



Brake Defect Causation and Abatement Study (BDCAS)

The Federal Motor Carrier Safety Administration (FMCSA) official made Performance Based Brake Testers (PBBTs) part of the out-of-service criterion for commercial motor vehicles in 2007. Unlike the standard Level I inspection which is a visual inspection of the all the vehicle components, a PBBT is a device that can be used to evaluate the current braking capability of a vehicle through measurement of the brake force developed as a function of weight. Any vehicle whose brake force is less than 43.5 percent of its gross vehicle weight is not allowed to return to its regular commerce until repairs are made to increase the PBBT score to an acceptable level.



Vehicle being tested on PBBT at Greene County Inspection Station on I-81 N in Tennessee

Approximately 10 percent of vehicles who pass a Level I inspection will fail a PBBT. Since the PBBT does not specifically tell a mechanic which vehicle component caused the low score like the visual Level I inspection, the true cause of failure may not

immediately be repaired. This lack of information makes correctly repairing a vehicle sometimes difficult for mechanics and increases the likely hood that the vehicle will fail a PBBT or Level I inspection again in the future.

Background— In an effort to ensure out-of-service vehicles are safely returned to service and document corrective actions and validate true abatement of initial out-of-service causation the FMCSA began the BDCAS. With cooperation from partnering fleets and an existing partnership with the Tennessee Department of Safety and Transportation, and ORNL, vehicles will regularly be tested on the PBBT. The goals of this study which will conclude in mid 2013 are to:

- identify fleet vehicle brake defects via PBBT;
- determine the cause(s) of brake defects by vehicle wheel end;
- facilitate and catalog the repairs made;
- document, over time, the performance (by wheel end and vehicle) of in service brakes and the vehicles overall braking system;
- collect brake efficiency data as new brakes are burnished; and
- where possible, collect brake efficiency data on various lining materials for comparison study

Research Areas

Freight Flows

Passenger Flows

Supply Chain
Efficiency

Transportation:
Energy
Environment

Safety
Security

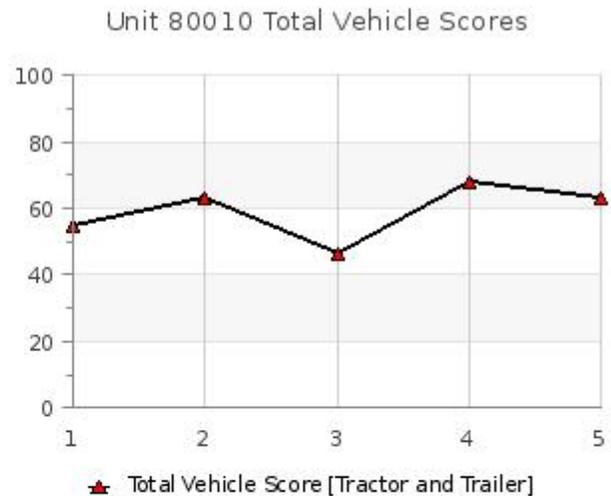
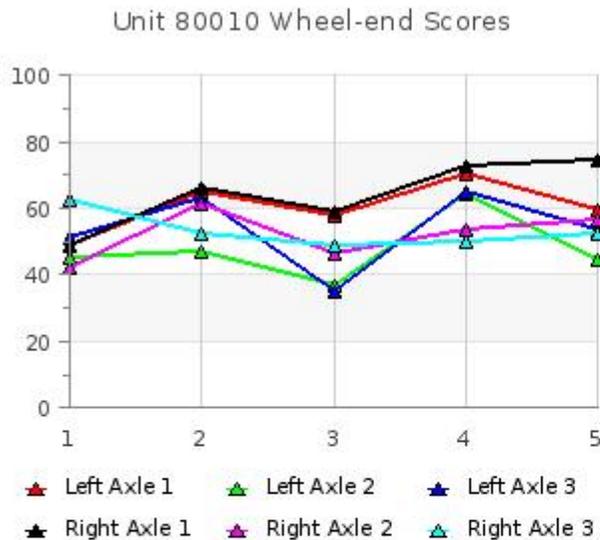
Vehicle
Technologies

Oak Ridge National Laboratory
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UT-Battelle, LLC
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Benefits— While the main benefit of this study is to place safer vehicles back on the highway after being placed out-of-service, there are many more industry wide benefits:

- extensive catalog of repairs and how they improve PBBT scores will be created

- mechanics will spend less time troubleshooting brake systems in order to make the proper repair
- fleets will save in operating cost with proper repairs being made the first time and reduction in out-of-service vehicles



Truck 80010 Wheel-End Scores										
Index	PBBT No.	Date	Result	L1	R1	L2	R2	L3	R3	
1	<u>1966</u>	<u>2011-09-02 11:53:07</u>	WE FAIL	48.5	48.4	45.1	41.8	51	62.2	
2	<u>1968</u>	<u>2011-09-11 14:07:06</u>	PASS	64.9	66.3	46.6	61	63.3	52.3	
3	<u>1972</u>	<u>2011-09-23 07:44:44</u>	WE FAIL	57.8	59	36.5	46.4	35	48.6	
4	<u>2000</u>	<u>2012-02-17 12:00:02</u>	PASS	70.4	72.7	64.1	53.6	64.9	50.1	
5	<u>2001</u>	<u>2012-02-17 12:04:32</u>	PASS	59.4	74.3	44.2	56.2	53.3	52	