SENSONICS keeping industry turning

FEBRUARY 2011 www.sensonics.co.uk

Welcome to our latest newsletter, keeping our customers and partners up-to-date with the latest developments at Sensonics. New projects, new products and case-studies, all helping to protect your critical rotating plant.

MEETING THE CHALLENGES AT CRUACHAN POWER STATION

Sensonics recently completed the retro-fitting of two static digital excitation systems at Cruachan power station in Scotland. Contracted by Scottish Power for the Unit 3 and Unit 4 upgrade, Sensonics worked closely with Optimised Systems and Solutions (OSyS) to replicate the equipment fitted to Unit 1 and Unit 2 during previous works.

Working in a tough environment

Constructed in the early 1960's, Cruachan Power Station is one of only four pump storage facilities in the UK and due to it's location presented a number of unique challenges to Sensonics. The power station is completely concealed within the hollowed out rock under Ben Cruachan and houses four generator / motor sets driven from an upper reservoir which are capable of generating 400MW of electricity. The station can produce electricity for the grid in less than 2 minutes when demanded and the need for high integrity turbine control systems is essential to meet these operational requirements.

Control cabinet housing circuit breaker, thyristor racks, Microprocessor control system

Optimum flexibility

The original AVR offered no hardware redundancy and with spare parts becoming obsolete, the reliability and availability was becoming of major concern. The new system has been designed to offer extremely high availability by utilising separate and diverse digital controller hardware in combination with dual thyristor bridges providing 100% full redundancy. These are all backed up by duplicate power supplies and independent protective trips. A power system stabiliser was also included in the software algorithm to ensure Grid Code compliance.

Total turnkey capability

For the Unit 3 and 4 equipment, Scottish Power contracted Sensonics to provide the same Optimised Systems and Solutions equipment configuration which were fitted to Units 1 and 2 in 2002. Sensonics managed the entire project on a 'turnkey' basis in terms of mechanical design, manufacture, factory testing and installation, through to commissioning the entire system in conjunction with the OSyS engineers.

Russell King, Managing Director at Sensonics commented. *'The partnership with OSyS to deliver this critical turbine system to Scottish Power utilised the OSyS technology and expertise in combination with Sensonics turn key project capability. Working closely with Scottish Power to develop the safe working systems and appropriate procedures to deliver this project half a mile under a Scottish mountain was a real challenge. The project timeframe and working environment were particularly demanding and the retrofit activity was successfully completed within the requested 4 week period.'*

SENTRY G3 – Online Machine Monitoring with Robustness

The latest Sentry G3 systems encompass vibration, position and speed measurements, the hardware fault tolerance of which has recently been independently verified through a recent study.

Channel hardware independence is important for machinery protection applications where a failure of any hardware assembly should have a minimal effect on the overall system measurement integrity and in this respect Sentry G3 offers the 'best-in-class'.

The four channel G3 module has been specifically designed with an independent digital signal processor (DSP) for each channel of measurement. The DSP can be loaded with the specific measurement algorithm which not only controls the sensor selection, but also the protection relay status and analogue output levels. This provides complete hardware autonomy from sensor through to the protection relay combined with high channel density (24 channels in a 3U format).

The rack based system operates on a dual +24V power supply backplane which can be connected externally or derived from the optional G3 dual redundant rack based power supplies.

continued...

continued...

When a high integrity protection function is required, the IEC61508 international standard for functional safety can be applied to ensure that sufficient integrity is designed into the electrical / electronic systems employed for the safety function.

A failure mode and effects analysis is carried out on the overall measurement control loop, from sensor to shutdown actuator. This determines not only the Mean Time between Failure (MTBF) of the protection equipment but also the diagnostic coverage and the safe failure fraction (SFF). The diagnostic coverage illustrates the percentage of failure modes of the equipment that are detectable from an operator perspective and the SFF determines the percentage of failures which result in a safe process condition.

All these factors, in combination with protection system channel redundancy, are used to calculate the overall SIL (Safety Integrity Level). A recent SIL analysis has demonstrated a single Sentry G3 measurement channel is suitable for use in a SIL-2 low demand safety function and when combined in a suitable voted redundant channel arrangement the system could be utilised for SIL-3 applications.

Sentry G3 provides state-of-the-art protection for vibration, position and speed measurements, turbine specialist algorithms to cover shaft eccentricity and large differential expansion measurements are also included within the equipment scope.

Chinese Website Goes Live

At the end of last year we released the Chinese version of our website, developed by Star Royal, our exclusive distributor for the region.

The release of the website is a major milestone in establishing Sensonics as a recognised brand in China. With product details now available to the whole market we look forward to further expansion in this region.

High Speed Rail Points Monitoring

Over the past two years we have been working closely with a customer to develop a proximity probe for points position monitoring for a high speed rail application. The challenge is to provide a robust eddy current probe capable of providing accurate position measurements on the switch rail with high linearity and minimal drift with temperature. Product approval has recently been achieved and the probes are now being installed at multiple locations on the rail infrastructure.

Probe positioned on fixed rail - opposite switch rail target

Monitoring of the switch rail position relative to the fixed rail is key to detecting long term movement away from the initial calibrated position. This is occurs over time through mechanical stresses caused by train movements. Too much drift results in a failure of the points locking mechanism and therefore subsequent closure of the line. Monitoring the offset with time allows maintenance to be planned without affecting the level of service offered by the train operator. The system can also provide invaluable data on both the static & dynamic performance of the rail during switching and train movements, particularly important on high speed lines.

Product Focus – Vibration monitoring that fits in your toolbox

The Vibcheck is a pocket sized vibration meter with a hand-held accelerometer probe, ideal for checking the condition of rotating plant. The unit displays absolute vibration levels in either velocity or acceleration units to the ISO10816 standard. There is also a very useful facility to verify the functionality of ICP type accelerometers, by means of a bias voltage check.The Vibcheck kit includes; the meter, a handheld accelerometer, interconnection cable, contact spike, carry case and instruction booklet, with tips on the use of vibration monitoring.

Monitor obsolescence

Sensonics has a reputation built on support and service of legacy equipment but recently we have found this increasingly more difficult on the older equipment due to component obsolescence. Our first generation of equipment the MO80xx / MO81xx series, mainly supplied during the 80's, is affected. We have written directly to all known current users and while we will continue to support the product as best we can, the same level of service offered in the past on this product cannot be guaranteed. Due to the critical function performed by this equipment we recommend spares holding and usage are reviewed.

For further information on particular model numbers please get in touch (contact details below).

RECENT CONTRACT AWARDS

- Digital Electronic Governor and Turbine Supervisory equipment retrofit for 300MW steam turbine.
  Location Hong Kong
- Multi-channel Vibration Analysis System for turbine driven generator.
  Location UK
- Sentry G3 protection system for steam turbine supervisory retrofit.
  Location Vietnam
- BOP vibration monitoring (2 x 300MW), 136 channels with sensors.
  Location China
- Seismic Protection System upgrade for Nuclear facility.
  Location UK

Take a look at our all-new web site: www.sensonics.co.uk

Sensonics are a leading supplier of turbine supervisory and high integrity protection equipment to industry. With 30 years experience in providing vibration, displacement and speed instrumentation solutions in demanding environments, not only do they supply a full range of sensors and API 670 compliant measuring and protection equipment, but also offer design through to installation & commissioning services.

SENSONICS LTD
Tel: +44 (0) 1442 876833
Email: sales@sensonics.co.uk
www.sensonics.co.uk