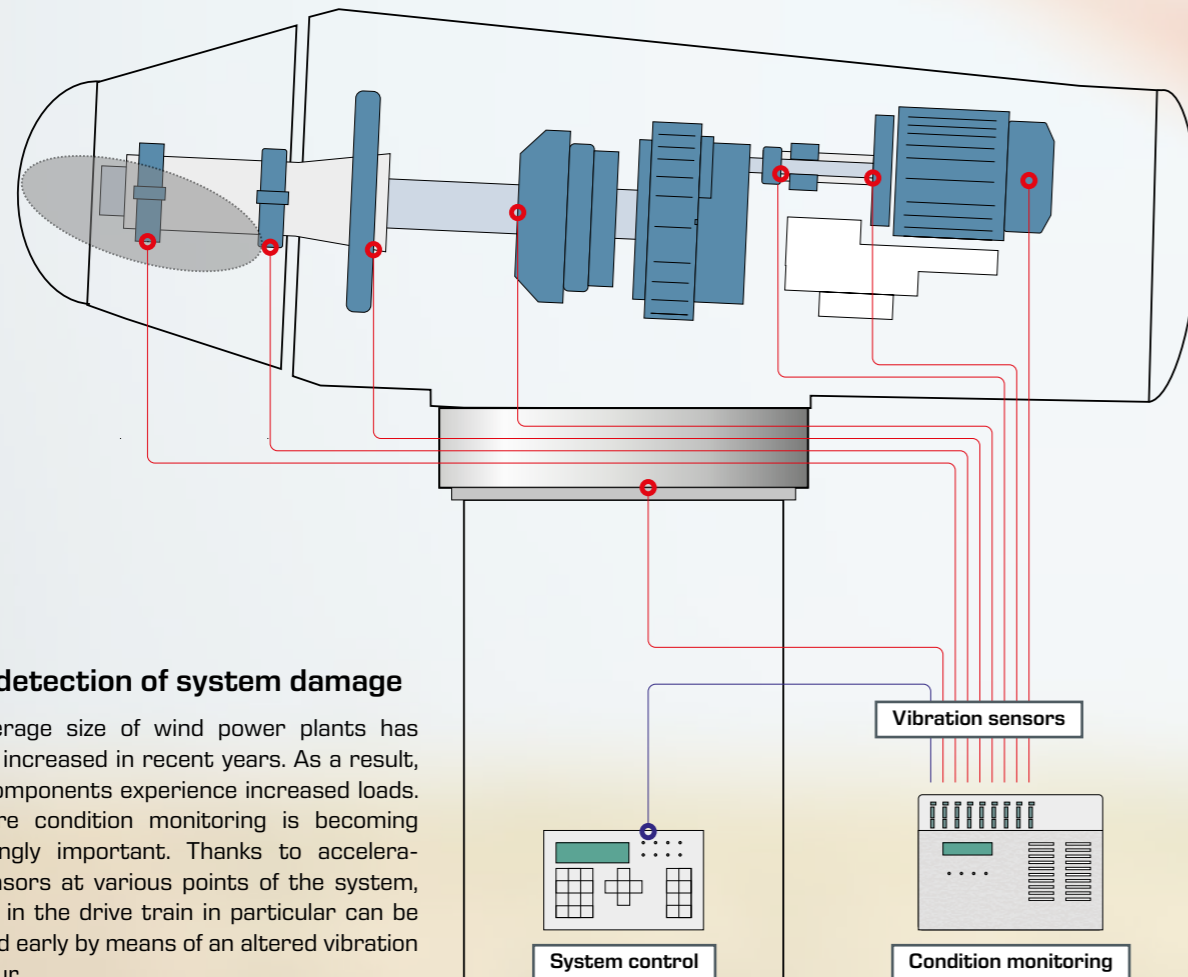


# Basic Knowledge Condition Monitoring in Wind Power Plants

In order to reduce technical and economic risks, systems for monitoring the status of the equipment (CMS, **C**ondition **M**onitoring **S**ystems) are now used in all large-scale wind power plants.

In addition to typical data such as wind velocity, speed, electrical power and temperature, these systems also detect vibrations at all relevant points of a turbine. By analysing the vibration data and comparing it with set values, it is possible to detect and replace damaged components in good time before the components fail. From the perspec-

tive of operational management, both the adaptation of suitable maintenance intervals and the early detection of damage are important. Taking into account CM systems, downtimes of much less than 10% are now agreed in contracts between wind power plant manufacturers, operators and insurance companies.



## Early detection of system damage

The average size of wind power plants has steadily increased in recent years. As a result, many components experience increased loads. Therefore condition monitoring is becoming increasingly important. Thanks to acceleration sensors at various points of the system, damage in the drive train in particular can be detected early by means of an altered vibration behaviour.

## Preventing hazards

Faults may occur in sensitive components of a wind power plant, such as bearings and gear wheels, due to a number of causes. These include regular wear and tear, extreme environmental conditions, overloads as well as installation and manufacturing faults. If resulting defects remain undiscovered for too long and are not rectified in good time, this can lead to significant damage up to destruction of a wind power plant.

Therefore continuous monitoring of the turbine condition is essential for larger wind power plants in particular, not least because of risks to the environment.



## Expert knowledge ensures reliable system monitoring

Condition monitoring includes vibration measurements on various system components in a suitable frequency range. By analysing the structure-borne sound, it is possible to draw conclusions about the condition of the components. Other important measured variables for example are speed and the temperature of the oil and the bearings.

In many cases, experienced experts are also required to safely distinguish between measurements caused by the condition of the component and those simply caused by operation. We are pleased to present to you important experiments with our equipment in the field of wind energy in order to teach the necessary expert knowledge.