



Smart production of metals

OnCare.Health Universal Joint Shafts

Benefits

- + Modular and upgradable system setup
 - + Shows evaluation results in simple and illustrative charts
 - + Records actual system loads and dynamic torque peaks
 - + Ensures operation of equipment according to specification
 - + Enables predictive maintenance via lifetime projection
 - + Facilitates reliable production with minimal downtimes
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Included with the On.Care Health product range, Voith offers an intelligent modular torque measuring system for condition monitoring of cardan shafts and complete drive lines. The torques are picked up directly on the drive spindles by highly precise sensors. Hereby, operators get knowledge about the real torques' inclusively high-frequent dynamical effects or torque spikes. The measured torques are transmitted to the processing units, where received signals are stored and analyzed continuously. The results are displayed in simple and illustrative graphs and charts. As an example on base of measured torques, the system calculates and visualizes the residual lifetime of the universal joint shaft and even other components in the drive chain.

Operators are informed about extraordinary events in case any threshold values are exceeded. Due to high resolution signal storage functionality, the process can be analyzed retroactively.

Voith Heavy duty torque monitoring



More than 25 years of experience...

Since 1995, Voith has designed and mounted more than 500 torque sensor systems in harsh operating conditions, which have been reliably working for many years.

Hereby, our service engineers gathered knowledge about how to install high-precision strain gauges in such rough industrial environment.

The systems are ideally suited for high-torque application such as rolling mills (especially hot strip mills, heavy plate mills), shredders, crushers and mining applications.

By providing expertise and service to read, understand and interpret the measured data, Voith brings more value add to the customer than "just measuring."

Based on this experience Voith has developed a highly improved modular torque monitoring system. Starting from new and smart telemetrical signal and energy transmission up to a completely reworked modern software layout with additional evaluation modules, Voith is even closer to customer requirements than before.

According to the special customer requirements, Voith offers three tailor-made solutions:



01. Torque Meter

- **Dtect.Torque**
Makes relevant, actual load data available as analogue signal
- **Torque Meter DAQ**
Monitors torque thresholds online, creates characteristic values, forwards information to other system (SCADA, IBA,...)



02. Mill Monitor

- + • **Expert Diagnostics**
Enables process optimization and root cause analyses
- **Trending**
Archives/ displays averaged characteristics values of loads
- **Data Historian**
Archives/ displays hi-res load and process signals



03. Mill Expert

- + • **Life-cycle Monitor**
Notifies wear and fatigue level for condition-based, preventive maintenance of components
 - **Product Specific Assessment**
Correlates wear and fatigue of monitored components to produced materials
 - **Report Generator**
Automatically provides focused and essential information where needed, when needed
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01. Torque Meter

Sensor arrangement on drive shaft



Benefits

- + Extremely robust, operating in challenging environments
- + Designed for industrial applications and long-term work
- + Highly precise measurements
- + No maintenance, no batteries
- + Permanent data access
- + Adjustable without drivetrain modifications
- + Alerts for exceeded threshold values

Dtect.Torque: Sensor, signal transmission and power supply



Dtect.Torque is an extremely robust and reliable torque measuring technology for continuous operation

No modifications are required to the drivetrain. The single-channel Dtect.Torque sensor system is mounted directly on the drive shafts ensuring immediate and accurate measurements. This is achieved by using strain gauge technology measuring the shaft torsion proportional to the torque applied. DTECT.Torque provides an analog signal of 5VDC +/- 4.5 V; 4...20 mA.

The sensors are housed by a robust protecting ring, which ensures power supply from and signal transmission to the receiver. The use of a telemetry system enables contact- and wear-free operation and provides permanent data access.

The rugged sensor system can be mounted on existing and new drives.

Torque meter DAQ



The torque meter DAQ enables torque monitoring, alarms and notifications.

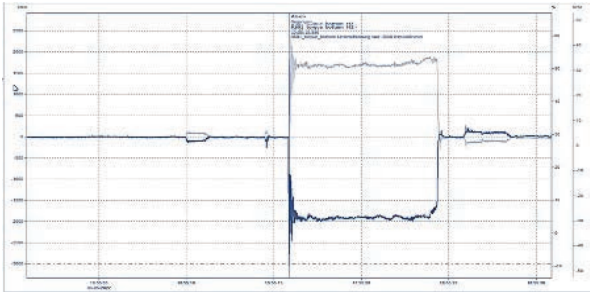
The DAQ is connected via cable to DTECT.Torque; it is well protected in a wall-mounted metal cabinet that is allocated in the cleaner environment not directly to the rollstand.

It generates characteristic values, monitors configurable thresholds and forwards this information to any other database for storage or further evaluation. This information enables assurance that the components of the drive chain are operated within their permissible torque range.

The generated characteristic values and events are available for other systems via standard automation protocols (ModBus TCP and OPC.UA).

02. Mill Monitor

Mill Monitor

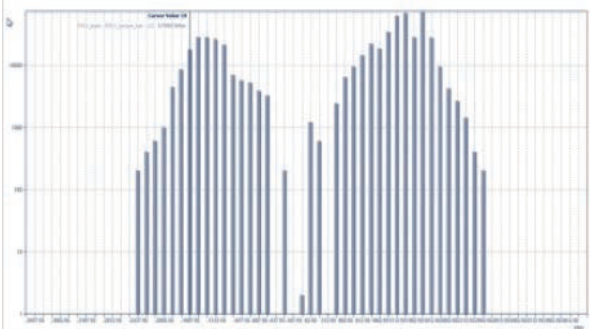


Alarm management

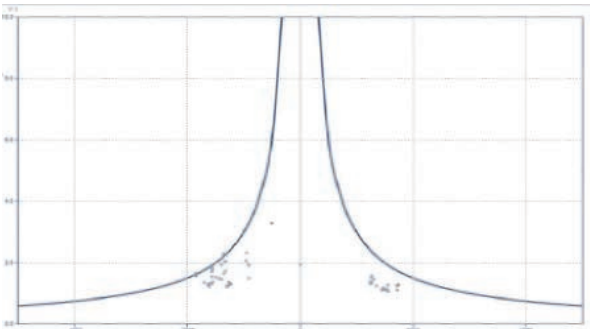
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Characteristic values

Load schedules



TAF-distribution (TAF= torque amplification factor)



Benefits

- + Enables process stabilization measures
- + Driver for preventive maintenance strategies
- + More uptime (fewer breakdowns and consequential damages)
- + Alerts for exceeded threshold values
- + Shows characteristic drive line values with regards to average load distribution and dynamic behavior
- + Extendable modular system

Analog to DAQ the complete hardware (data acquisition device, power supply, network switches and auxiliary components) is housed in a metal control cabinet at safer environment. Additional signals can be imported via Modbus TPC, OPC-UA, OPC-DA, or analog interfaces. With use of server architecture, the results can be shown on any computer within the customer network. Optional remote access is realized by a safe VPN connection.

The Mill Monitor archives and displays high-resolution load and process signals.

For monitored characteristic values, individual threshold values can be set to alert in case of any extraordinary incidences as prerequisite for condition-based, preventive maintenance of cardan shafts and other driveline components. Operators can define the group of notified persons and the frequency of alerts individually.

By storing all signals in high resolution, events can be visualized and analyzed retroactively, enabling root cause analyses and process optimization at any time.

Load schedules and other characteristic values, like the torque amplification factor (= TAF) that shows the dynamic response when slabs enter the workrolls, are generated by the system in parallel. They give operators a transparent overview of what is going on in the driveline and what should be improved without the need to extract this information manually out of the huge pool of measured data.

The system setup is totally modular and easily upgradable. Additional or already available signals can be connected and evaluated according to customer requirements, and on-demand further sensors like temperature and vibration sensors can be added and monitored. Furthermore, one system can be upgraded even to monitor multi-rollstands. Hereby, only the sensors need to be provided for the individual stands.

03. Mill Expert

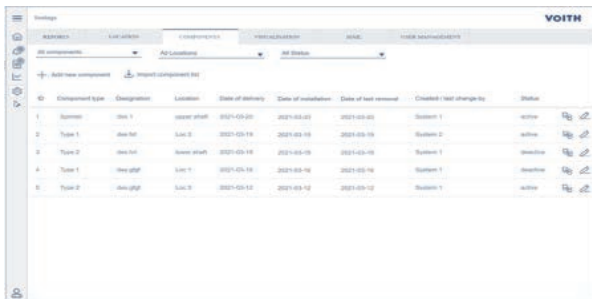
Lifecycle monitor



Benefits

- + Quick and simple drive line status overview
- + Efficient maintenance during planned shut-down
- + Spare part availability, when needed
- + Alerts for life-time limits
- + Condition and prognosis reports of individual key indicators
- + Know-how gaining for process optimization

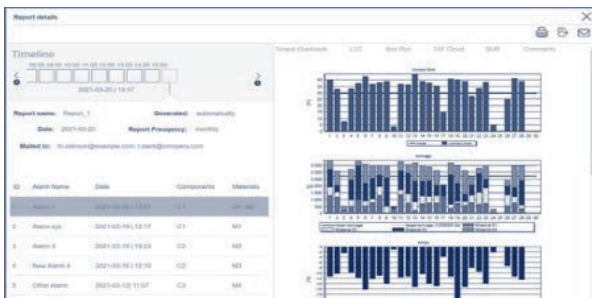
Component manager



The Mill Expert enables component health status and comprehensive expert diagnostics with root cause analysis for the complete driveline plus automatically generated reports.

With use of intelligent algorithms, the lifetime status of bearings and components can be calculated, and the remaining lifetime is shown in detailed graphs and charts. The component management stores the lifetime status of active as well as passive components, e.g., for already used spare parts, their history will be stored and reconsidered after reinstallation. Even for such components that have been in operation before establishing Mill Expert, their lifetime status can be estimated on the basis of actual production. Operators get alerted in time before components reach the end of their life. This enables the timely purchase of spare parts and repair work to be performed within planned shutdowns.

Production-specific fatigue analyzer

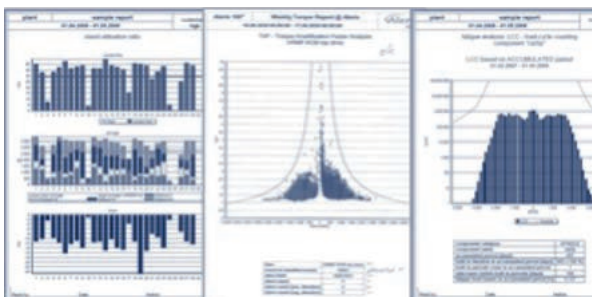


A production specific fatigue analyzer helps to evaluate the damaging impact of different materials, dimensions or profiles.

This can be used to establish an even better forecast of the remaining lifetime by considering the future production mix.

The automatic report generator provides focused and essential information with expressive charts where needed and when needed – thereby releasing the user from screening a huge amount of data and preparing reports manually.

Health report generator



On request, Voith offers a yearly consultation to optimize inventory management based on actual health data to ensure availability of spares while reducing inventory.

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