Freight Car Axle Manufacturing Requirements

Michael Hiller
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