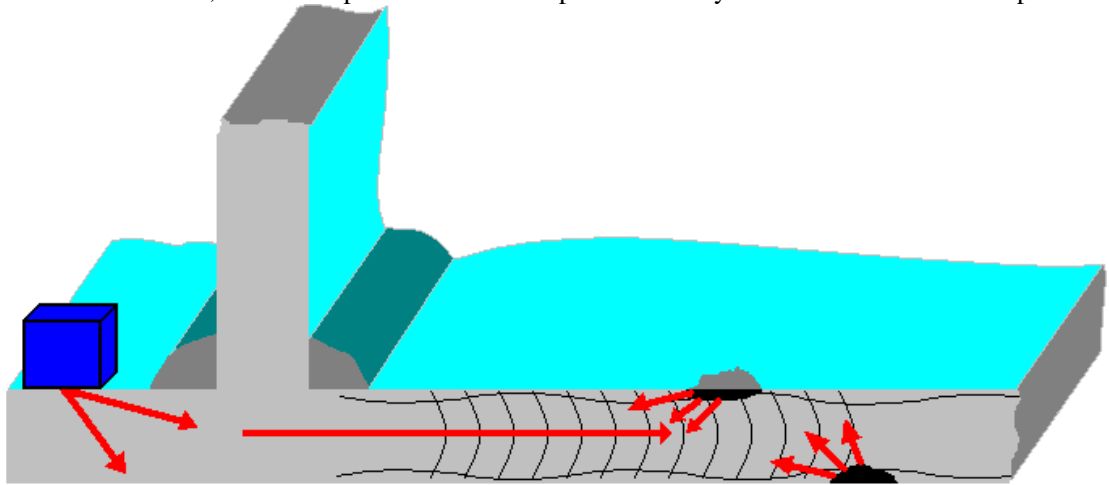




Long Range Ultrasonic Technique (LRUT) for Inspection of In-Service Tank Bottom with access from Annular Plate

The **specially designed probe** emits the ultrasonic beam having the width, duration of the wave package and basic wavelength comparable with the thickness of the plate. The components of the emitted wave package interfere between the plate's surfaces. The probe's dead zone is located under the fillet weld, so the probable echoes from the welding area are significantly suppressed. After passing through the fillet weld area the ultrasonic wave package saturates the volume of the plate while propagating. Pitting and corrosion damage if any returns an echo, picked up by the probe.



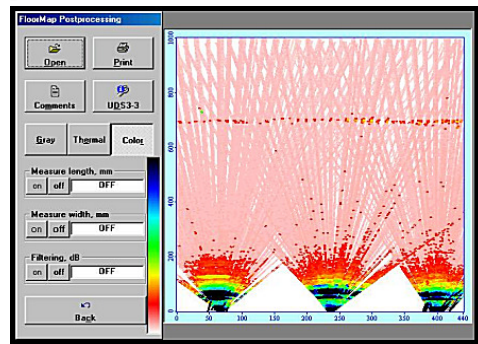
The echo height correlates with the depth and surface dimensions of the pitting (corrosion damage), so the degree of the damage may be evaluated by referring to the amplitude of the received signal. The defects located on both surfaces of the plate may be detected; however it is not possible to distinguish between echoes obtained from defects belonging to different surfaces.

Inspection software package provides the pitting (corrosion damage) mapping of the plate through the linear scanning along the plate edge, for example the lip of annular plate, with capturing, processing and storing of all received ultrasonic signals (A-Scans). The mapping procedure may be encoded (true-to-scale) or timed.

The described principle of the pitting (corrosion damage) detection and mapping is applicable for the probe to-damage distances of up to 1...1.5 m providing that there is no another weld or plate wedge on the way of wave package propagation beside the shell's welding

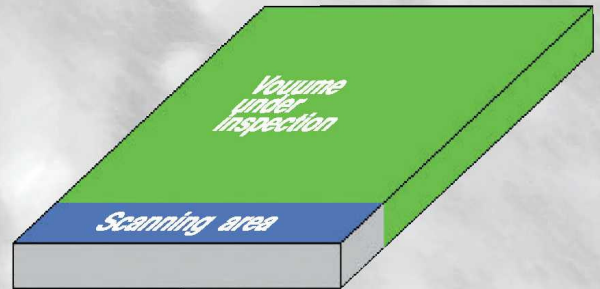


The LRUT probe pushed the sound through with the aid of thick couplant layer despite of corrosion pitting on the annular ring.



LRUT imaging of the tank floor, scan taken at 3 points of the tank; Note the lap weld signal at 700-mm. sound path distance inside the tank.

*Rapid Scanning of the Large Areas
(mapping of defects from annular
plate in above ground storage tanks)
Linear Scanning Along the Shell. It
is an in service annular screening
tool for AST covering up to a
maximum of 1.2 m from the tank
shell and similar projection plate and
sometimes AST bottom plate
depending on annular size.*



CB-Scan imaging of volume under test aside of narrow scanning area is performed through continuous measuring and recording of echo amplitudes, reflectors coordinates, and probe swiveling angle during XY probe manipulating:

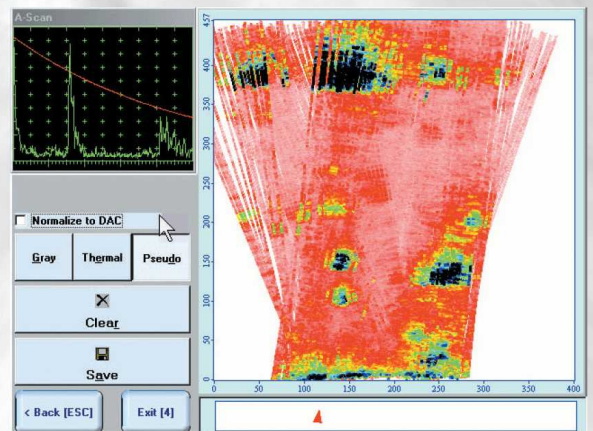
- ◆ True-to-location data recording is provided through mechanics free airborne ultrasound determining of probe location and swiveling angle
- ◆ Complete sequence of A-Scans is recorded along with real time CB-Scan imaging
- ◆ Off-line evaluation of captured CB-Scan images and A-Scan distribution data is featured with
 - Sizing of defects at any location of scanned volume: coordinates, XY projection dimensions, and area
 - Play-back and evaluation of A-Scans obtained during scanning; echo-dynamic pattern analysis
 - CB-Scan image reconstruction for various Gain and /or Reject settings

Typical Application: Flaw detection and corrosion screening using guided and surface waves; defect outlining using angle beam probes



info@russelltech-india.com
www.russelltech-india.com

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