AXIS

ACFM Axle Inspection System

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ACFM® AXLE INSPECTION SOLUTIONS

Until now, NDT techniques used in the freight rail industry are recognised to have major limitations in their ability to detect and evaluate shallow, surface breaking defects. TSC Inspection Systems is proud to present the revolutionary AXIS™, a simple, fast and accurate NDT solution that addresses these limitations and provides operators with confidence in freight rail axle integrity management.

If you work within the rail freight sector, you know as well as anyone that the safety and integrity of a freight wagon axle is of critical importance. Failure of a wagon axle can lead to unimaginable safety consequences, not to mention significant financial loss.

The current technologies used to inspect the centre span of wagon axles are usually ultrasonic testing (UT) and magnetic particle inspection (MPI). Both of these methods have weaknesses, particularly when trying to detect shallow surface breaking defects in real-world situations where there is a heavy reliance on operator technique and interpretation.

In the case of MPI, the removal of paint is required in order to effectively carry out the technique. This can be a hugely time consuming process.

UT has not always shown the required sensitivity in this application. In addition, with both techniques, recording of inspection data is not easy and is often not carried out unless an indication is noted.

THE AXIS™

The AXIS is the solution to these issues and includes a number of other time saving and operational advantages. The system utilises the Alternating Current Field Measurement (ACFM®) technique to inspect the centre section of a plain freight axle for fatigue cracks in the surface.

The simplicity of the deployment allows the AXIS to be used in rail depots as a frontline tool for the screening of defects in axles before they can threaten the integrity of the vehicle.

The AXIS comprises a motorised crawler, which is magnetically attached to the centre of the axle while it is in place on the bogie, and is connected to a rugged, touch-screen controller. It can be deployed from the vehicle inspection pit in a depot, during general visual inspection or light refurbishment operations on a set of wagons.

Unlike MPI, the AXIS only requires minimal cleaning of the axle surface. A simple brush down of each axle to remove loose dirt is all that is required to prepare the axle for inspection.

The AXIS, which can be operated by train technicians with no prior inspection experience, is placed onto the axle and held in position via its powerful magnetic wheels. A security cable is also provided for secondary fall protection.

To start the inspection, the operator simply enters the ID

"FULL AXLE INSPECTION IN ONLY 2 MINUTES"

of the axle on the touch-screen controller and initiates the scan with the push of a button. From this point on, the scan is fully automated as the AXIS rotates around the axle, covering the full circumference and gathering data from its ACFM probe. The AXIS then automatically reverses back to the start, unwinding the umbilical cable and allowing easy removal from the axle. This entire process is completed in around two minutes.

The system then automatically analyses the data for crack-like indications and reports a simple Pass or Fail message to the technician. If a defect is identified, the scanner will move to the location(s) of the indication(s) to allow the technician to mark the location of the defect.

AXIS FEATURES

- The semi-automated system is capable of inspecting an axle in 2 minutes.

- Can be used by train technicians with no prior experience of inspection.

- Automated data interpretation and defect detection.

- Simple Pass/Fail result provides an effective screening tool.

AXIS BENEFITS

- AXIS allows vehicle maintainers to roll out state of the art axle inspections to the front line of vehicle maintenance to improve reliability and potentially generate significant cost savings when compared to the expense of a single clean-up campaign following a waggon derailment event.

- AXIS is simple to use allowing non-inspectors to gather the inspection data so current technicians can be used even more productively.

- Detailed AXIS data can provide the length and depth of a defect which can be used to decide whether to repair or scrap an axle.

- AXIS data can be downloaded and stored centrally for audit purposes.

TRAINING

TSC can offer training on the use of the AXIS at a client's site. Training of vehicle technicians is a simple one day course, which teaches all that is required to operate, test and maintain the AXIS and concludes with an assessed competency test. Also offered, is supervisor training which teaches the technology and detailed data interpretation to allow in-house support for the site technicians.

AXIS SYSTEM SPECIFICATIONS

GENERAL	MIN	MAX	NOMINAL	NOTES
Inspection Time		2 minutes		Mounted on axle
Inspection Area (covered)			340mm	Centred on axle
Weight		7.8kg (17.2lbs)		Scanner only
Weight of AXIS control box		25kg (55.1 lbs)		
Power Requirement	110VAC	240VAC		Single Phase
Operating Temperature Range	0°C	50°C	25°C	
Storage Temperature Range	-5°C	60°C	25°C	Non-condensing environment
AXLES				
Material				Carbon steel
Axle Diameter	145mm (5.ins)	200mm (7.8ins)		
Vertical Top Clearance	100mm (3.9ins)			English
Side Clearance	200mm (7.8ins)			4 rugged corner harness points
Bottom Clearance				No constraint
Coating (Paint) Thickness	0mm	0.5mm (0.02ins)	0.2mm (0.008ins)	
Depth of repair grinds		3.0mm (0.12ins)		
TARGET DEFECT				
Minimum Detection Length	10mm (0.4ins)			
Minimun Detection Depth	2mm (0.08ins)			
Defect Orientation				Circumferential
Type				Surface breaking fatigue (semi-ellipse)

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