DMT - Wind*Safe*®

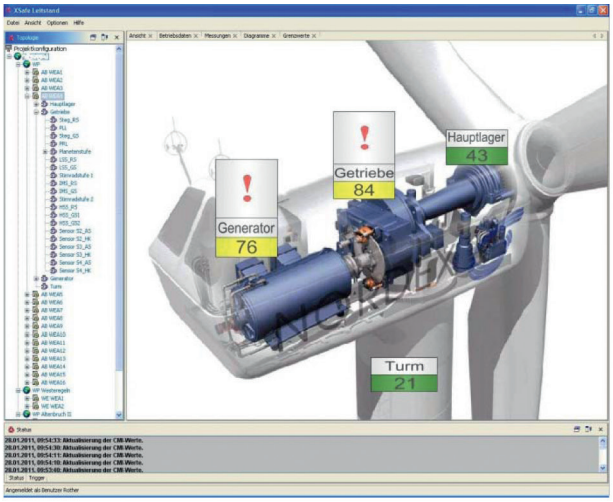
Online Condition Monitoring System

for the drivetrain of wind turbines

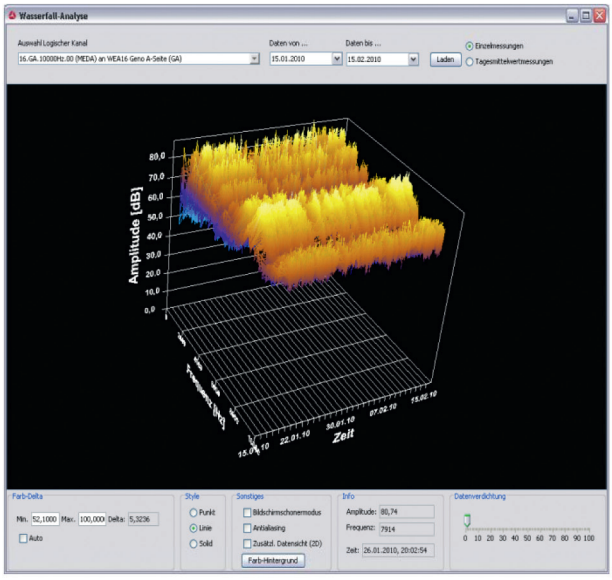
In order to ensure early detection of damage to the components of the drivetrain (main bearing, gearbox, generator), vibrations are recorded and analysed at defined intervals by the Wind*Safe*® online condition monitoring system.

Wind*Safe*® 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.

Wind*Safe*® is a certified system for monitoring wind turbines.



Visualization of the system hierarchy



Diagramm

Technical Data

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.

Topbox/Hardware	
Processor	Intel Celeron 600 MHZ, passive cooling
Memory	16 GB RAM – 16 GB SSD (non-rotational)
Supply voltage	230V – UPS optional
Housing	Stainless steel
Protection class	IP 54
Mounting	Pole/wall-mounted
Dimensions	Approx. 500 x 500 x 230 mm (W*H*D)
Weight	Approx. 20 kg
Connections	20 x PG, 4 x optical fibre bayonet
Modem	Industrial hybridmodem / Router / GSM/GRPS – Modem including reset module
Operating data acquisition	via OPC or from existing BEDA

Data Acquisition Unit	
Inputs	8 x vibration or envelope, parallel, potentialfree, cascadable
Sampling rate	25,6 kHz / channel
Filter stages	12,5 kHz, 1,25 kHz, 125 Hz, 12,5 Hz
Dynamics	138 dB (24Bit)
Iintegrated FFT´s	0,0125 Hz – bandwidth bei 10Hz 0,125 Hz – bandwidth bei 100 Hz 1,25 Hz – bandwidth bei 1000 Hz 12,5 Hz - bandwidth bei 10000 Hz
Analysis	Time signal, envelope, FFT
Interfaces	Ethernet (TCP/IP), RS232, USB optional: GRPS, UMTS
Supply voltage	24V DC
Dimensions	150 x 98 x 125 mm (W*H*D)
Mounting	DIN rail
Security	Watchdog

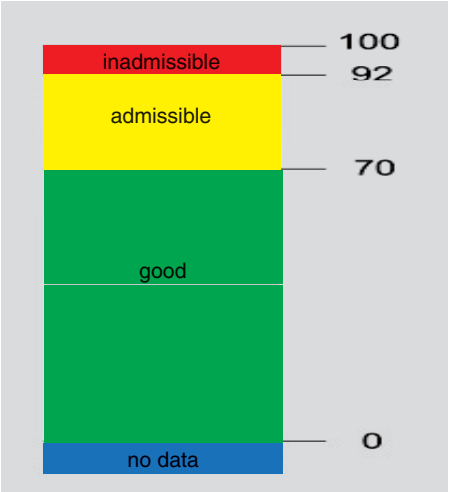
Subject to change in line with progress and technical standards. .

DMT - Wind*Safe*®

Monitoring and evaluation with our own software

Monitoring strategy

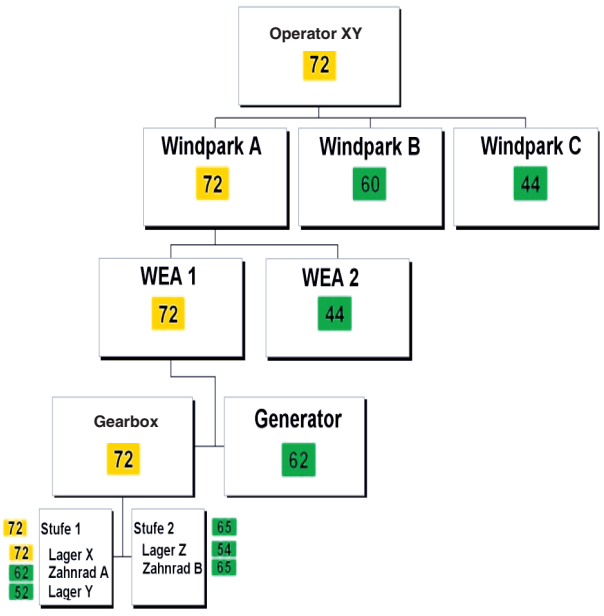
Characteristic changes in the operating status of the monitored drive train are captured and evaluated by the DMT software. This data can then be used to compile trend analyses and prognoses. Relevant statuses are visualized for the user in form of an easily understood intuitive traffic light logic. A clarification of the wear occurs by the normalized CMI (Condition Monitoring Index) with a scale value between 10 and 100.



C M I – Condition Monitoring Index

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.



Evaluation structure of the Wind*Safe*® control centre concept

DMT - Wind*Safe*®

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

As a part of our support for installed online Wind*Safe*® 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 CMIs 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 = Wind*Safe*®

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

DMT GmbH & Co. KG
Industry Systems Division

Am Technologiepark 1
45307 Essen, Germany

Phone +49 201 172-1666
Fax +49 201 172-1515
is@dmt.de
www.dmt.de

Member of TÜV NORD Group

DIN EN ISO 9001 certified