



# Seam Weld

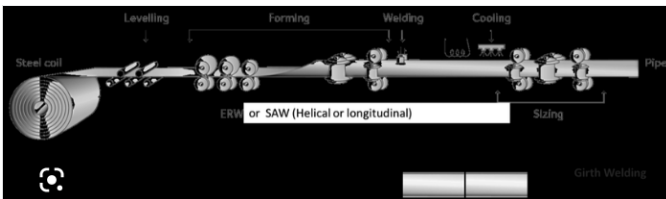
Value Tracking Case Study



# Seam Weld

## Background

The girth weld is relatively easily identified, both on the ILI data and visually on the exposed pipe. Similarly, the seam weld of submerged arc welded longitudinal (SAWL), or helical (SAWH) pipe is readily identifiable. However, for electrical resistance welded (ERW) or high frequency welded (HFW) pipes the seam weld can prove very difficult to locate (visually). This is due to the manufacturing technique whereby the flash formed on the outside and inside surface of the bond line is removed to blend smoothly with the adjacent pipe. Consistent and accurate determination of the seam weld position is important where pipes are being assessed for damage under the P/11 procedure or for proposed pipeline modifications (tapping etc.). A critical stage of the P/11 assessment process is to determine whether any damage identified during inspection is coincident with the weld or heat affected zone (HAZ). This requires the positive identification of the girth weld and, if it is welded pipe, the seam weld



The aim of the project was to investigate if additional inspection technologies (techniques, tools, or guidelines) exist, or can be developed that National Gas engineers or inspectors could implement on site to enable identification of the ERW/HFW bond line and its position around the pipe circumference.

## What's new?

The main findings of the project were:

- Visual inspection alone is not sufficiently reliable to consistently identify the longitudinal seam weld of HFW pipe supplied in accordance with National Gas specifications due to ambiguity over features and the likelihood of misreporting other longitudinal features.
- Some inspector knowledge of HFI welding is critical to understanding the features and typical appearance of a longitudinal seam weld.
- Metallographic examination on a moderately prepared surface using 10% Nital produced consistently good results with no significant impact upon the remaining wall thickness of the pipe.
- UT wall thickness analysis was able to identify the HFW longitudinal seam weld region by associated localised material thickness variations. There was both thickening and thinning in the weld seam region of the test pipes analysed and both cases complimented the identification of the seam weld.
- Shear wave angle probe examination was not reliable for the locating of the HFW longitudinal seam weld on National Gas material due to the general high quality and consistent removal of the internal weld flash and resultant smooth transition with the adjacent pipe material.
- The Roland electronic equipment successfully located the HFW longitudinal seam weld in the pipe examined by this technique using both Eddy current and MFL techniques. However, in its current form, the technology is not site portable.
- The ROSEN EMAT velocity measurement inspections successfully located the HFW longitudinal seam weld region in all of the National Gas pipe samples.
- The Creaform 3D laser scanning inspections successfully located the HFW longitudinal seam region in all of the National Gas pipe samples. The technique was also able to



identify the seam weld as it traversed a region of mild surface corrosion.

## The benefits

The outputs of this work will provide further information when identifying seam welds. This will save time through onsite assessments and allow engineers to identify issues quicker to resolve.

## Financial savings

Benefits to be tracked as a result of new methods added to existing procedures to save time and cost in onsite assessments.

## Implementation

The procedures developed during this innovation project will be implemented as part of the T/PM/P/11 management procedure ('Inspection, Assessment and Repair of Damaged (Non Leaking) Steel Pipelines Above 150mm Nominal Diameter and Designed To Operate at Pressures Above 2 Bar') update to ensure the information is readily available for all those undertaking this type of inspection. A briefing on the updates, including the seam weld identification procedures, will be delivered to all current P/11 technicians as part of the implementation of the revised P/11 once the procedure has been approved and published.

