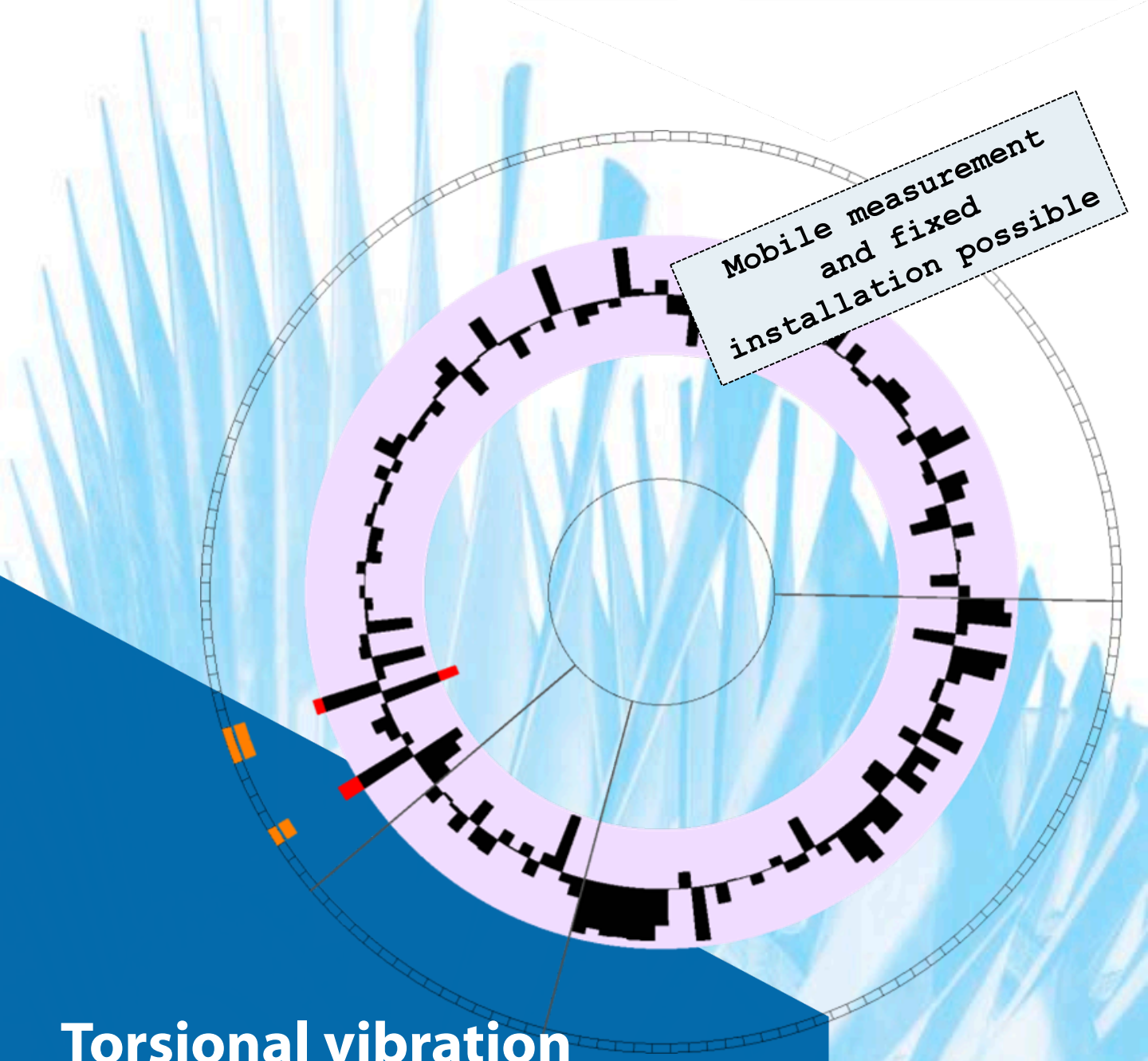

Torsional vibration measurement with STUDIS-SE TIM

The new STUDIS-SE TIM torsional vibration measurement system allows you to measure, analyse and monitor torsional vibrations with the sensors you already have for speed measurement. This eliminates the need for costly installations of additional sensors.

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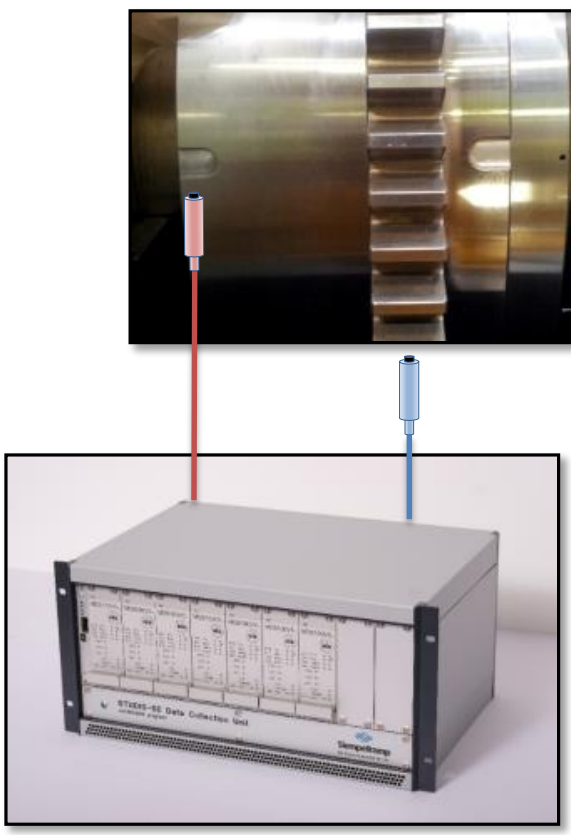
Due to the changed situation in the European interconnected grid, in particular the expansion of HVDC transmission lines, torsional vibrations will increasingly occur on turbine sets in the future. Torsional vibrations can lead to increased loads in the shaft train and even component failure. In order to detect and avoid critical conditions in the form of resonance excitation or instabilities during dynamic processes, the exact measurement and analysis of torsional vibrations is of crucial importance.

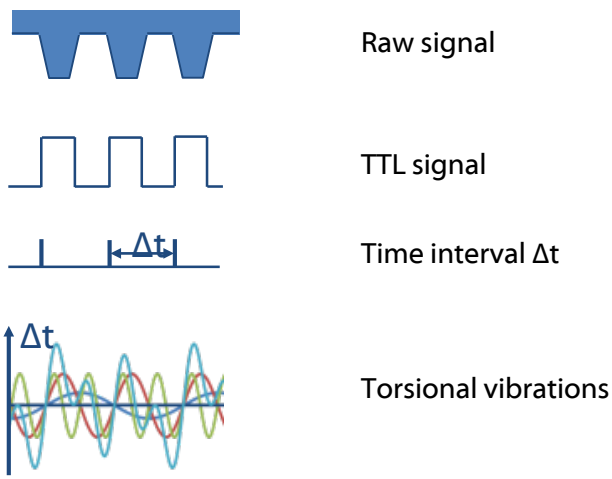
Simplest measurement set-up for measuring torsional vibrations

- Connection to permanently installed speed measurement and permanently installed reference signal
- No additional sensors necessary
- Alternatively: use of Zebra tape in combination with optical sensors possible

Reference groove and gear wheel for speed measurement



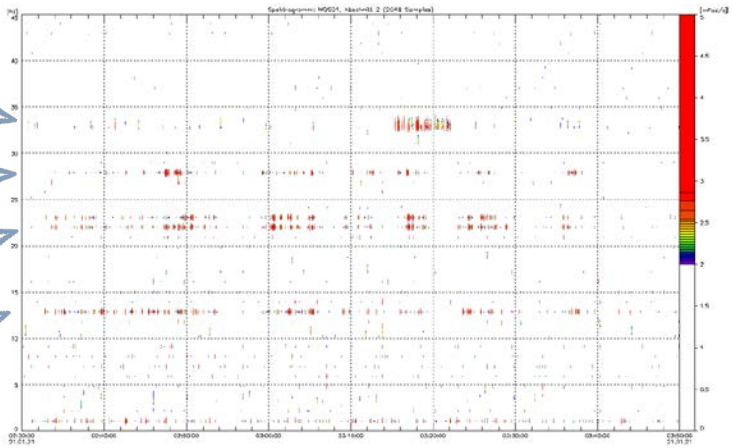
STUDIS-SE TIM measuringsystem



The raw signal acquired by STUDIS-SE TIM at 100 MHz is converted into a TTL signal. With the help of the TTL signal, the time interval Δt of successive teeth is continuously determined and converted into the torsional vibrations currently present.

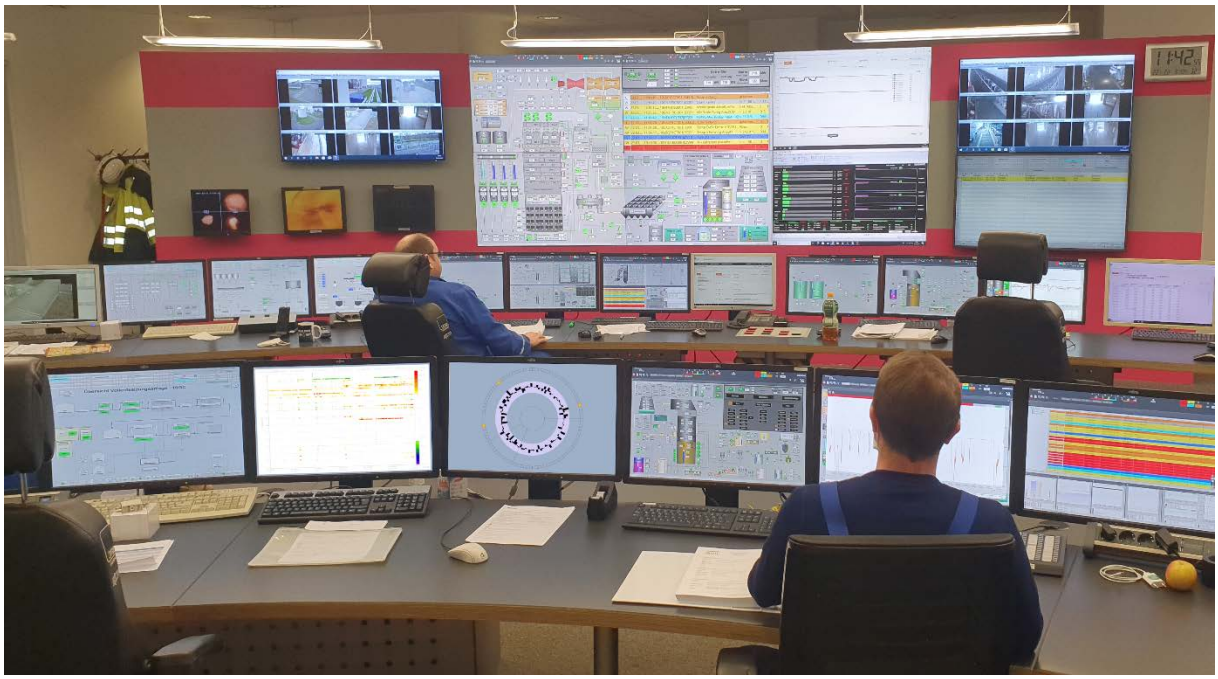
Comparison of calculated and measured torsional natural frequencies

Calculated torsional natural frequencies and natural modes f1 to f4



Measured torsional natural frequencies f1 to f4

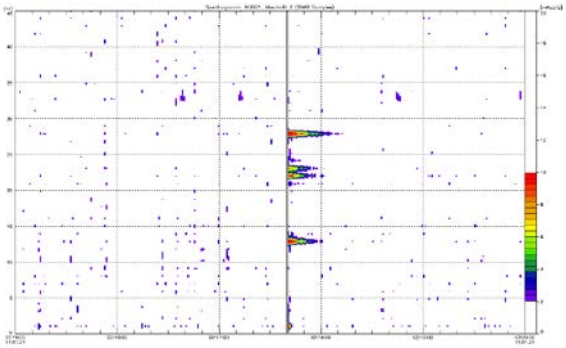
Due to the frequency-selective monitoring of the natural frequencies, all monitoring displays known from STUDIS-SE such as "Magic Eye" and "Graphic Report" are available..



- Temporary mobile measurement for actual recording and analysis
- Permanent installation offers additional monitoring possibilities

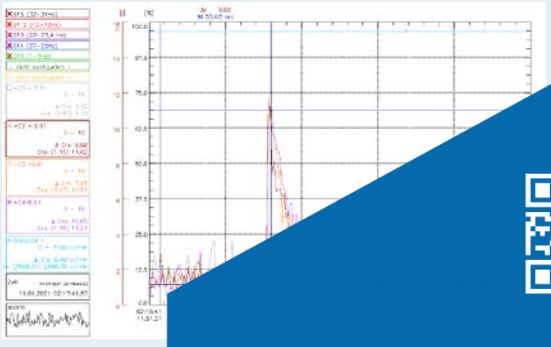
Detection of torsional events

Torsional natural frequencies are excited by network influences, for example a jump in active power (picture on the left).



The excited natural frequencies are clearly visible in the spectrogram.

The frequency-selective evaluation shows the excitation of the individual natural frequencies in the trend.



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