

Market surveillance on Compressors

Catherine Hardy
HSE Safety Unit



Compressors market surveillance



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- Following complaints about air receivers 10 were tested by HSE to assess compliance with the SPV
 - 9 were manufactured in China, 1 in UK
 - 7 suppliers involved
 - 5 in UK
 - 1 in Germany
 - 1 in Italy

The results

- Of the 10 air receivers tested by HSL, they ALL failed to meet the required standards



Testing process

Destructive and non-destructive testing, including:

- Pressure test, MPI/DPI, radiographs
- Sectioning of welds to check quality
- Hardness tests
- Multi element chemical analysis of shell
- Tensile test of shell
- Visual examination
- Functionality test
- Document examination

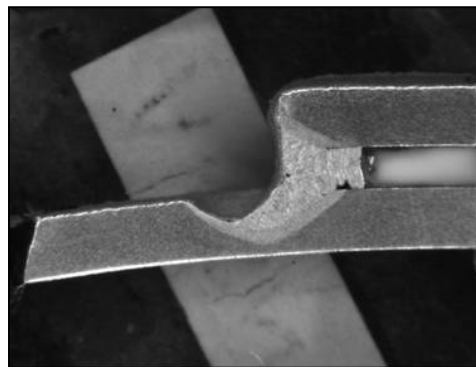
Compliance



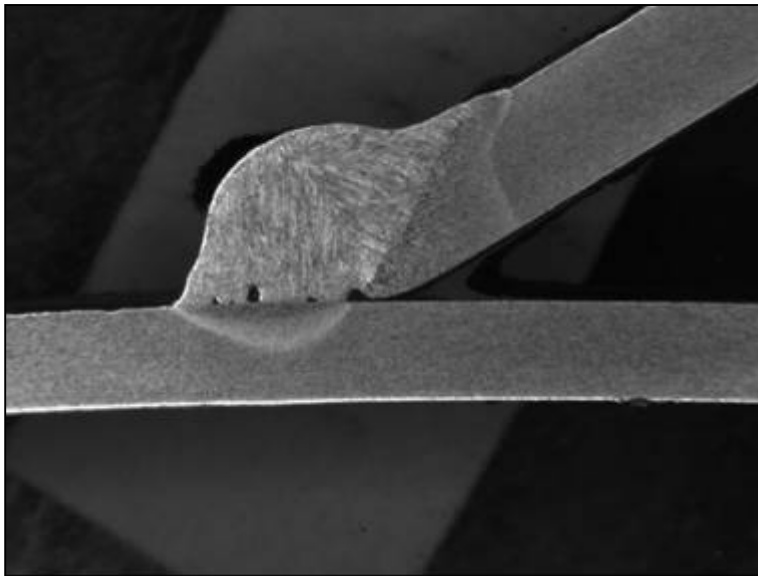
- Pressure cut-out switches, pressure-relief valves, drain valves and gauges- all worked
- Pressure test at 1.5 x max working pressure- all passed
- Weld tensile strength – all acceptable
- Chemical analysis- all made from low carbon steel- impurity levels OK
- Wall thickness- all acceptable

Non-compliance

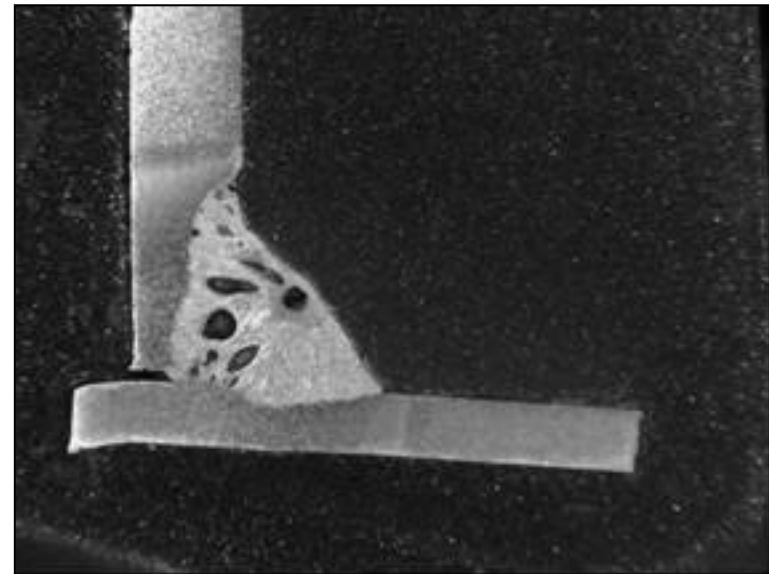
- Poor quality welding, eg porosity, slag inclusions, peaking undercut
- Lack of data on ID plate
- No certificate of conformity
- Operation of drain valve and inspection ports
- Shot blasting beads had been left inside one of the vessels
- In another vessel, the drain hole was not at the lowest point of the vessel



Weld defects

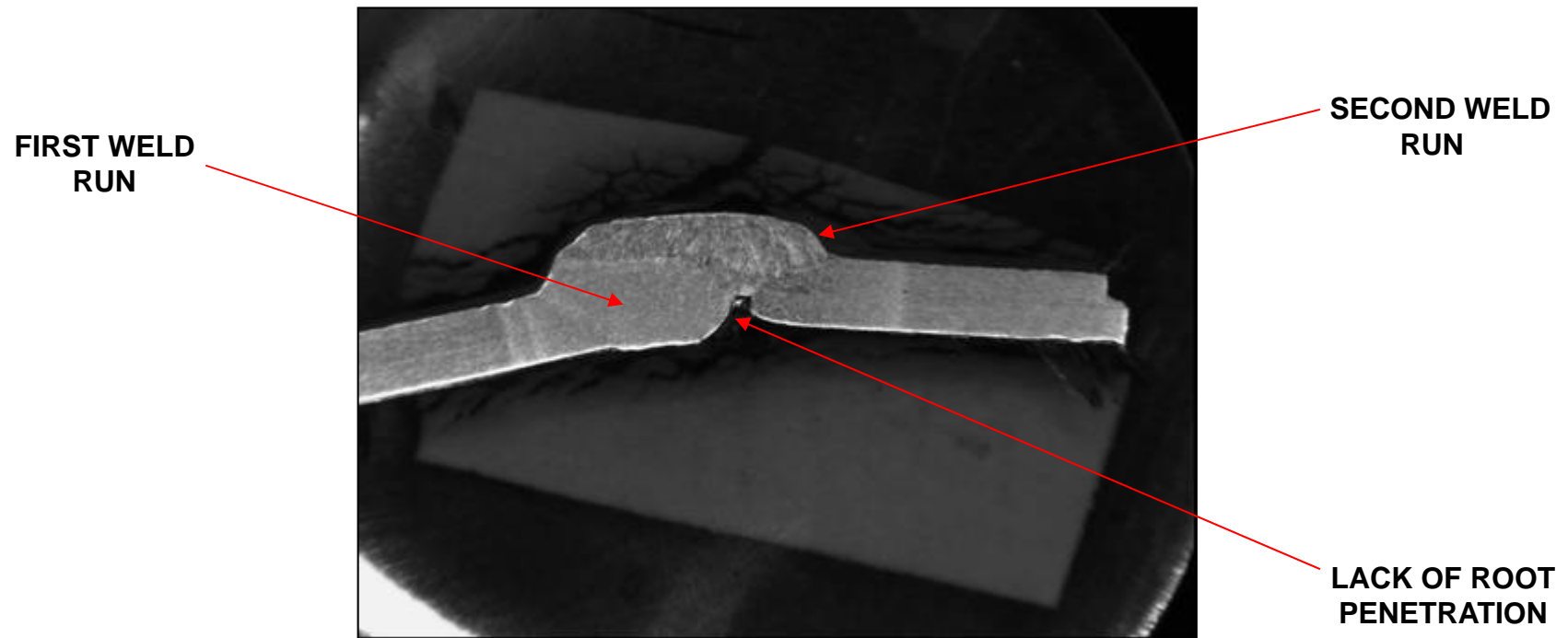


Lack of fusion



Porosity in weld

Weld defects



Longitudinal seam weld – lack of fusion and root penetration
(2 weld runs – one missed the other not penetrated fully)
Joint also Peaked

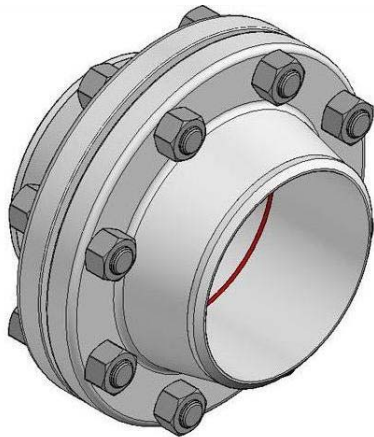
Assessment of safety risks



- More likely to leak than burst
- Relatively small capacities
- Failure along the length of the vessel would be either:
 - progressive deterioration along the weld
 - catastrophic explosion from overpressure or internal reduction in wall thickness (corrosion)



Assessment of safety risks



- Greater potential for significant release from jointed connections or dome ends
- Rapid change in sectional area
- Failure initiation results in offset loading

Action from HSE



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- Findings were entered on to the EU-wide ICSMS database
 - Wrote to the suppliers with the test report, informing them of the findings and asking them to take action
 - Non repliers (1) were referred to the local HSE Product Safety Team (PST inspectors) for follow up
 - The 2 suppliers based outside the UK (Italy and Germany) were referred to their domestic market surveillance authorities
 - Other market surveillance using this intelligence will continue

Action from Suppliers



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- Stopped selling the product (3 suppliers)
 - Stopped using the factory (3)
 - Increased quality inspections for each batch (2)
 - Reviewed procedures (1)
 - Raised the issues with the factory (1)
 - Reviewed quality controls- more testing of weld quality
 - Raised issues with Notified Body (1)
 - Improved the instructions supplied with product (1)
 - Revised DoC (1)
 - Changed data plate to state all required information (1)

Further work



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- Joint enforcement with Ports earlier this year
 - Batch of small compressors destined for a popular supermarket were held at the port as part of a larger operation.
 - Sampled, tested, and found to be compliant