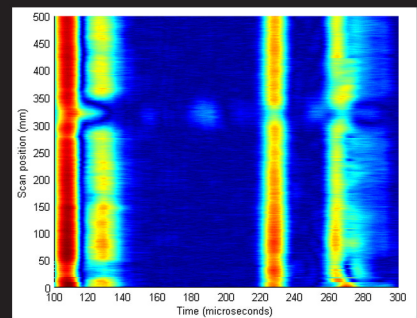


SH-EMAT Inspection

Sonomatic's SH-EMAT based technique allows rapid inspection of pipework and pipelines. Inspection under pipe supports is a major application since it allows the condition of the material to be reliably assessed without the need for lifting the pipe off the support. The SH-EMAT system developed has been shown to have industry leading capability for this application in blind trials conducted by the HOIS Joint Industry Project. The technique developed is also suitable for rapid screening of piping and, where the degradation conditions are not homogeneous, it is more effective in this application than sampling approaches using manual ultrasonic inspection.



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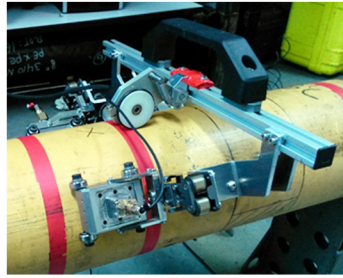
Sonomatic has offices in strategic global locations so we can respond quickly to customers' requirements wherever they may be situated. Our high quality products are matched only by our customer service. In addition to our field services, we offer training and consultancy at our sites in the UK or at clients' premises anywhere in the world. Sonomatic is committed to improving asset performance through applied and innovative technology; to delivering these benefits to our customers in the products and services that we provide; and to working with our customers, as value-added partners, to realise the maximum benefits of inspection technology.

The technique is complementary to Sonomatic's existing CHIME and Multiskip methods for inspection under pipe supports and screening of pipework. In general it is more suitable for thinner wall material (<12 mm) than CHIME or Multiskip. Sonomatic can advise on the best approach for different applications.

EMATs use the Lorentz force and magnetostriction to produce ultrasound within a specimen. Although EMATs are in general less efficient at producing ultrasound than piezo-electric probes, they are capable of creating waves that would be difficult by other means. As such, EMATs can be used to create Lamb waves or horizontally polarised shear (SH) waves, both of which are types of guided waves. In general conventional EMATs use Lamb waves, following tests of both approaches, Sonomatic decided to use SH-EMATs inspection system.

Unlike piezo-electric probes, EMATs do not require couplant, they can also tolerate an air gap between the bottom of the probe and the specimen. For this reason, EMATs are less sensitive to surface condition than other ultrasonic techniques. SH-EMATs are capable of scanning through coatings, however, the effectiveness of the technique depends upon the thickness of the coating.

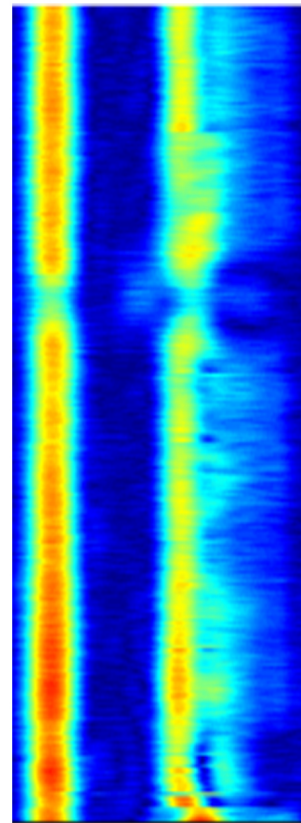
The SH-EMAT technique uses two probes in pitch catch mode, one at the 11 o'clock position and the other at the 1 o'clock position on the pipe. The guided waves produced by the EMATs can be used to obtain information on the entire circumference of the pipe from these two positions. The probes are held in place and scanned along the length of the pipe using a scanning frame. The frame is encoded, so the axial position of any features noted in the collected data can be identified.



The first wave mode produced by SH-EMATs travels at the shear velocity of the specimen under inspection. The remaining wave modes are dispersive, meaning their velocity is dependent upon the thickness of the specimen and the frequency of the signal, these modes will always have a lower velocity than the first mode. The arrival time of the first mode can be used to calibrate the velocity and probe separation of the system, the arrival times of the higher modes can be used to determine the average thickness of the specimen between the probes.

Any areas of degradation between the probes will affect the amplitude of the received signals and the arrival times of the dispersive modes. Should any degradation be detected, areas can be highlighted as requiring further investigation.

This is a screening approach which allows rapid inspection of piping, including the material at pipe supports. The technique uses Sonomatic's in-house developed scanners and can be deployed by rope access technicians.



QA and HS&E

It is Sonomatic's ongoing commitment to supply services and products, through the application of technical and engineering excellence, which complement both the customer's and our own QA and HS&E requirements.

Sonomatic's commitment to quality is maintained through continuous assessment and review of our Quality Management Systems to BS EN ISO 9001:2008. Sonomatic actively promotes the development, implementation and improvement of our QMS as a part of our ongoing drive to enhance customer satisfaction by meeting or exceeding customer requirements. In 2009 Sonomatic achieved UKAS accreditation as an Inspection Body to BS EN ISO/IEC 17020 (UKAS IB4276).