

KEMWAT.

On-stream wall thickness measurements.



Background

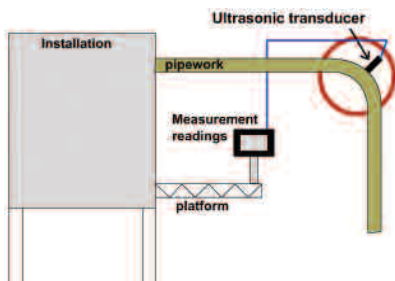
Pipes that carry very hot pressurized gases and fluids are under the supervision of a 'notified body'. In the Netherlands, that is usually Lloyds. With such systems, safety is paramount. All risks therefore have to be properly managed, which means taking account of mechanisms such as creep, fatigue, corrosion and erosion. The extent to which a pipe system is prone to each of these threats depends on the operating circumstances, the materials used and the medium being conducted. Steam pipes, for example, are particularly liable to be

affected by creep, while pipe work carrying hydrocarbons at a petrochemicals plant is more likely to suffer corrosion and erosion. Regular overhauls are planned to inspect the integrity of pipe work. Expensive scaffolding might have to be built for locations that are difficult to access. For these locations and critical locations in your system the KEMWAT (KEMA system for on stream wall thickness measurement) may be the right solution for you. KEMWAT accurately measures the wall thickness at temperatures up to 550°C.

Service

At first it is necessary to identify the individual components or elements of the system that are most critical to the integrity of the whole. Critical areas, which are mostly known from experience or inspections, are selected for monitoring. In many cases, that will be the bends and welds.

KEMWAT utilizes a sensor that is welded in place to measure the thickness of a pipe's wall at one critical spot of approximately 1 cm² while it



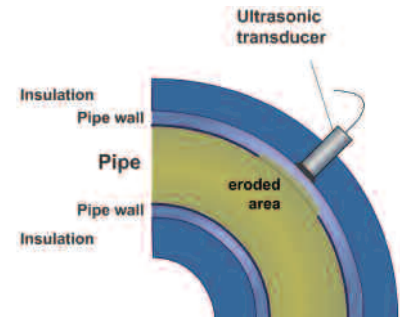
remains in use. An ultrasonic technique is applied to measure the wall thickness of pipes. At the critical spot a stud is welded and an ultrasonic transducer is mounted at the free end of the stud just outside the insulation. Because data from the sensor is registered remotely,

the method is particularly useful for monitoring inaccessible sections of pipe. Cables are conducted to a junction box at an easily accessible place like a platform or manifold so that readings can be taken at any time during operation. Measurements are performed with standard ultrasonic equipment.

Measurement resolution of less than 0.1 mm can be achieved using a thermocouple wire mounted near the stud weld. Measurement intervals can be varied depending on the decrease of the wall thickness monitored. Since erosion and corrosion are gradual processes, a handful of measurements per year are normally sufficient to provide accurate feedback on the diminution in wall thickness. Results can also be used in condition based maintenance.

Application

KEMWAT can be applied on all kinds of piping with no limitation with respect to operating pressure and temperature. All kind of wall materials can be



monitored, regardless the wall thickness. Elongation sensors are ideal for monitoring creep. The amount of elongation is readily measured, and progress over time is dependent on known physical processes.

Benefits

- Careful monitoring of critical areas removes the need for many inspections
- During tight scheduled maintenance windows:
 - o fewer things need checking
 - o less scaffolding has to be erected
 - o less removing and refitting of insulation
- Shorter maintenance stops result in higher availability
- Input to improve a maintenance plan.

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