

USL

Ultrasonic Sciences Ltd

Hollow rail axle inspection system

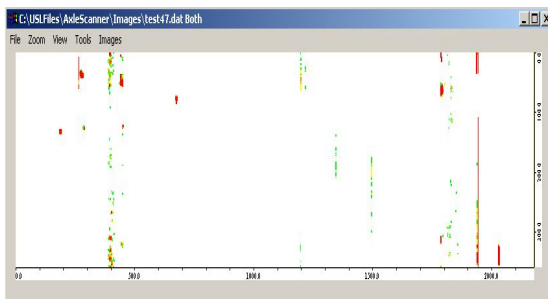


- Inspection of hollow axles in-situ on the train
- Fast and reliable inspection
- One man operation
- Inspection of entire surface, including the blend radius
- Sensitivity 0.5mm notch, or better
- Permanent C scan records with true surface position recorded
- Automatic calibration from corner reflectors
- Continuous couplant monitoring and recycling
- Automatic defect evaluation and numbering

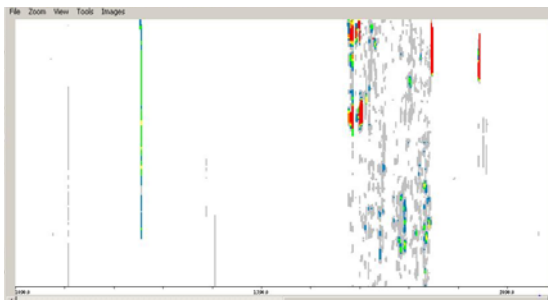
An increasing number of train designs incorporate hollow axles. Manual ultrasonic inspection is a laborious operation, with poor reliability. Over a 10 year period USL have developed and supplied automated systems for hollow axle inspection, which provide permanent records of the inspection in a C scan format.

These systems are used with the wheelsets in-situ on the train - normally only the axle end caps have to be removed. Using these systems it is possible to detect circumferential defects down to 0.5mm deep. All the external surfaces can be inspected, including wheelseats, gearseats and transition radii.

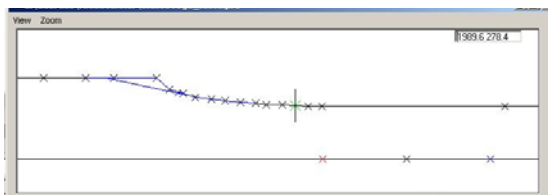
Typically, an inspection can be carried out in 10 - 15 minutes and the system can be moved and fitted to the next axle in a few minutes more.



Results are presented in a C scan format - defects are highlighted in red. The results from different probes can be displayed separately or combined, with defects shown in their corrected surface positions



Defect areas can be magnified using the "Zoom" function



The axle profile can be accurately represented, with the ultrasonic settings programmed to follow the contours of the blend radii.

Specification

Mechanical

Axle bore diameter:	50, 65, 85, 110 mm (Others on request)
Axle height range:	360 - 1500 mms (Others on request)
Axle length:	2600mm max
System dimensions:	1000 x 800 x 1100 mm
System weight:	350kgs
Probe head:	Continuous rotation 40 - 90 rpm
Angular resolution:	0.1 degree
Linear drive:	Compact linear drive
Linear resolution:	0.1mm
Linear speed:	150mm/sec maximum. Typical 3 to 10mm/sec during scanning.
Axle fixturing:	Quick release fixing. Counterbalanced head. Angular adjustment.

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Transducers:	Twin shear wave 2.5 or 4 Mhz 38 or 45 degree
Electronics	USL PC based boards <i>PR20 Pulser receivers</i> <i>100MHz A-D converter</i> <i>Digital Signal Processor</i>

Couplant

30 litre couplant tank. Automatic pumped supply with full recirculation. Visual and electronic level display. Continuous couplant monitoring by flow sensor and ultrasonically.

Computer

Industrial rack mount computer (1 GHz) with hinged LCD screen. 40 Gbyte HDU. Read write CD drive. Industrial keyboard and mouse pad.

Software

Windows 2000 software package, with the following features:

- Digital A scan display - 20Hz update rate
- Colour coded gate displays - active display according to probe axial position.
- Real time C scan displays - channels independently displayed or combined.
- Powerful profile editing functions.
- Independent gain and gate settings for each channel.
- Real time graphic display of probe position, beam surface position, gate delay and gate width during scanning.
- Zoom, Pan and Scroll of images.
- Automatic defect identification and numbering.

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