ULTRASONIC RAILWAY WHEEL INSPECTION SYSTEM



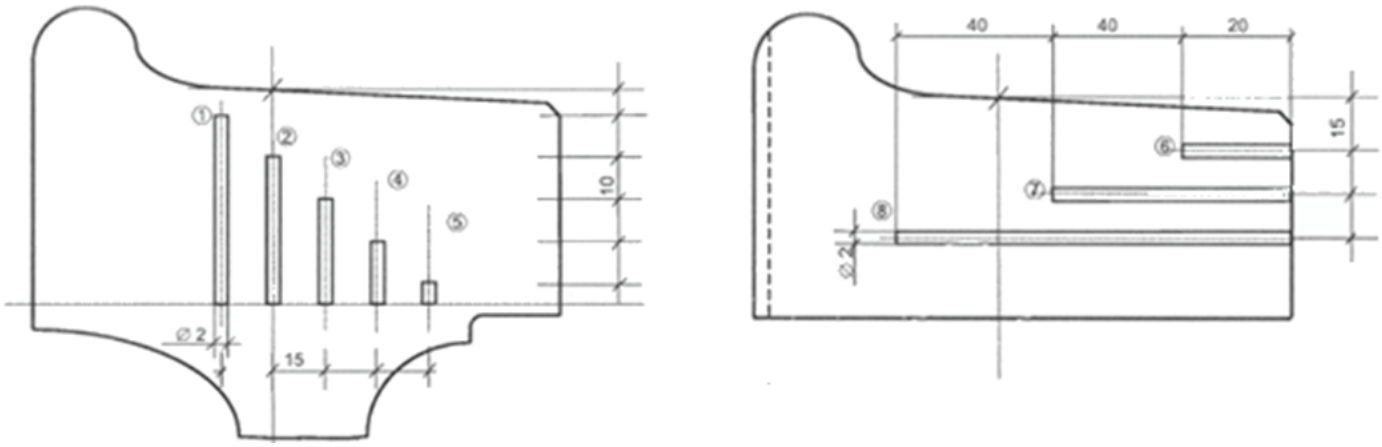
RDSO Approved

Phased array Ultrasonic Testing of New Railway Wheels

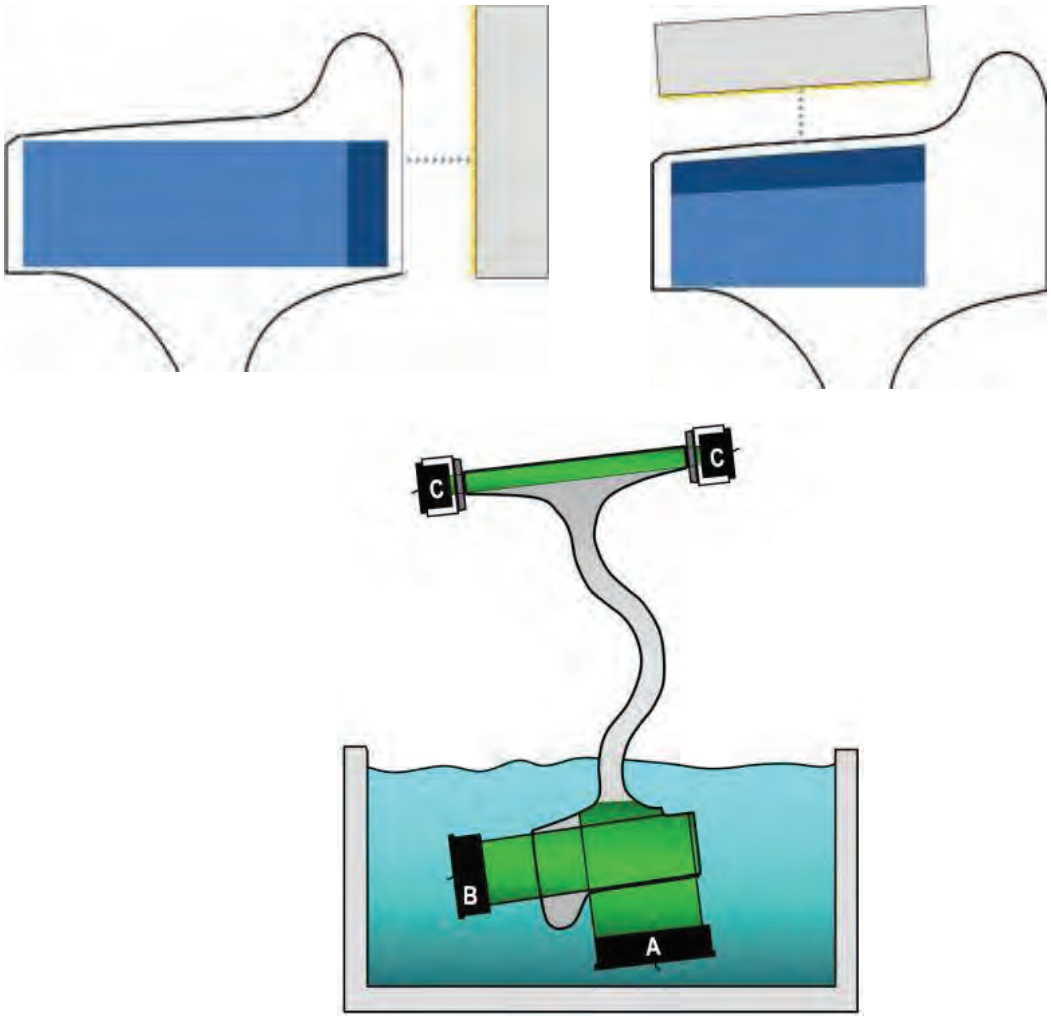
Railway wheels are inspected for discontinuities using the ultrasonic technique and Magnetic Particle Testing during the manufacturing process. Depending on the requirements to be met and the classification of the wheel, the wheel rim is inspected for flaws of the sizes FBH 1 mm or 2 mm. The wheel hub and wheel web are inspected for flaws of the sizes 3mm and 5mm (FBH).

The NDTT AURWIS (Automatic Ultrasonic Railway Wheel Inspection System) is an advanced automated system designed for the inspection of railway wheels using ultrasonic technology. Developed by NDT Technologies (P) Limited India, this system represents the latest generation of technology in its field. It is specifically designed to detect defects and irregularities in railway wheels, ensuring their safety and reliability by providing accurate and efficient inspections.

The inspection is performed with an almost vertical position, wheel is tilted at 13°. This suggests that the ultrasonic waves will be directed at a specific angle to penetrate the wheel material effectively. The wheel is partially immersed in coupling water. This water acts as a medium to transmit the ultrasonic waves between the probes and the wheel surface, helping in obtaining clear and accurate readings.



Two phased array probes with 128 elements each are used for inspection of Tread & Rim. The probes are mounted at the 6 o'clock position of the wheel, which is immersed in water.



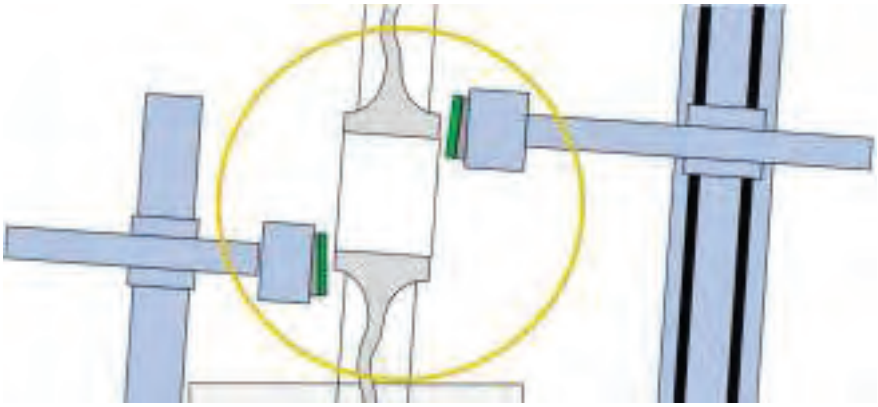
Probe positions for the ultrasonic wheel inspection :

A) Probe for tread testing

B) Probe for rim testing

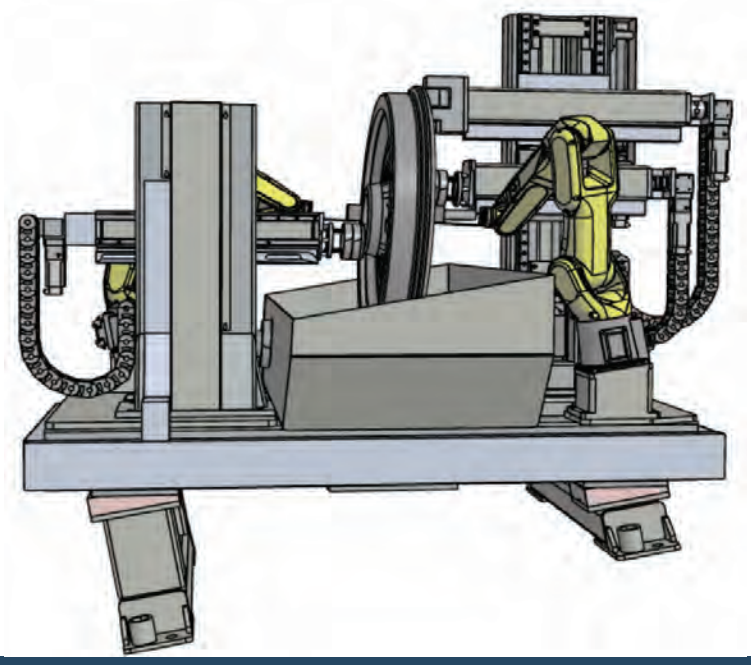
C) two-sided hub testing

Hub: Two phased array probes, each with 64 elements are used to inspect the hub for internal defects, including cracks, voids, and inclusions. The probes are coupled using a water collum to generate water gap.



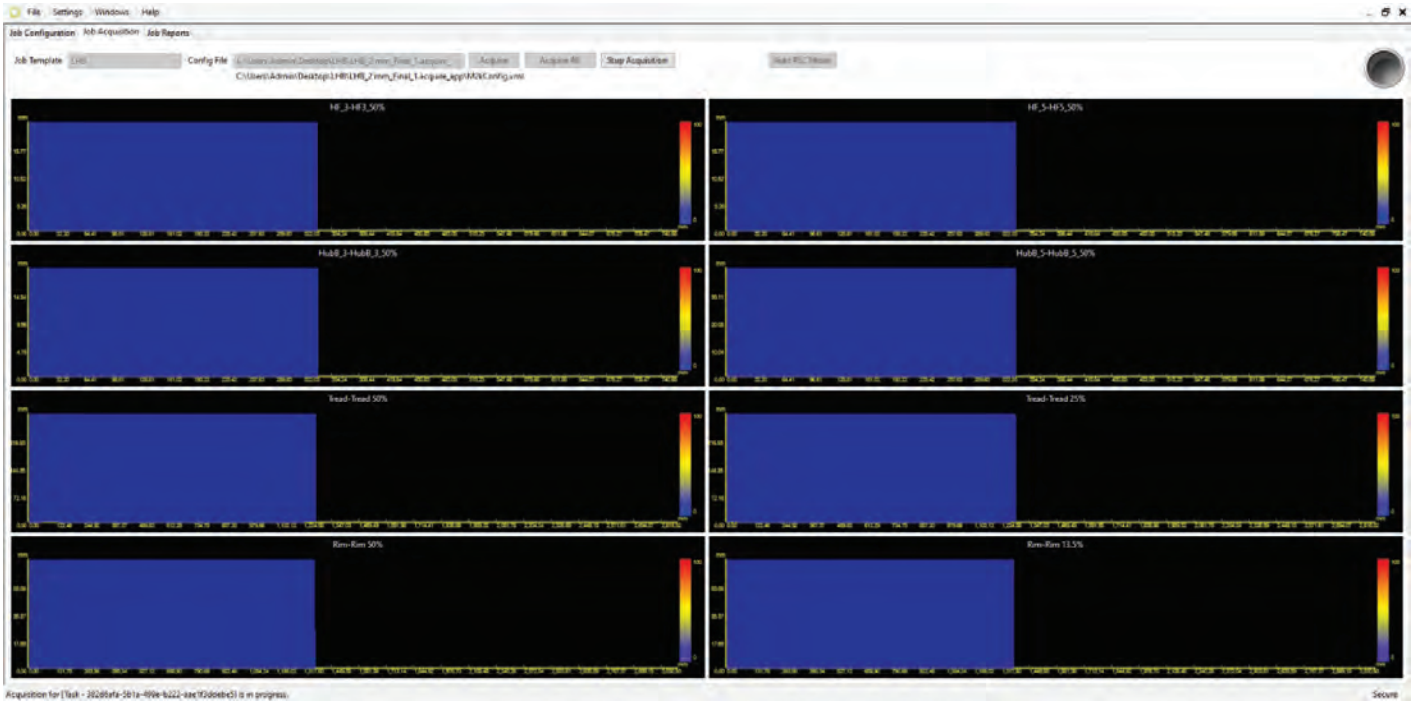
Wheel Web Inspection: Two Robots are installed to inspect both side of the wheel. The inside robots could be responsible for positioning squirters in the inner contours, while the outside robots handle the outer contours. The squirters Ultrasonic probe need to be positioned so they align perfectly with the wheel disk's contour. This ensures that the probe is always perpendicular to the testing surface.

The wheel rotates 360 degrees in the testing system and robot reposition themselves to inspect a new circular orbit. This repositioning allows the system to inspect the web in a systematic manner, covering all necessary areas without missing any spots for the inspection of the web. The inspection software then assembles these circular orbits into a comprehensive overall image of the web. This final image is used to evaluate the web's quality, identifying any defects or issues.





UT Phased Array – Test Setup Screen



UT Phased Array – C Scan Acquisition Scree

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