TELETEST™ FOCUS+ IN BITUMEN LINE LRUT INSPECTION APPLICATIONS

Eddyfi Technologies inspected bitumen pipelines on a jetty and the transfer lines at a storage depot in Norway.

Guided waves were deemed a suitable inspection technique because the bitumen pipelines were elevated and insulated, which would require very extensive scaffolding and insulation removal for conventional NDT techniques to be used.

Figure 1 Heated transfer line at 90–100 °C (194–212 °F)

Teletest™ FOCUS+ guided wave ultrasonic testing was used to screen the 25.4 cm (10 in) jetty line and the two 15.2 cm (6 in) transfer lines. The jetty line was operating at a temperature of less than 70 °C (158 °F) and the transfer lines were operating at temperatures of 90–100 °C (194–212 °F), which is well within the maximum operating range of the system.

The bitumen lines at the storage facility comprised of a 25.4 cm (10 in) line running from the jetty to two storage tanks. This line has electrical trace heating under the insulation which did not hinder the inspection. The temperature of the line at the time of testing was less than 70 °C (158 °F). No product was being unloaded at the time, so the pipeline was empty (the line gets blown through after unloading in an attempt to completely empty it).

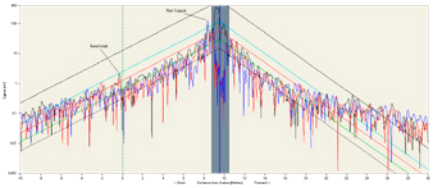

Figure 2. Data collected from the 25.4 cm (10 in) jetty line at less than 70 °C (158 °F)

The data in figure 2 was collected from the 25.4 cm (10 in) jetty line and shows that the signal is very highly attenuative and the diagnostic length very short. This is likely due to a bitumen coating on the interior surface of the pipeline despite the line being blown through and supposedly clean. The bitumen had cooled below the softening point into a semi-solid, highly attenuating the guided wave signal.

From the storage tanks, two 15.2 cm (6 in) lines run to the loading gantry. These lines are also insulated and heated.

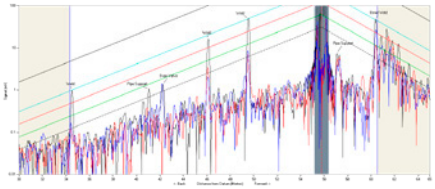

Figure 3. Data collected from one of the 15.2 cm (6 in) transfer lines at 90–100 °C (194–212 °F)

In figure 3, a much greater signal-to-noise ratio can be observed. The higher temperature of this line is above the softening point of bitumen, turning it into a semi-liquid and lowering its viscosity to the point where the guided waves display much lower attenuation rates, significantly increasing the possible diagnostic length and inspection.

Eddyfi Technologies