

Commercial Motor Vehicle Brake Assessment Tools

Commercial Motor Vehicle Roadside Technology
Corridor Safety Technology Showcase

October 14, 2010



Commercial Motor Vehicle Roadside Technology Corridor



Overview

- Commercial Motor Vehicle (CMV) Air Brake System
- North American Standard Level-1 Inspection
- Performance-Based Brake Tester
- Related Research

CMV Air Brake System

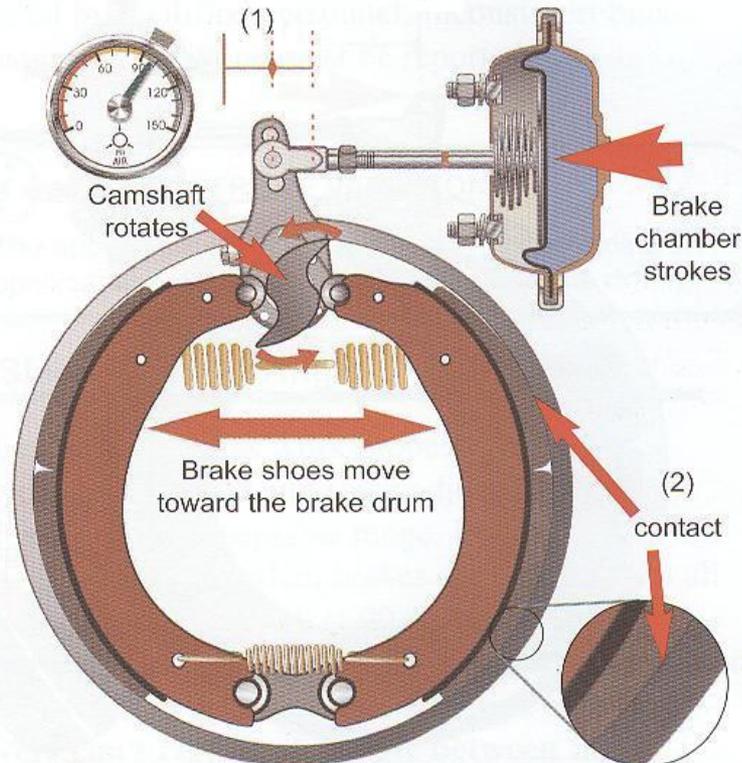
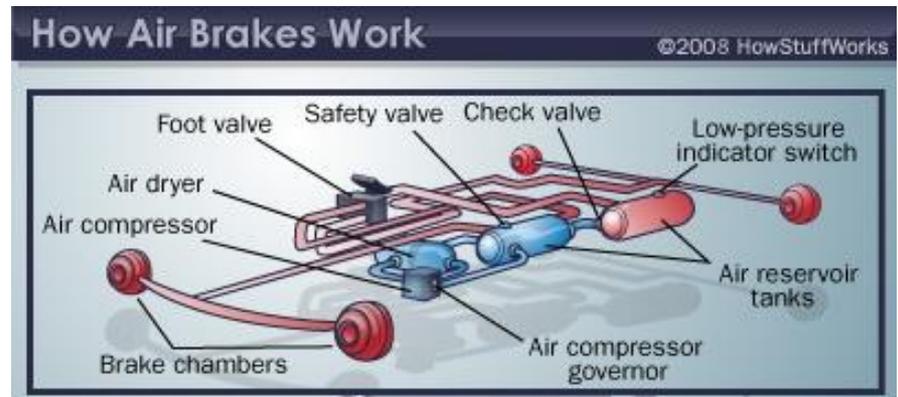


Fig. 1.5 An 'S' cam brake in the **applied** position. (1) The brake chamber is partially extended and (2) the brake shoes are against the brake drum.

Illustration by Robert Curry, Rolf VanderZwaag in *Practical Airbrakes Book 2: Brake Adjustment*, Richmond Hill, ON: Techni-Com, 2005.



<http://auto.howstuffworks.com/auto-parts/brakes/brake-types/air-brake5.htm>

Accessed 14 Sep 2010

NAS Level-1 Inspection

- Comprehensive inspection of driver and vehicle
 - Includes check of brake system components
- Used for enforcement for over 20 years.
- Primarily visual-based rather than performance-based



NAS Level-1 – Brake System



- Visual determination of potentially unsafe conditions
 - Cracked brake shoes/drums
 - Worn components
 - Brake stroke length
- Limitations
 - Access to components
 - Inability to determine actual braking ability

Performance-Based Brake Tester

- Assessment of brake efficiency
 - $BE = \frac{\text{Total Braking Force}}{\text{Total Vehicle Weight}}$
 - Equivalent to deceleration in g 's
 - Passing score:
 $BE \geq 43.5$
- Enforcement tool for only 3 years.
- Based solely on brake performance

$$\frac{\text{Total Braking Force}}{\text{Total Vehicle Weight}}$$



Related Brake Research

- CMVRTC research built on these enforcement tools
 - Correlation Study
 - Level-1 / PBBT Analysis Tool (LPAT)
 - Statewide Mainline Brake Assessment

