

DMT - WindSafe®

Online Condition Monitoring System for the drivetrain of wind turbines

In order to ensure early detection of damage to the components of the drivetrain (main bearing, gearbox, generator), vibrations are recorded and analysed at defined intervals by the WindSafe® online condition monitoring system.

WindSafe® collects structure-borne noise data in real time and processes the signals, averages, defines the parameters and displays information about the current state of wear of the wind turbine gearbox and components. The information is based on the measurement of structure-borne noise, vibrations and shock pulses by means of special sensors and on simultaneous acquisition of operating data (BEDA) in addition.

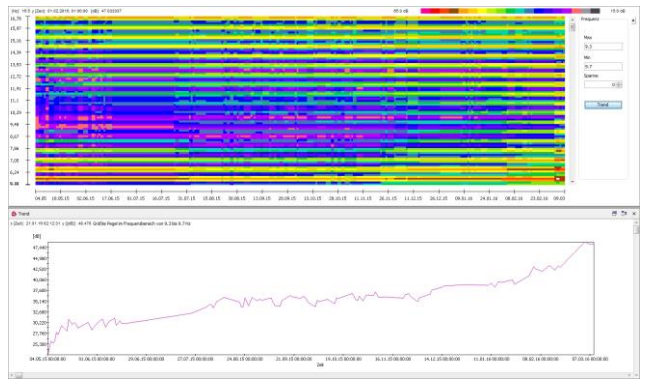
WindSafe® is a certified system for monitoring wind turbines.

Visualization of the system hierarchy



Source: ZF Industrieantriebe Witten GmbH

Sonagrammtrend



Topbox – Data Acquisition Unit

Topbox is the data acquisition module developed by DMT. The signals from the structure-borne noise sensors are collected in Topbox and processed in the data acquisition unit. An integrated IPC transmits the spectral data, envelopes, FFT's and time signals from the plant to the technical support and also to the plant manager or external service provider (e.g. diagnostician).

Autonomous operation of measured data acquisition ensures that no data can be lost in the case of network or telecommunication disruptions.

| Technical Data | | |
|-------------------------|--|---|
| Inputs | Structure-borne noise Operating data | 8 channels 8 channels |
| Sampling rate | Structure-borne noise Operating data | 25,6 kHz per channel (5,12 kHz simultaneous) 1,28 kHz per channel (simultaneous) |
| Resolution | in 20 Hz range in 200 Hz range in 2 kHz range in 10 kHz range | 0,0125 Hz 0,125 Hz 1,25 Hz 12,5 Hz |
| Dynamics | 138 dB (24 Bit) | |
| Signal-to-noise ratio | 90 dB | |
| Analytic process | FFT, envelope of failure, RMS, order analysis (XSafe-software) | |
| Network based | TCP/IP, Ethernet, WLAN | |
| Database Connectivities | MySQL, MariaDB | |
| Data export | CSV | |
| Memory | 2 x 8 GB (SSD, Typ SLC), upgradeable | |
| Protection class | IP 65 | |
| Operating temperature | -20 ... 60°C | |
| Supply voltage | 100 ... 240 VAC, 50 ... 60 Hz | |
| Power input | 50 W | |

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DMT - WindSafe®

DMT - WindSafe®
Monitoring and evaluation with our own software

Monitoring strategy

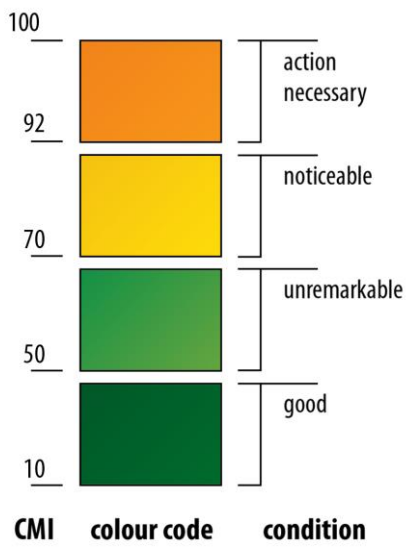
Characteristic changes in the operating status of the monitored drive train are captured and evaluated by the DMT software. This data can then be used to compile trend analyses and prognoses. Relevant statuses are visualized for the user in form of an easily understood intuitive traffic light logic.

A clarification of the wear occurs by the normalized CMI (Condition Monitoring Index) with a scale value between 10 and 100.

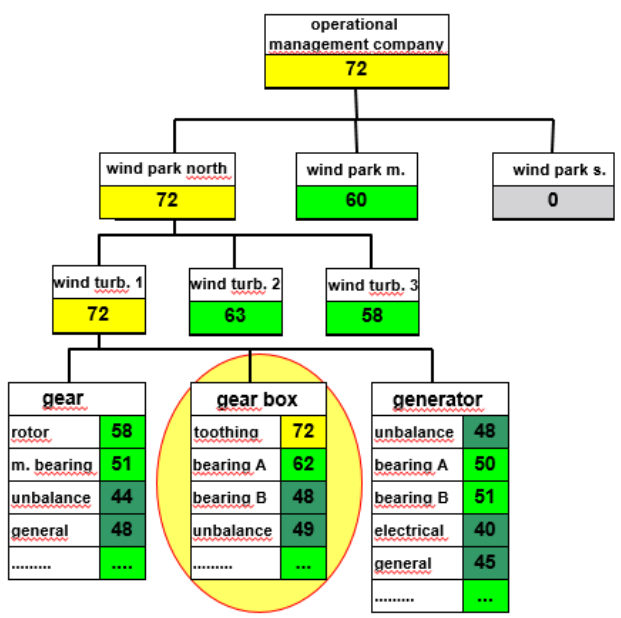
Aggregation

When monitoring an entire wind park with a large number of powerful turbines, a variety of sensors and many monitored parameters, maintaining a clear overview of all the information generated by the system is no longer possible without appropriate support. The control centre concept offers a very clear means of monitoring, as the highest CMI values of all monitored wind turbines are always reported automatically to the control centre.

CMI – Condition Monitoring Index



Evaluation structure of the WindSafe® control centre concept



The perfect combination of drive technical know-how and state-of-the-art technology for your reliable maintenance

Our many years of expertise in drive technology and experience in condition monitoring enable us to offer a comprehensive range of services in the planning and operation of online CM systems.

As a part of our support for installed online WindSafe® systems we can offer a full service (premium) package. The available services are optional and must be matched with the needs of the customer/operator. They include:

- Data archiving, management and backup
- Inspection and maintenance on site
- Ongoing monitoring of the data transfer and CMLs at component level
- Automated diagnostic tools
- In-depth diagnostic evaluations including recommended action and documentation
- Training for CM teams/plant managers
- Software service
- Telephone hotline
- Status report – in line with insurance-compliant sample report

Greater utility = WindSafe®

- Increased plant availability, reduced downtimes
- Remaining service life prognosis – avoiding consequential/major damage
- Predictable maintenance, optimized spares procurement

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