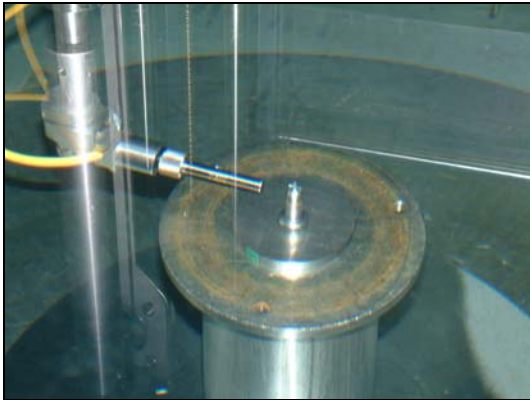


UT Imaging Application: Thin Wall Welds

Application Background

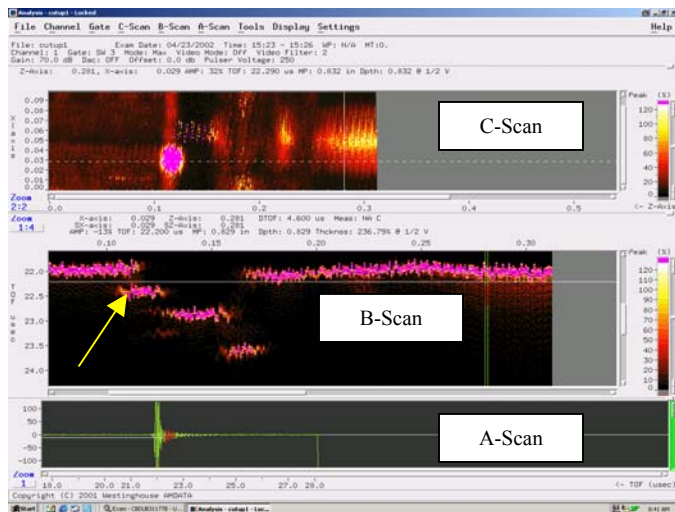
In many situations, ultrasonics (UT) is used to confirm the existence and integrity of thin welds on small parts. Examples of such applications are described herein.

Case 1 – A small cylindrical stainless steel part involving a welded cap. The UT challenge is to confirm the integrity and thickness of the resulting weld. The requirement is for a weld thickness of 0.020" (0.0008 mm) or greater, and no lack of fusion in the weld zone.



Part in immersion tank being scanned on a pedestal

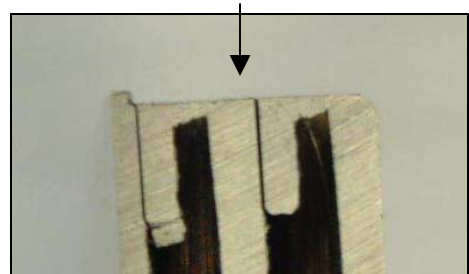
Using a zero degree exam for thickness and bond related integrity, UT data provided useful insight to troubleshoot the manufacturer's process and optimize its resultant solution.



Geometry and weld indications that conformed to destructive testing (DT) results

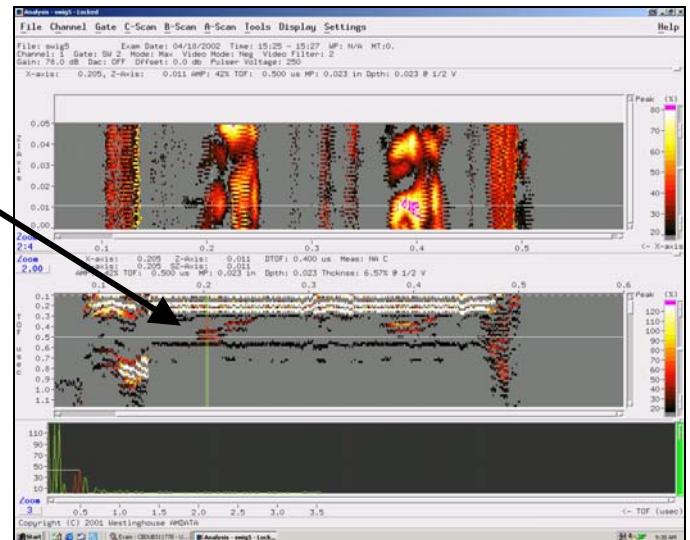
The C-Scan view shows an area of incomplete weld, its location is seen as the first step below the surface in the B-Scan (shown by yellow arrow).

Case 2 – A seal weld to its base. Weld penetration is the issue of concern, the requirement being to have a weld thickness of 0.008" (0.0003 mm) or greater.



Sectioned part contour prior to a welded condition

The complexities of this application are that the seal is composed of multiple strands, and that the strands are welded to a thin section of base metal. The arrow in the above photograph denotes the direction of the subsequent UT examination.



Initial testing results of the welded seal

The arrow in the above image points to the B-Scan (side view) of the weld. The sloped contour of the original base metal in the upper photograph remains in the resultant weld. This slope is clearly detected in the UT B-Scan view.

Conclusion

While UT inspections in immersion conditions routinely deal with relatively thick forgings and machined parts, the same technology can also be applied to thin wall welds in normal conditions as well as in unusual geometries.

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