Designed for Periodic Monitoring of Corrosion/Erosion or Cracking using Non-Invasive External Sensors

Can be used in Locations where Continuous Monitoring is not Appropriate

Possible Applications include Pipes, Storage Vessels and Ducting

Uses High-Sensitivity Electrical Resistance Techniques

Technology based on our Fixed Scanner Systems for Continuous Monitoring

Powered by an Internal Battery Pack

Rowan Technologies' scanner systems monitor corrosion/erosion or thermal behaviour of industrial plant and, depending on application, can also be used for crack growth monitoring.

Portable versions of the scanner technology have been developed for applications where a fixed system may not be the most appropriate or cost-effective means of monitoring. For example where there is a requirement for monitoring in a number of areas of a plant, situated some distance apart, as in a chemical complex or refinery.

The latest version of our portable system is a lighter, more compact version of our original design: incorporating multi-point signal switching hardware, and the battery power source, within the main scanner case.

www.rowantechologies.co.uk
System Overview

Rowan Technologies’ scanner systems were first developed in the late 1990s for continuous real-time monitoring of corrosion rates of boiler membrane walls, using electrodes welded to external (cold-side) surfaces. Details of our fixed scanner technology can be found on our website. Portable scanner systems have evolved from this technology and use the same measurement principles:

To monitor corrosion/erosion, or crack propagation, the systems use refined electrical resistance techniques: thinning of a metal (or propagating cracks) increases measured electrical resistance values. Measured resistance values also heavily depend on metal temperature and the scanner systems utilise two methods to compensate for these temperature variations.

During the resistance measurements, current passes between adjacent pairs of scanner sensor (electrode) locations. In the case of the portable scanner, sensors can either be welded to the item of plant under investigation or, alternatively, they may be firmly clamped or pressed against the electrically-conductive metal surface for the duration of the measurement cycle.

The portable scanner can measure up to 16 sensor locations at a time, allowing a sequence of measurements to be performed on a small rectangular sensor matrix or linear sensor array (for example, around the circumference of a pipe at a welded joint).

For a Rectangular Sensor Matrix, measurements can be made Horizontally, Diagonally and Vertically between Sensor Locations, in Sequence, enabling Surface Corrosion/Erosion Maps to be Produced.
Monitoring Configurations

The portable scanner has been designed for use in a wide range of ambient temperatures (approx. -20 to + 50°C). The primary components are:

- Scanner case, catering for up to 16 sensor locations, with integral battery power source.
- Laptop with dedicated control and acquisition software.
- Sensors and associated cables.

A choice of hardware configurations are shown below:

Cables connect directly between the portable scanner case and up to 16 sensor locations (welded or clamped sensors).

An example of a pipe sensor clamp is shown on the left.

Cables run from the sensors to a signal multiplexing enclosure. The portable components connect to, and power, this enclosure.

Cables run from the sensors to a site junction box containing robust signal connection points. These are connected to the scanner during the measurement sequence.

The scanner connects directly to individual pairs of sensor locations.
Data Acquisition and Analysis

The portable scanner has an in-built micro-computer that can communicate wirelessly with a laptop. Once the case is powered up, it awaits commands from the laptop’s dedicated software package. Acquired scanner data is uploaded to the laptop at frequent intervals allowing real-time updates of graphic data displays:

Detection and quantification of corrosion/erosion or cracking may take from as little as a few days, to several weeks/months, depending on circumstances and application. Detection and quantification is faster for: higher corrosion/erosion or crack propagation rates, thinner walls or membranes and thermally more-stable conditions. Please contact the company to discuss specific applications.

Features, Benefits and Applications

- On-line or off-line monitoring of internal wall or surface conditions: corrosion, erosion or crack propagation. The actual plant itself is monitored - no need for insert probes and entry ports. Sensors are welded or clamped to external surfaces.
- Portable instrumentation and power source – readily transported between monitoring locations. Cost-effective method of monitoring multiple locations.
- Suited to high temperature plant and remote locations: systems developed for use in a wide range of ambient temperatures.
- Multiple sensor arrangements for a variety of applications: suited for pipes, storage vessels, membrane walls etc. Hazardous areas (under work permit) and non-hazardous areas.
- Can be applied to thick or thin walls/membranes (<1mm to >50mm).

Specifications

- Up to 16 channels (sensor locations)
- Resistance measurement configurable between any two channels
- Up to 12 amps DC current for resistance measurements
- Maximum 9mV signal measurement
- 18-bit A-D conversion
- Multiple sample averaging
- Optional surface temperature measurements
- 24V system battery power
- System configuration, data storage and display using MS Windows based laptop

www.rowantechnologies.co.uk