



National Transportation Safety Board

Freight Car Axle Manufacturing Requirements

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Axle Manufacturing Process

- Electric arc furnace
- Bottom casting
- Forging
- Heat treatment
- Final machining
- Stamped with heat-lot and date of manufacture



Inspection Requirements for New Axles

- Axle manufactured in 2002
- AAR M-101 – Manufacturing of Axles and Wheels
- 1998 revision: prescribed an axial ultrasonic inspection after manufacture
- 2009 revision: added radial ultrasonic inspection along axle body length after manufacture



Inspection Requirements for Secondhand Use Axles

- Axle was reused in 2010
- AAR MSRP Standard S-659
 - Magnetic particle testing
- More thorough NDT would have found the defect

Urgent Recommendation

- R-14-10 (Urgent) to AAR
 - Develop more thorough nondestructive testing requirements for secondhand use axles
 - Require AAR certified wheel shops to meet these requirements
- The AAR revised the standards in September 2014
- R-14-10 Closed – Acceptable action

Investigation Results

- 48 axles from heat lot E0912
- January 2014 AAR issues maintenance advisory
- February 2014 manufacturer contacted customers
- Axles identified as of 2016
 - Ten through the maintenance advisory
 - Three through accident investigations



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