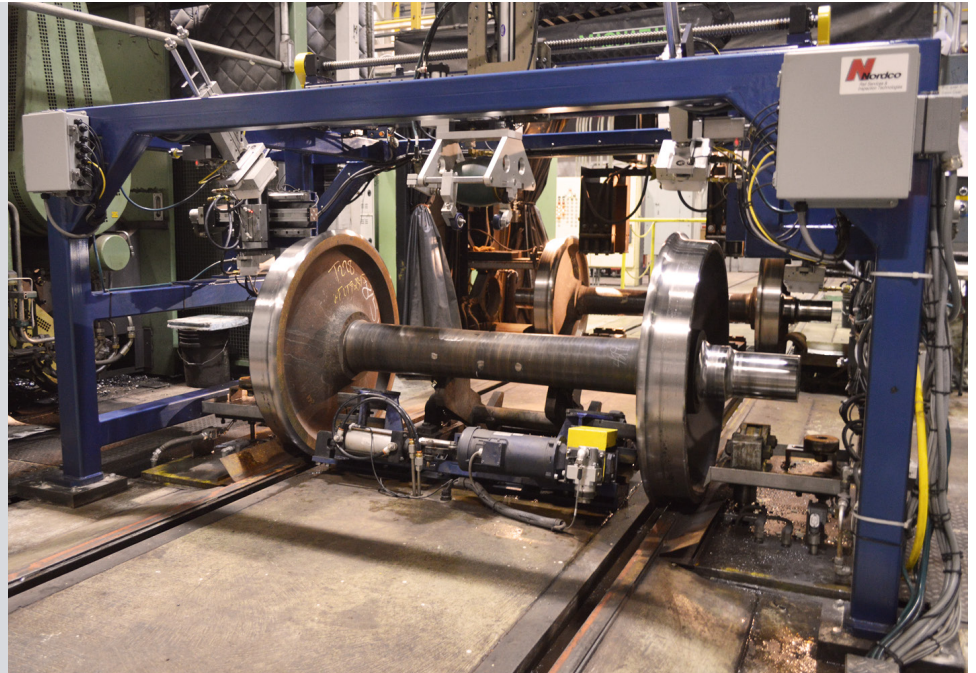


Ultrasonic Wheel & Axle Inspection System

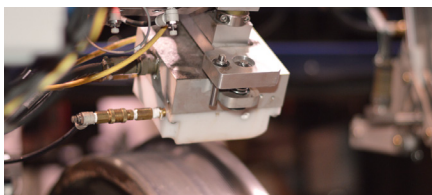


Key Features

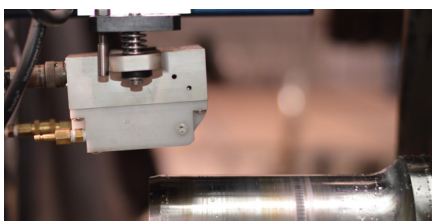
- Multi-Probe, concurrent inspection of wheel treads, journal bearing surfaces & axle shaft
- Eight channel Rolling Search Unit
- Custom shoe type probes
- HD Digital Signal Processing platform
- Fully automated
- Wheel lift and drive mechanism
- Stand-alone or in-line production
- Real-time data collection & display
- Bar-Code scanner
- Reporting to AAR specifications
- Database storage



8 Channel Pulse-Echo Ultrasonic Wheel Probe



3 Channel Dual Ultrasonic Wheel Thread Probe



2 Channel Dual + Shear Ultrasonic Journal Probe

Versatile, High-Tech Ultrasonic Wheel & Axle Inspection

Nordco's stationary Ultrasonic Wheel & Axle Inspection System consists of multiple probes, which allow simultaneous inspection of wheel and axle for optimal throughput.

Our ultrasonic sensor technology is deployed using proprietary multi-sensor shoe-style test heads, which conform to the journal bearing surfaces and wheel treads to be inspected. The actuated test heads are positioned over the rotating test surfaces, while a fine mist of couplant ensures proper transfer of the ultrasonic energy. All run-off liquid is captured, filtered and recycled into the couplant delivery system.

The center portion of the axle shaft is examined with a roller sensing unit (RSU), which traverses along the length of the rotating axle in a fully automated fashion. The system employs a combination of radial, angular, or shear waves to conduct volumetric testing of the entire axle length and diameter.

Test head alignment and test execution is fully automated and can be configured for in-line production setups. Loading and unloading of the wheel & axle set is operator controlled.

Nordco's proprietary High-Definition, Premium Resolution Inspection & Measurement Equipment includes a state-of-the-art digital electronic mainframe that processes multiple channels simultaneously. Data collected from the sensors is analyzed in real time by the system and is sent to the Wheel & Axle software application for display, reporting and database storage.

Product Specifications

Category	Description	Specification
Inspection Capability	Product	AAR Wheels and Axles - Per M-107/M-281, RP-631 G, GII
	Wheel Diameter	36 to 42" (915 to 1067 mm)
	Axle Diameter	5 to 9.25" (127 to 235 mm)
	Axle Length	85 to 89" (2160 to 2260 mm)
	Surface Conditions	Relatively clean of rust and scale but may be rough (500µin/in Ra) and irregular
	Detection	Defect of 0.25" x 3" (6.35 mm x 76.2 mm) long and/or 0.25" (6.35mm) diameter sphere
	Cycle Time	4 minute automated inspection time, excluding operator controlled load & unload
Software	Alarms	Automated Alarming with Variable Set Points
	Data Collection	Data Storage Capability of over 1 million Wheel & Axle sets
	Record Keeping	AAR S-920 Compliant Automated Bar Code Scanning Feature using Motorola Scanner
	Reporting	Certification and Exception Reports
Environment	Temperature	35 to 120°F (1.5 to 49°C) cold weather provisions available

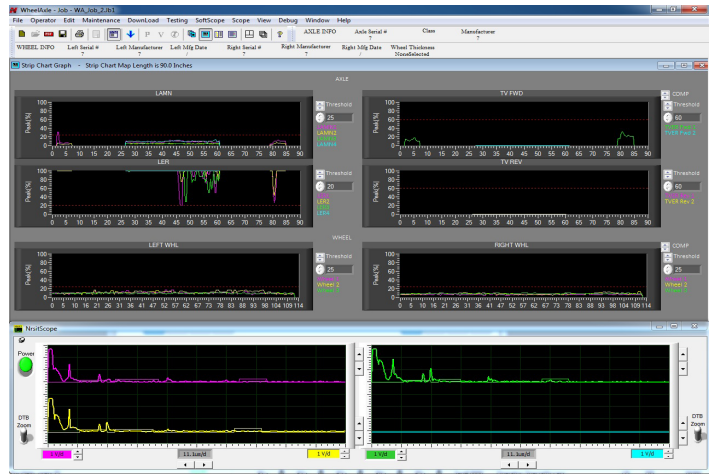
Nordco Wheel & Axle Software

Customers can quickly setup tests via bar-code scanning, which loads the appropriate job file from a library of wheel and axle designs. This sets up all required ultrasonic test parameters, automation settings and thresholds for pass/fail acceptance. Throughout test execution strip charts allow the operator to monitor local material defects (LAMM & TV) and back wall problems (LER) of the axis instantly. Similarly, outputs of the wheel sensors are displayed on the two wheel (WHL) strip charts. If preset signal thresholds are exceeded (representing potential flaw scenarios) at any point during the test, the system will record signal details and position coordinates in a defect list for record keeping and post analysis.

Once a test sequence is completed all flaw data is stored in a database and a PDF certification report, indicating overall PASS/FAIL, will be generated. The ultrasonic data collected may also be used to generate a consolidated A-Scan video image for setup purposes and additional part examination

Length	Pos	Left Pos	Type	L	P	A	XL	Peak	Count	Start	Walk
25.363	8.125	LAMM	3	2	33	85	330	3.072	3.070		
25.363	8.274	LAMM	3	2	33	86	330	3.072	3.072		
25.363	8.382	LAMM	3	2	33	87	330	3.074	3.073		
25.363	8.512	LAMM	3	2	33	82	330	3.070	3.046		
25.363	8.600	LAMM	3	2	33	82	330	3.046	3.043		
25.363	8.249	LAMM	3	2	33	82	330	3.042	3.075		
25.363	11.498	LAMM	3	2	33	85	330	3.070	3.075		
33.125	5.687	LAMM	3	2	34	92	330	3.130	3.075		
33.125	11.938	LAMM	3	2	34	92	330	3.075	3.040		
33.125	5.824	LAMM	3	2	34	92	46	3.038	3.046		
33.125	8.761	LAMM	3	2	34	91	84	3.087	3.083		

The Defect List generated during test execution.



Wheel & Axle app showing defect signals on all channels in a composite view.

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