USL **Ultrasonic Sciences Ltd**

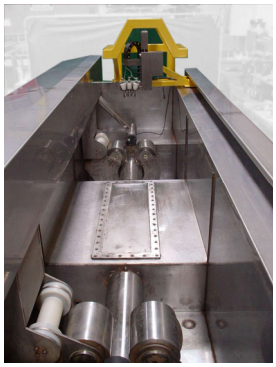
Ultrasonic systems for the railway industry

- Automated systems for inspection of hollow rail axles in-situ on the train
- Immersion systems for axle testing during manufacture, in-line and off-line
- Rail wheel testing units - production and in-service inspection
- Fully integrated systems, with handling and cell communication
- More than 20 years experience in the industry

For more than 20 years, Ultrasonic Sciences Ltd has manufactured automated ultrasonic testing systems for the rail industry. These include:

- Mobile machines for inspection of hollow axles in-situ on the train.
- In-line units for inspection of wheels during manufacture, both cast and forged wheels.
- Immersion systems for testing rough machined axles in the manufacturing cell
- Units for inspection of rail wheels in service and after re-machining.

Many of these units are fully integrated with machining cell controllers and gantry handling units, for unattended inspection as a seamless part of the manufacturing process.



Ultrasonic immersion tank with adjustable roller drives for axle testing (left) integrated into conveyor and gantry handling line

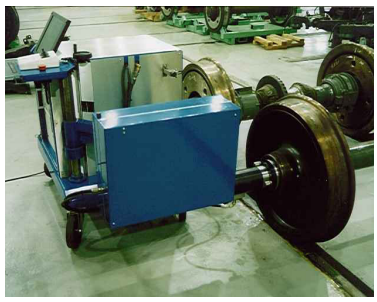
These units use multiple probes with USL ultrasonic and data acquisition systems, which have been proven in hundreds of industrial applications in a range of industries. They have exceptional signal to noise ratio and immunity to external noise sources, both essential requirements in heavy duty industrial environments.

USL manufactures both multiplexed and phased array ultrasonic testing electronics to ensure that the right instrumentation is chosen for the application.

Systems can be designed to suit the specific requirements of the end user, for example matching of the inspection speed to suit the production throughput, custom data output formats or special handling units.

Example systems

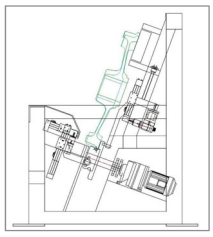
Hollow axle inspection systems



These are mobile units used in maintenance workshops for periodic inspection of axles for fatigue cracks and other defects on both exposed and hidden surfaces. The unit is connected to each axle in turn and a rotating probe head travels down the bore. The inspection is completely automatic and produces an image displaying any defects above a preset threshold.

- Inspection with wheel set in-situ on the train
- Programmable changes to test parameters to compensate for changes in axle profile
- Simple attachment to axle
- Inspects a complete axle from one end
- Couplant recirculation and monitoring

Wheel testing in a manufacturing cell



In a typical system wheels are transferred by gravity or by a gantry handling system onto a partially immersed roller drive system. The wheel is rotated as probes scan mechanically or electronically over the tread, boss and web areas. Any defects detected cause the wheels to be marked and removed from the manufacturing line. The cycle time can be less than 1 minute.

Axle inspection during manufacture

Axles are inspected by the immersion method using both radial and axial inspection, according to international and local standards. Suspect axles are rejected or quarantined.
USL works with end users and machine tool manufacturers to ensure that systems are fully integrated into the manufacturing process.

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