

TORSO FAMILY

Detecting and addressing harmful torsional vibrations in shaft lines

Among the potential harmful conditions for turbo groups, torsional vibration is one that is generally overlooked although it can lead to dramatic failures. The issue requires special attention in today's new normal of constantly changing grid circumstances.

With TORSO, ENGIE Laborelec provides a suite of detection and protection solutions that addresses this issue effectively, bringing you peace of mind.

AN UNDERSTATED RISK

Although the design of a power system generally reduces the risk of damage due to torsional vibration to a minimum, later adjustments to the shaft line can compromise the system's resilience. In addition, the energy transition makes for a much more dynamic grid where classic power systems interact with wind farms and an increasingly elaborate apparatus of power electronics. This could lead to excessive levels of torsional vibration in the rotating shafts, leading to fatigue and ultimately severe damage such as shaft cracking, blade loss, gearbox failure or retaining ring failure. Unfortunately, current shaft lines are not equipped to detect and mitigate this specific type of vibration.

AUTOMATIC DETECTION AND IMMEDIATE PROTECTION

ENGIE Laborelec's TORSO solution addresses this issue effectively.

TORSO Detect is the low-cost plug-and-play detection system. It uses your existing array of sensors to monitor the shaft line for the presence of potentially harmful torsional vibrations. Comprehensive reporting capabilities enable you to assess the risks and decide if further analysis and protection will be needed.

TORSO Protect is the high-end automatic protection system. Multiple sensors are used along with precise signal conditioning, enabling a robust and redundant measurement chain. We also define thresholds for critical vibrations. Whenever a threshold is reached, TORSO Protect sends an appropriate alarm or trip signal to your DCS or SCADA system, protecting your shaft line from severe damage.

BENEFITS

- **Peace of mind**
TORSO's automatic detection and protection functionality eliminates your worries for excessive torsional vibrations in today's situation of constantly changing grid circumstances.
- **At a very limited cost**
TORSO Detect, the plug-and-play version, brings TORSO's powerful detection capabilities to your shaft line at a very limited cost.
- **Tailored to your situation**
Both TORSO Detect and TORSO Protect can be installed on most encountered types of machines, also for temporary purposes.
- **30+ years of experience**
ENGIE Laborelec's team of experts has more than 30 years of valuable experience in detecting harmful torsional vibration in power plant shaft lines all over the world. Our solutions and recommendations are 100% OEM-independent.



Excessive amplitudes of torsional vibrations can lead to shaft cracking without warning.

TORSO PROTECT: HOW THE HIGH-END PROTECTION SYSTEM WORKS

For TORSO Protect, we carry out a mode shape analysis on your rotor equipment, enabling us to assess the location of the sensors as well as the stress levels corresponding to the torsional vibration amplitude at the location of the sensor. We subsequently validate the outcome with on-site measurements, ensuring reality-based detection and protection.

INSTALLATION AND VALIDATION

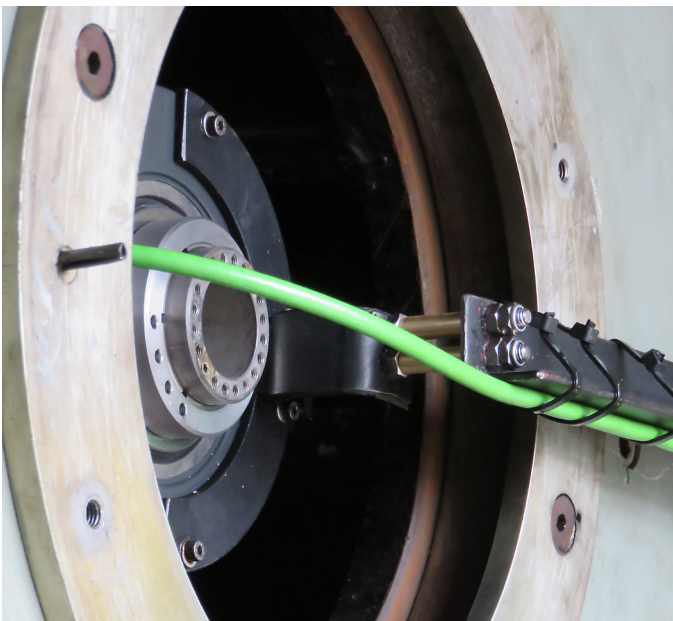
Multiple sensors are being used to ensure redundancy. Alarm or trip signals can be wired either to the control system or to one of the generator relays. Frequency and amplitude signals of monitored frequency bands can be wired to the DCS or SCADA system.

MONITORING

The system continuously monitors frequency and peak amplitude of critical resonance frequency bands. We configure appropriate alarms such as a watchdog alarm, an event detection level alarm, and a trip level alarm.

DIAGNOSIS OF SPECIFIC ISSUES

Measurement data are presented through a configurable interface for analysis, diagnosis, and identification of remedial action by power plant staff or ENGIE Laborelec experts.



In most cases existing sensors can be used. If needed, additional sensors can be installed.

TORSO DETECT: AFFORDABLE EARLY WARNING WITH BUILT-IN EXPERIENCE

Our 30+ years of experience with torsional vibration in shaft lines enabled us to develop the standardized TORSO Detect module, which makes **reliable torsional vibration detection available to everyone**. Deploying the same technology as the high-end system, TORSO Detect simply plugs into your existing system and monitors the torsional vibrations using the available array of sensors. It is an affordable early-warning system that enables you to timely take measures if needed.



A retaining crack due to torsional vibrations.

WOULD YOU LIKE TO KNOW MORE?

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