

Online Vibration Monitoring of Gas Turbines

Using the Delphin TopMessage Modular Data Acquisition System

CHESTERLAND OH—November 15, 2011

CAS DataLoggers recently provided the data acquisition solution for a large manufacturer producing turbochargers and turbo aeroengines. These products required constant vibration monitoring to prevent damage and keep maintenance costs down. Remote monitoring of the plant's machinery had become increasingly important over time, since high demands on machine availability and the need for quick breakdown response times required uninterrupted access to machine and process-relevant measurement data. Consequently, management began searching for a wireless data acquisition and control system capable of high-precision vibration measurements and automatically downloading data to an online server. This solution would also need to feature powerful yet intuitive software for analysis and reporting.



The company installed a **Delphin TopMessage Data Acquisition and Control System** adjacent to the gas turbines under monitoring. A vibration monitoring system was installed on these industrial gas turbines in order to prevent costly damage taking place as well as for cause diagnosis in the event of breakdowns. Vibration data was acquired and recorded at the turbine and then automatically transmitted via the internet to the main plant where detailed evaluation could be performed. In the event of a turbine breakdown, service personnel were immediately informed via alerts sent via SMS or email.

Delphin TopMessage measurement data acquisition systems recorded both vibration and process measurement data, featuring a modular design and coming equipped with process and control interfaces. The system also had Ethernet TCP/IP interfaces for connecting evaluation PCs. Remote operation took place via modem, Internet or GSM. This sophisticated data acquisition system was capable of extremely precise measurements, processing any signal quickly and reliably from a few thermocouples up to thousands of measurement points. Universal inputs allowed any unit of measurement to be acquired, including temperature, pressure flow, and vibration, eliminating the need for costly measurement transducers. Data then underwent direct scaling and linearization. Featuring both universal inputs and outputs with extended functions and software channels, the Delphin TopMessage had 30 analog inputs or 48 digital inputs and could connect up to 10 slave devices for extended functionality. This modular system performed high accuracy measurements with up to 24-bit resolution and also contained 2 slots for analog or digital input or output cards as well as a CANbus for expansion modules. Contained within an industrial grade enclosure, the TopMessage systems also featured signal conditioning within the device, an Ethernet interface, and screw terminal connections.

The Delphin TopMessage device processed the signals from existing vibration pick-ups, processing vibrations in the range of 0 to 1000 Hz.. This system distinguished itself from other standard measurement systems by processing unfiltered measurement data. If limit values were exceeded, an email was sent to personnel in the main headquarters.

The customer was offered a wide range of I/O modules for the TopMessage to select the best one for their application, with different modules available for any number of channels and sensor types. Master and slave devices each accommodated two I/O modules. The TopMessage device could be integrated into a TCP/IP network via a network interface or could be directly connected to a PC workstation or laptop/netbook computer. Online measurement data could be transmitted, saved and processed, and the data could be stored simultaneously within the TopMessage device on its local memory. Data was regularly transmitted over the internet to the company's central server, providing a centralized collection point for measurement data to be accessed. Visualization was performed using Delphin's VibroLab software. The personnel responsible could then process the transmitted data as cascade, spectrum or trend diagrams, providing all the requirements for immediate fault diagnosis.

A major feature of the TopMessage device was its wide functional range. Vibration signals were immediately transformed into meaningful characteristic values and could then be correlated with other process data. The devices could perform and record FFT analyses and then carry out alert procedures in the form of SMS and email transmission or shutdown procedures.

The TopMessage system was upgraded to include ProfiSignal Basic universal software for data acquisition, test automation and data acquisition applications. ProfiSignal software enabled measurement data to be evaluated at a PC. Vibration data recorded from the turbines was saved and analyzed using a database. ProfiSignal's user-friendly interface made it easy to setup and run, with wide areas of application ranging from simple data storage and visualization to a complete automation solution offering reporting. ProfiSignal Basic was easily configured by PC, and plant engineers found the representation of the channels to be clear and intuitive with a Windows Explorer-style operation. Online visualization via telephone or internet was also possible providing an adequate bandwidth was being used.

The turbocharger manufacturer achieved several benefits after installing the Delphin TopMessage Data Acquisition and Control System; a clear advantage of the device was its ability to obtain long-term information on the state of the plant and its machinery. Measurement data was regularly downloaded and automatically evaluated, saving countless hours of manual retrieval and individual review. The TopMessage's internal data logger guaranteed independent and uninterrupted data recording, which enabled the saving of up to 128 million characteristic values, process values or FFT analyses. The

system's measurements were very reliable and highly accurate, and operators were easily able to work with the ProfiSignal Basic software for automation and reporting. Additionally, the TopMessage's modular design gave the plant the flexibility to consider future expansion with additional inputs and outputs.

For further information on the Delphin TopMessage Data Acquisition and Control System, other data acquisition devices from Delphin, or to find the ideal solution for your application-specific needs, contact a CAS Data Logger Applications Specialist at (800) 956-4437 or visit the website at www.DataLoggerInc.com.

Contact Information:

CAS DataLoggers, Inc.
12628 Chillicothe Road
Chesterland, Ohio 44026
(440) 729-2570
(800) 956-4437
sales@dataloggerinc.com
<http://www.dataloggerinc.com>