

CASE STUDY

Inspection of two parallel 36" lines from tank to jetty.

100% inspection coverage required.

Lines have a history of 6 o'clock corrosion including some leaks.

Mixture of spiral weld and seam weld pipe.

Inspection equipment used

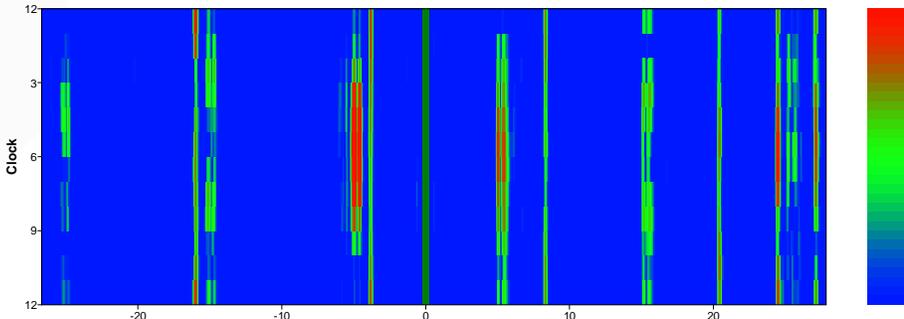
1. Wavemaker G4mini
2. inflatable 36" ring
3. QSR1



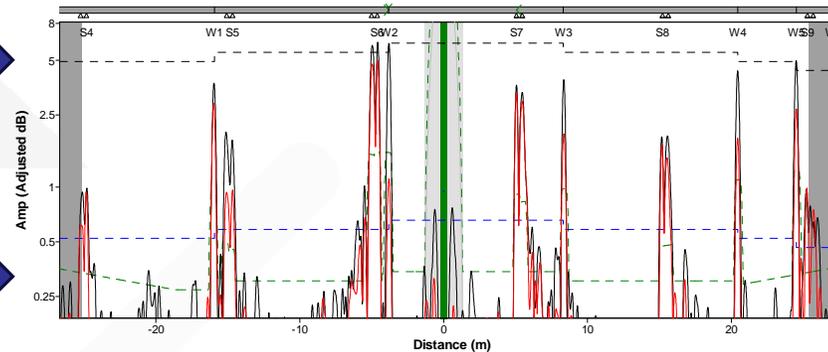
SCREENING RESULTS

Screening the line quickly identified sections of line that fall into one of three categories
 1. **Little or no damage**; 2. Isolated area of significant damage; 3. Large number of defects

Clean unrolled pipe display



Calibrated weld DAC



1% detection threshold

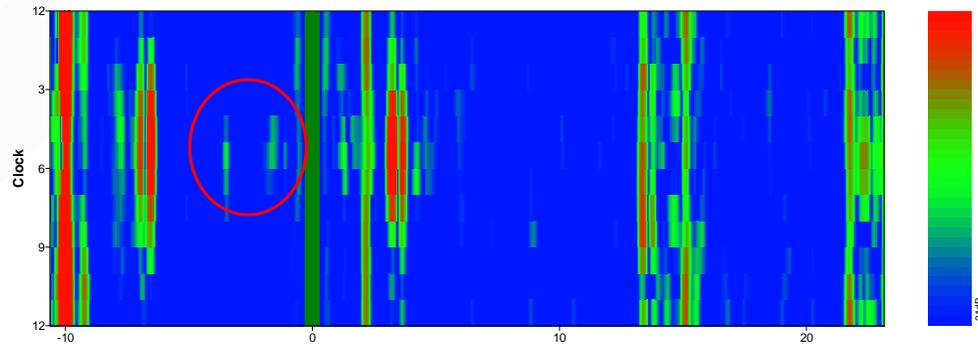


SCREENING RESULTS

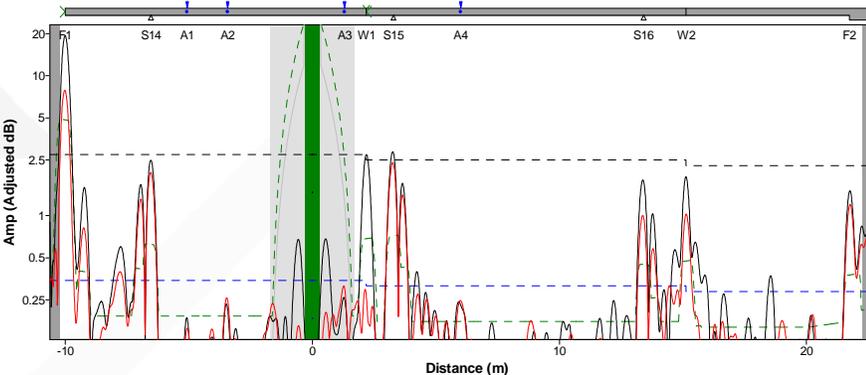
Screening the line quickly identified sections of line that fall into one of three categories

1. Little or no damage;
2. **Isolated area of significant damage;**
3. Large number of defects

Unrolled pipe display showing
6 o'clock indications



Calibrated weld DAC



1% detection threshold

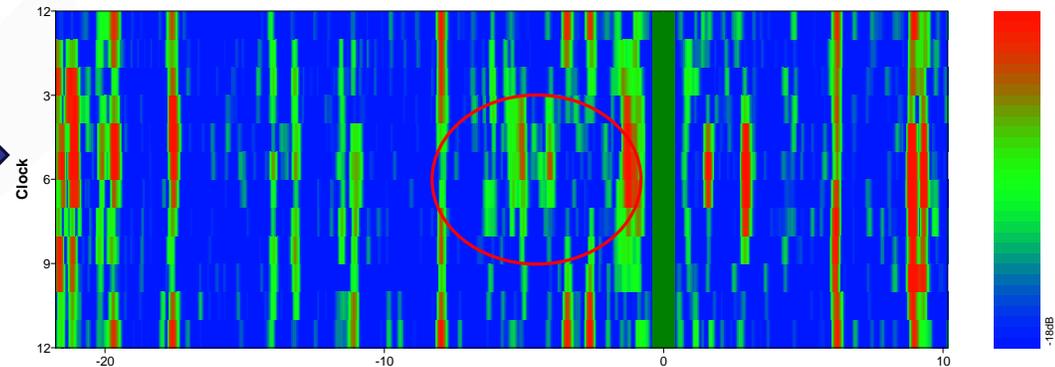


SCREENING RESULTS

Screening the line quickly identified sections of line that fall into one of three categories

1. Little or no damage;
2. Isolated area of significant damage;
3. **Large number of defects**

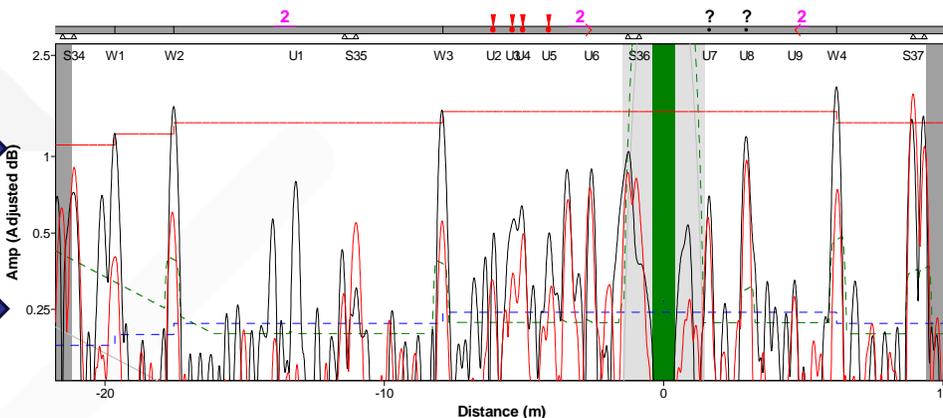
Unrolled pipe display showing
6 o'clock indications,



Weld DAC adjusted to average for line



1.8% detection threshold



QSR PROVE UP OF INDICATIONS

For indication at the 6 o'clock position the QSR was used to scan 30-100 cm along the pipe.

Automatically adjustable magnet allows QSR to be configured for different pipe wall thickness in matter of seconds.

Scans speed ~6 minutes per meter.

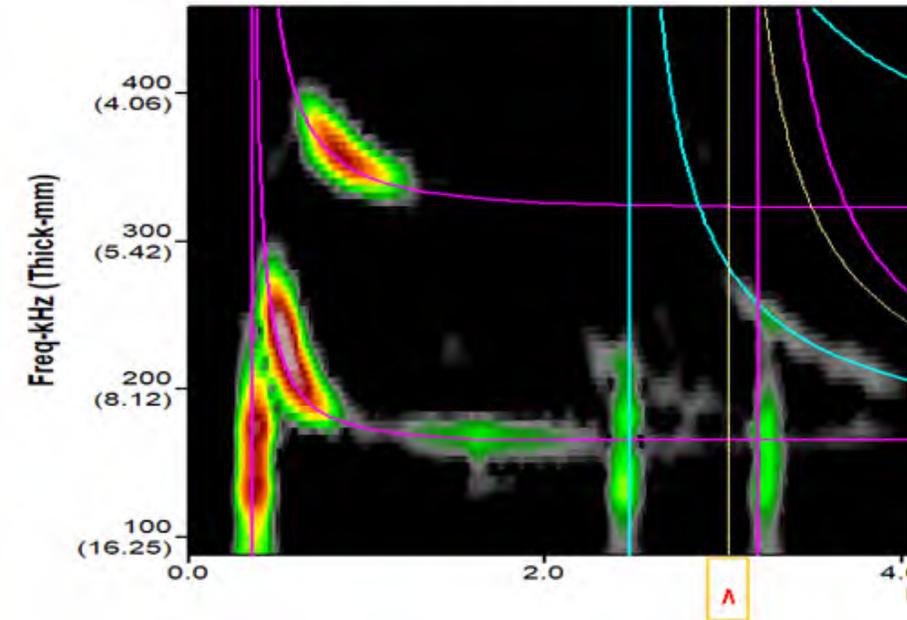
Beam width of 50mm means that 50 mm steps cover 100% of the bottom half of the pipe quickly

Pipe always scanned on opposite side of pipe to seam or spiral weld.



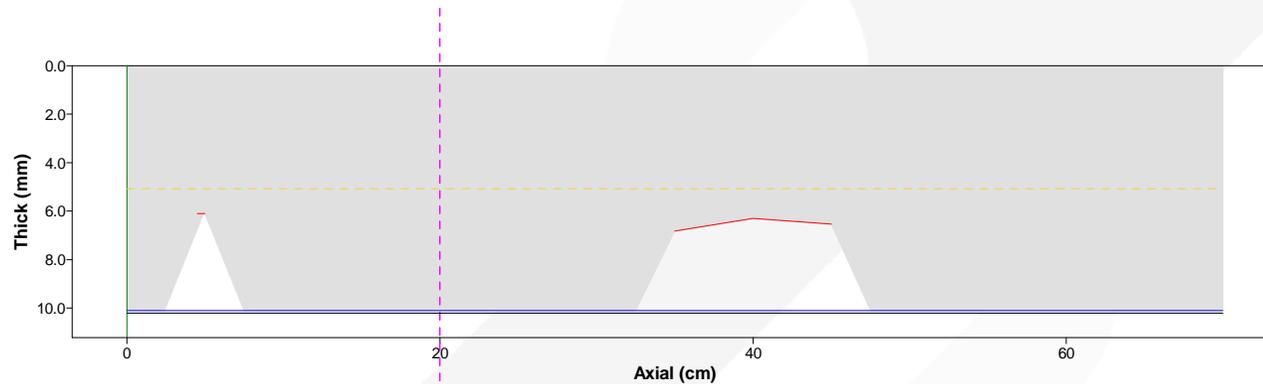
Frequency time plot

Map at z = 25.0cm (10.0mm)



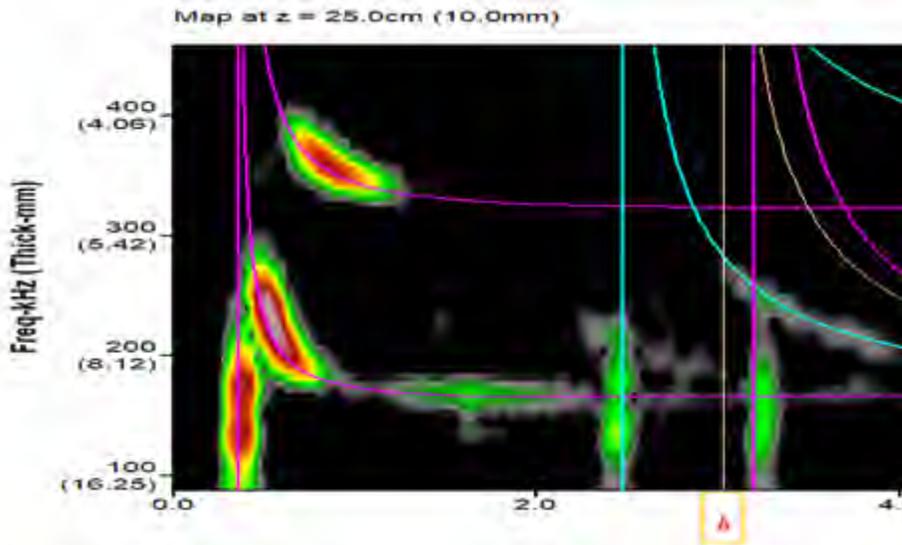
Vertical lines show non-dispersive SH0 modes
 Curved lines show dispersive SH1 modes
 Defects less than 50% wall loss only reflect SH1 mode
 Deepest defects reflect SH1 and SH0

QSR FOR MEASURING REMAINING WALL



QSR pipe profile along 6 o'clock position from scan across indication from screening.

QSR result for no 6 o'clock wall loss



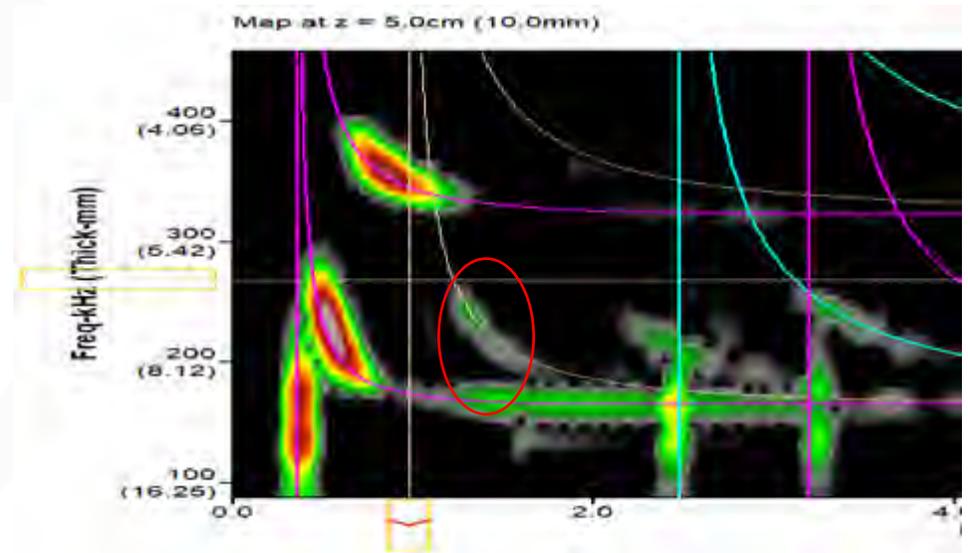
Frequency time plot

“Small” waves



“big” waves

QSR result for 40% 6 o'clock wall loss



SH1 that doesn't "fit" through the bottom of the pipe

CONCLUSION

- Combination of rapid screening with QSR prove up highly effective for locating and then determining the depth of highly localised MIC types of pit.
- GWT sensitivity shown to be sufficient provided careful control of both frequency and mode selection is maintained.
- Unrolled pipe display quickly identifies 6 o'clock defects and improves sensitivity over A-scan only.
- QSR has 100% POI due to beam width.
- Low frequency of QSR compared to UT and PAUT removes sensitivity to defect geometry.



ADJUSTABLE LARGE DIAMETER FRAME

In order to make scanning of large diameter pipes quicker and easier a new adjustable frame has been made for the QSR which separates the sensors from the E-POD. This reduced weight allows the sensors to be scanned at any circumferential position as long as the coating is thin enough for the magnets of the emat to hold the assembly to the pipe.

The frames can be set for any pipe size of 12" diameter or bigger.

