WHEN — Q4 2014
Federal Safety Standards for Heavy Trucks - Part 2

Update #2328

Attention: Dayton Parts' Distributors and Business Partners.

The fourth issue of **WHEN** **(WHeel End News)**

Continuing in Part 2 with our discussion of shorter stopping distances for heavy duty trucks we'll pick up where we left off in the aftermath of the "Paccar Decision" which repealed all of the ABS requirements from FMVSS-121. Since 1978 there has been tremendous growth in digital technology. Computers now control most systems on heavy trucks like engines, drive trains, emissions and brakes. The advancement in ABS is one of the main reasons the reduction in stopping distances for heavy duty trucks is possible today. To have an effective braking system there are three things that are essential:

1. Control – A system is only as responsive as its ability to control the energy source for the system which in this case is air.
2. Transfer – All of the brake force in the world does no good if it can't be transferred to the road surface and thereby slow down or stop the vehicle.
3. Reliability – This goes without saying, you don't want to have to pray every time you step on the brake. That's definitely not good.

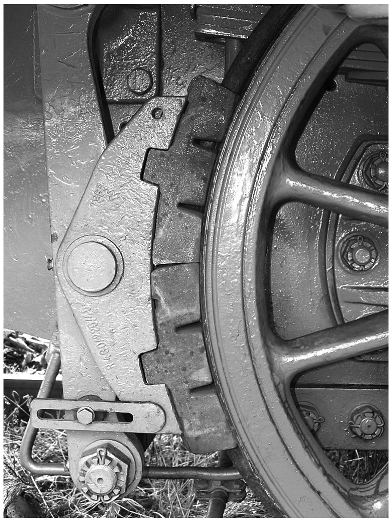
Once again, this edition of WHEN will draw on information from many different sources.

I think it's always a good idea to get some background information on the subject at hand to be sure we have the proper perspective on the situation.

Since ABS is one of the main factors in this discussion let's first take a brief look at the history of the air brake.

Early locomotive brakes –

As stated in Part 1, before the invention of the automobile the primary means of moving goods and people around the country was the railroad. The first train brakes consisted of a cast iron hand wheel attached to a screw linkage that when turned would apply brake blocks to wheel treads. To slow or stop a train, the engineer would blow a certain whistle or whistle pattern alerting the brakemen to set the brakes. Obviously this system was very limited in the amount of brake force that could be applied. As more powerful locomotives were built naturally the speed and length *(or load carried)* of trains increased. This is a cycle that continually repeats itself. Advancements in *"power train"* technology bring increases in speed and carrying capacity that require a more effective braking system to control it.



Early Locomotive Brake

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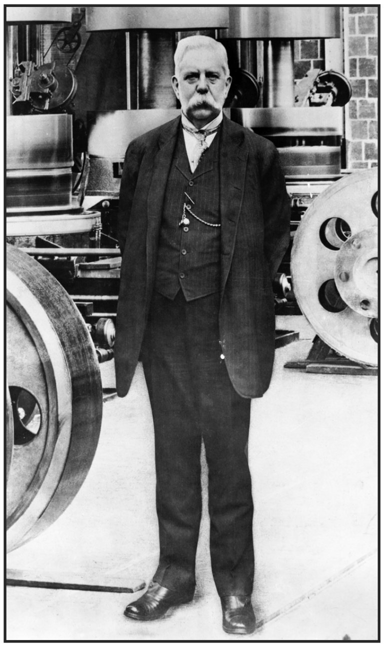
The next generation of locomotive brakes added an air compressor *(imagine that !)* to the engine so pressurized air could be used to push a lever *(force multiplier)* that applied brake blocks to the wheels of the locomotive *(at the front of the train)*. This compressor also supplied a brake pipe that ran the length of the train, connected between carriages with gladhands. This brake pipe connected to an air cylinder on each carriage, which pulled on the handbrake chain whenever it was pressurized, applying the brakes. This system worked ok for the front cars but it took a long time to pump air all the way down the train. Also if one of the gladhands happened to disconnect or a bad leak occurred anywhere, the entire brake system would fail. Not a very reliable design.

At this early stage of air brake development, when the brakes were applied the average freight train, traveling at 45-50 mph, would take 800 to 1200 yards to come to a complete stop. In other words a train needed a minimum of 2,400 feet or essentially a half a mile of clear rail in front of it to stop safely. A pretty tall order considering life is full of things *“that happen”*. A reliable, more effective brake system was needed with the ability to be applied and released quickly down the entire length of the train.

Enter a young inventor and entrepreneur named George Westinghouse.



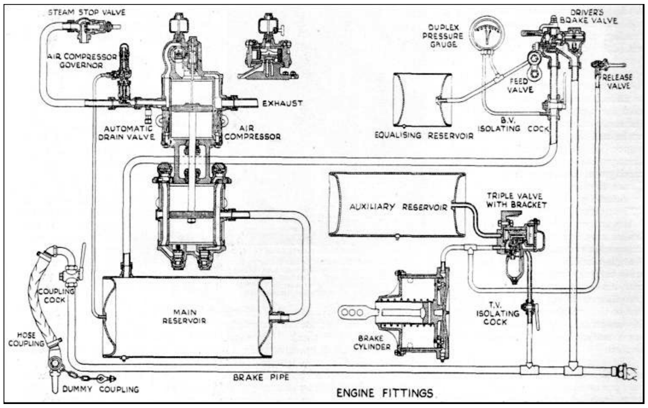
George Westinghouse

The original air brake –

In 1869 at the age of 22, George Westinghouse designed an air brake system which addressed the issues facing the rail industry at that time. First he solved the problem of air supply by mounting an independent air reservoir on each carriage. The heart of his system was the triple valve he invented which attached directly to the brake pipe and controlled air to the reservoir and the brake cylinder. It was called a triple valve because it served three functions — *charging, applying, releasing.*

Charging

At rest the Westinghouse brake system has no air in it. As the air compressor on the locomotive pumped air into the brake pipe, the system is charged and the brakes are released. The triple valve directs air into the reservoir on each carriage where it’s held for use in applying the *(service)* brakes when needed.



Early Locomotive Brake Diagram

Applying

When the engineer wants to apply the brakes he moves the brake handle to the proper location and air is removed from the brake pipe. When the triple valve senses this pressure drop in the brake pipe it allows air from the reservoir into the brake cylinder and the brakes are applied.

Releasing

To release the brakes, the engineer again moves the brake handle to the proper location which refills the brake pipe with air. The triple valve senses this increase in brake pipe pressure and releases the brake cylinder by venting the air into the atmosphere. Then the whole process starts over again by recharging the air reservoir.

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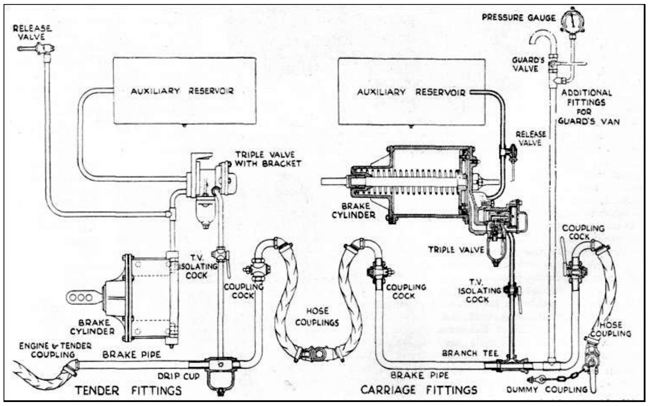
Westinghouse's triple valve greatly improved response time because it didn't need to move all the air necessary to apply the brakes but only enough air to carry a signal to the triple valve, telling it to apply or release *(like a relay valve)*. It still took a long time for the signal to move down the entire length of the brake pipe but this was a vast improvement over what was replaced. Other issues were addressed in later revisions like adding a completely independent emergency brake system with its own air reservoir on each carriage, in case the primary system failed.



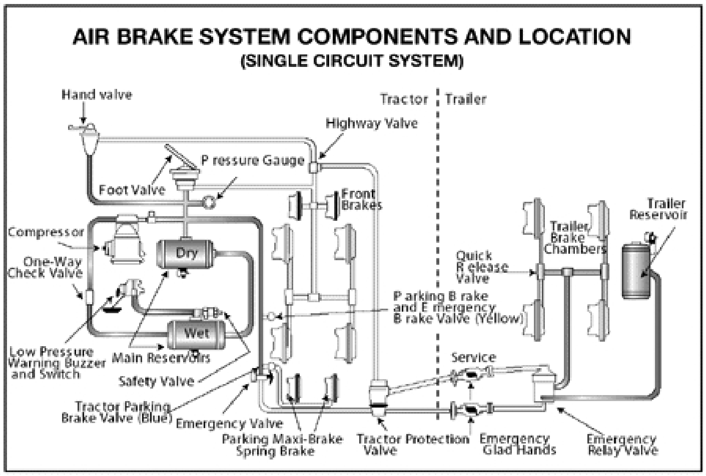
Early Tender and Coach Diagram

Looking at the locomotive and carriage car diagrams, it's obvious Westinghouse's design became the basis for the modern air brake system. As a side note here, George Westinghouse is also the founder of the Westinghouse Air Brake Company more commonly known as WABCO.

That's all the historical background for the time being; now back to where we left off after the Paccar Decision.

Aftermath of the NHTSA vs. Paccar decision –

With ABS no longer required by federal mandate fleet operators immediately started switching their equipment to non-ABS systems (remember their vehicles could meet the 335ft stopping distance without ABS). Tractor and trailer manufacturers stopped offering ABS on new vehicles and air brake system suppliers who had already spent piles of cash on R&D canceled any further research. The diagram below shows a typical heavy truck air brake system circa the 1970's.



ABS development in Europe –

The development of ABS for air brake systems in the US essentially *"died a natural death."* However such was not the case in Europe. In the 1980's, ABS development for air brake systems in Europe was in full swing and there were four main players:

Bendix Europe – In the mid 1980's most of the ABS systems Bendix had in service were the older Maxaret systems installed in the UK years earlier. Renault in France was installing a few ABS systems from Bendix France. In a reorganization, Bendix combined Bendix UK and Bendix France with Maxaret systems to form Bendix Europe. This helped Bendix pool resources to catch up in the development of ABS systems.

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Bosch – Bosch was working with MAN bus company in the development of ABS systems and almost all of the systems they had in service were on MAN buses. Since Bosch was more of a component parts supplier then a complete system supplier the system they offered was very similar to WABCO.

Grau-Girling – Previously associated with Lucas Girling, they were one of the main suppliers of ABS systems for semi-trailers in the UK with 80-90% of that market. The ABS systems they were installing used analog technology based on what Kelsey Hayes had used in the US in the 1970's. In the early 1980's Grau-Girling introduced a new system based on digital technology similar to their competitors. Geez, it's almost like Kelsey Hayes (who owned Lucas Girling at this time) shipped their remaining ABS inventory over to Europe after the Paccar decision left them with no market for it. Then, later, Grau-Girling separated from Lucas Girling so they could develop their own new ABS system using digital technology instead of the old analog stuff. *(Just "thinking out loud" here.)*

WABCO – WABCO *(there's that name again)* partnered with Daimler-Benz AG in Germany to work on developing their ABS system and started installing them around 1981. Through this partnership WABCO had almost as many ABS systems on buses as Bosch did. A majority of their ABS systems were on straight trucks but they had also adapted them to tractors and trailers as well.

Daimler-Benz, Freightliner and ABS –

In the late 1930's Leland James, then president of Consolidated Freightways out of Portland, OR, had an idea to build trucks out of lightweight aluminum *(the most abundant metallic element on earth)* instead of steel. He also came up with the original *"cab over engine"* design which was met with a lot of resistance *(most new ideas are)* from established truck manufacturers. Taking all of this in stride with that American *"can do"* attitude, Mr. James decided to hire a team of engineers and build the vehicles himself. He established the Freightways Manufacturing Company in Salt Lake City, Utah, in 1940 and then changed the name to Freightliner Corporation in 1942.

The new Freightliner trucks were a huge success as they were lightweight, less expensive and easier to work on. *(Sounds like Mr. James saw a need in the truck market and decided to fill it.)* Then with the onset of WWII, which brought shortages of manpower and raw materials, Mr. James converted his truck operations over to the production of ship and aircraft parts. *(as did many other manufacturers to help the war effort.)*

Leland James (on the right side)
and an unidentified engineer

In 1950 Portland's Hyster Company became the first private carrier to order trucks for their fleet from Freightliner because of their ability to make trucks to a customer's specifications. Business continued to grow with the election of Dwight Eisenhower as President in 1952 which gave birth to the highway transportation industry *(as we discussed in Part 1).* Freightliner was definitely considered on the *"cutting edge"* of heavy truck manufacturing in the US. In 1981 Daimler-Benz AG, the premier heavy truck manufacturer in Europe, purchased Freightliner from Consolidated Freightways. Not many years later, in February of 1987, Freightliner announced that it would be the first heavy truck manufacturer to reintroduce ABS air brake systems to the US market *(saw that one coming didn't ya'?).* I'll give you one guess who manufactured the ABS air brake system for Freightliner.

Freightliner, ABS and the NHTSA –

No doubt Daimler-Benz brought over their WABCO ABS brake system from Europe to use on Freightliner trucks in order to have an advantage over their competition. This time, an ABS brake system was being offered because the technology existed and it had been *"road proven"*. Needless to say, Freightliner doing this without a federal mandate, didn't make the NHTSA look very good. The NHTSA had been pretty quiet since the FMVSS-121 ABS debacle, but with this new development they didn't waste any time.

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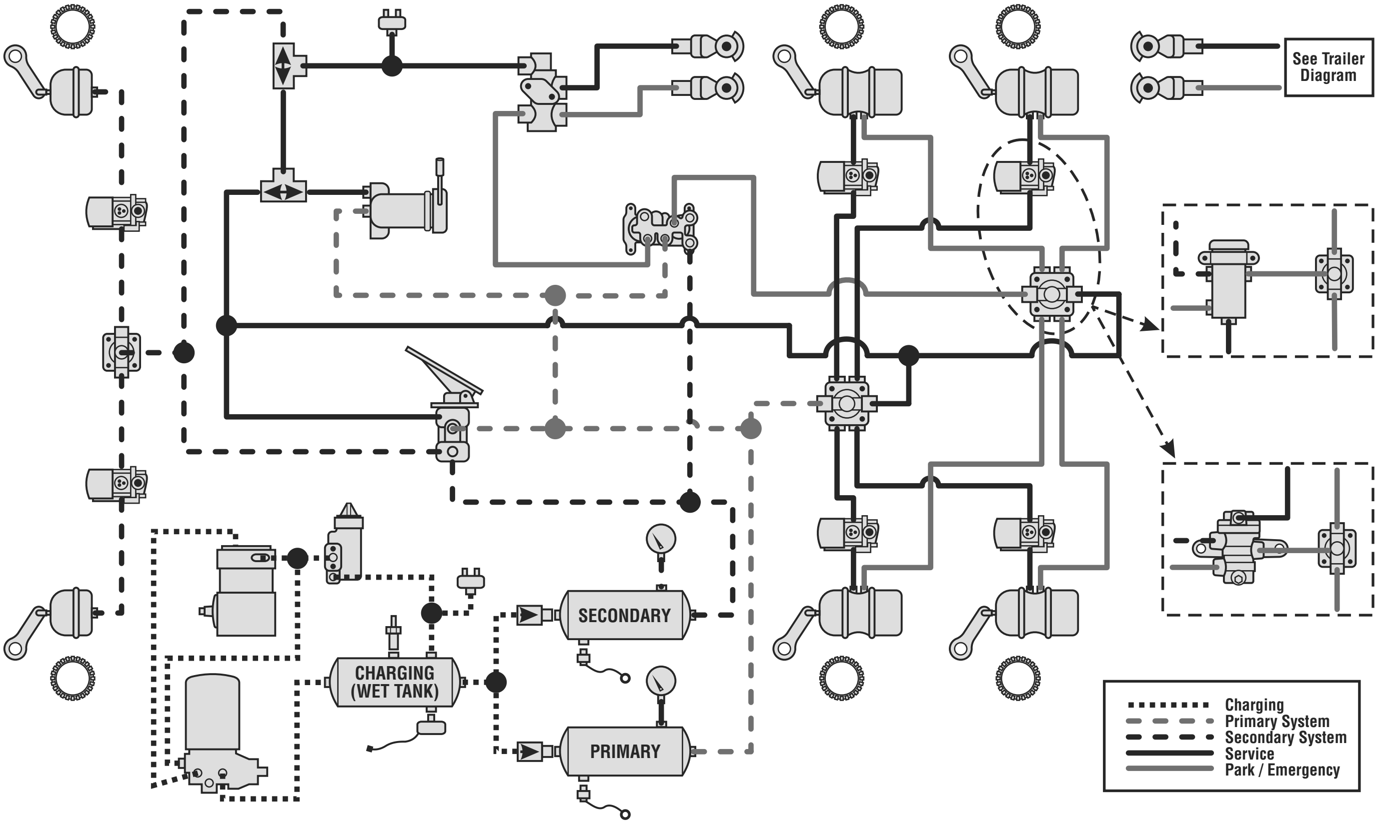
From May of 1987 *(remember Freightliner made their announcement in February of 1987)* to March of 1988 the NHTSA conducted an extensive *"fact finding"* mission in Europe and Australia on the performance, reliability and maintainability of ABS brake systems. Armed with the results of these fact finding missions of 1988, the NHTSA began a 200 vehicle test of ABS systems on tractors that lasted for two years *(geez, I wonder which brand of truck they used since only one had an ABS system available at that time? I'll bet that hurt, eh?).* This time the NHTSA was going to make sure they had adequate documentation on the feasibility, cost effectiveness and reliability of ABS brake systems, prior to issuing any new regulations.

In 1992 the US Congress ordered the DOT to announce that they were looking at making a rule change in regards to ABS brake systems. That same year, the NHTSA also made a recommendation that ABS should once again be required on commercial vehicles *(imagine that !)* and then sponsored fleet tests on trailers with ABS which took two years. As a result of all this in 1995 FMVSS-121 was amended to once again require ABS brake systems on all air braked commercial trucks, tractors, trailers and buses. The effective date for tractors was March 1, 1997 and for trucks, trailers and buses March 1, 1998.

Many of the brake issues that faced the rail industry at one time are the same ones facing the heavy truck industry today. As road tractors have become more powerful, the speed and load carrying capacities have increased which means, a more responsive brake system is needed. Like the rail industry we've been addressing our brake issues by enhancing the existing air supply system with some new technology.

Here's a diagram of a typical truck/tractor air brake system today.



Typical Truck / Tractor Air System Diagram

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This air supply system is not really different in its fundamental design from what we had decades ago. However with the addition of new technology we have accomplished the three things that are essential for a braking system to be effective:

1. Control – ABS systems have speed sensors on each wheel end that monitors the rate at which the wheel end is decelerating as it responds to the brake force being applied. That information is fed to the relay valve which decides how much air pressure to send to each wheel end so there is equal braking and everything stays in a nice straight line as the vehicle decelerates. This brings control to a whole new level not achievable otherwise.

2. Transfer – Maximum brake force/deceleration is achieved right before wheel lock-up. What happens when a wheel end locks up? The tires begin to skid. Not good because brake force isn't turning into deceleration of the vehicle, instead it's turning into loss of control. Here the ABS system keeps the brake force being applied to be transferred to the road surface in a controlled manner.

3. Reliability – With all the advancements in computer technology we have much more reliable ABS components then we ever have. The ABS components that were being used back in the 1970's weren't even digital in design, they were analog! No wonder that part of FMVSS-121 was repealed back then.

When the NHTSA originally implemented the FMVSS-121 standard they really over reached with the ABS part by mandating something that simply didn't exist at the time. If you ever saw any of these original 1975ish ABS systems in use all they could do was monitor the deceleration rate of each wheel end and release the air pressure right before lock-up. This made for an extremely *"jerky"* brake application to say the least with very little real control. However I think they learned their lesson *(for the most part)* and since then have moved forward with much better documentation. Today there is more of a *"give and take"* between the government setting goals for safer roadways and working with the manufacturers to get there. We now have air supply systems that are much more responsive, efficient and reliable. With ABS once again mandated for air brake systems on commercial vehicles there were also changes taking place with friction material.

Recommended Practice 628 –

The friction material tests we looked at in Part 1 as outlined in FMVSS-121 have been in place since January 1, 1975. As stated in Part 1, all friction material manufacturers seeking OE approval for any of their formulas must first pass this test. However any friction material sold in the aftermarket as a replacement for an OE approved material doesn't have to pass the first test of any kind. With ABS once again mandated on air brake commercial vehicles, fleet managers that belonged to the Truck Maintenance Council *(TMC)* requested that something be put into place to evaluate aftermarket friction materials. TMC in turn made this request known to their parent organization the American Trucking Association *(ATA)* who in turn talked to some people at the Society of Automotive Engineers *(SAE)*. In 1994 SAE established their Brake Lining Review Institute *(BLRI)* as a service to the commercial trucking industry. In 1995 the BLRI launched their Truck Brake Lining Review Program and TMC composed their Recommended Practice 628 or RP628.

In 2000 the responsibility for this program was transferred to SAE's Performance Review Institute *(PRI)* who publishes their Qualified Products List *(QPL)* of friction materials. BLRI in turn set-up their Brake Lining Review Committee *(BLRC)* to review and assess the test data of brake lining materials used on commercial heavy trucks. For a friction material to be considered for the QPL it must first pass the FMVSS-121 test and submit those results to the BLRC for evaluation. Where this program goes farther than the original FMVSS-121 standard is set criteria for the test set-up by tire size, brake size, air chamber size and slack arm drilling *(see the chart on page 7)*.

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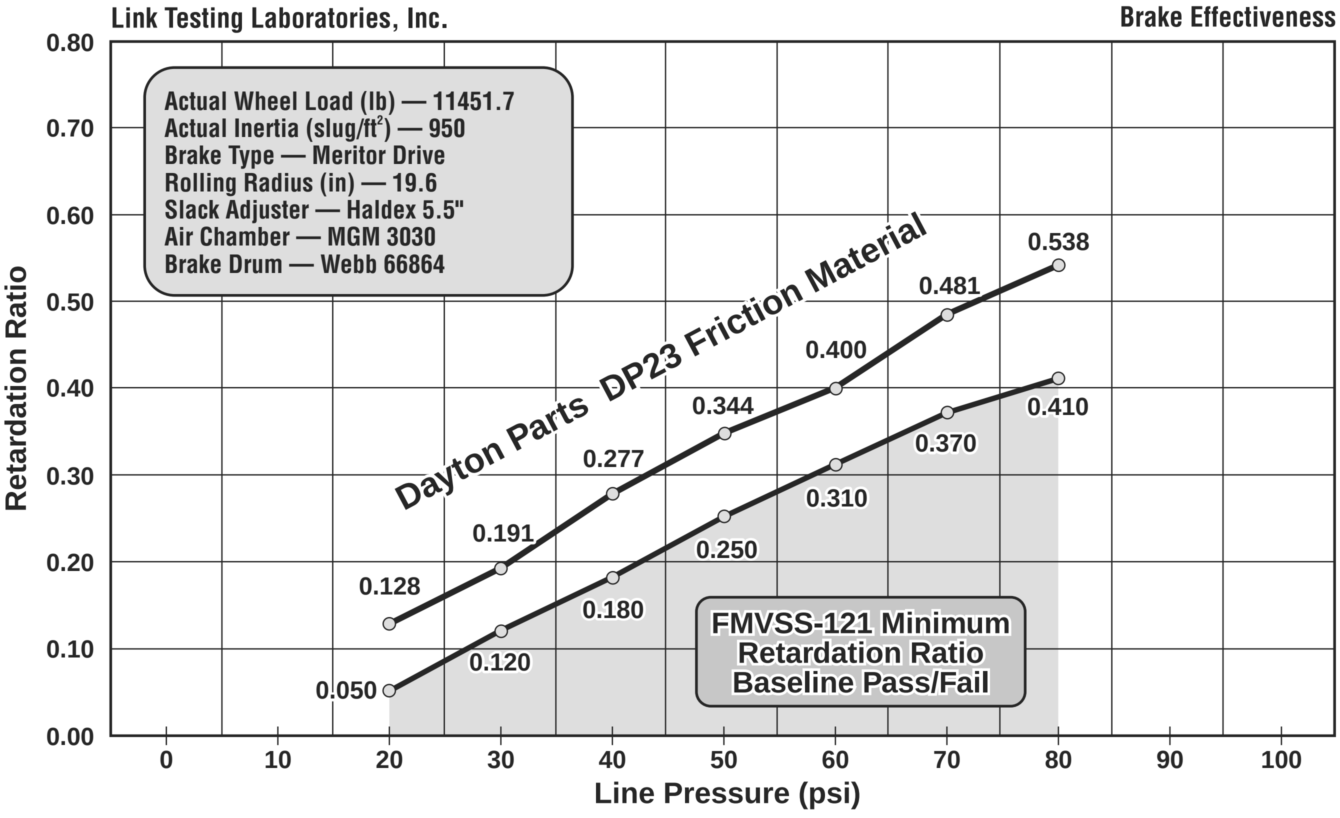
LINING TEST CONDITIONS AND THE VEHICLE CONFIGURATIONS THEY REPRESENT

Rim Size		Drive/Trailer					Steer		
22.5 In.	Brake Size (Drum - Dia./Width, in., Disc - Rim Size, in.)	16.5x7 Drum	16.5x7 Drum	16.5x7 Drum	22.5 Disc	22.5 Disc	15x4 Drum	16.5x5 Drum	22.5 Disc
	GAWR (lbs.)	20,000	20,000	23,000	20,000	23,000	12,000	14,600	14,600
	Air Chamber Size (type)	30	24	30	Various	Various	20	24	Various
	Cam Brake Slack Adjuster Size (in.) -	5.5	5.5	5.5	Not Req'd.	Not Req'd.	5.5	5.5	Not Req'd.
	Tire Size for Test, Rolling Radius (in.)	19.6	19.6	19.6	19.6	19.6	19.6	19.6	19.6
	Range of Tire Sizes on Vehicle	18.5 - 21.0	18.5 - 21.0	18.5 - 21.0	18.5 - 21.0	18.5 - 21.0	18.5 - 21.0	18.5 - 21.0	18.5 - 21.0
19.5 In.	Brake Size (Drum - Dia./Width, in., Disc - Rim Size, in.)	15x8.625 Drum	15x8.625 Drum	19.5 Disc	Additional brake sizes, linings, axle ratings, etc. can be supplied as special configurations for any wheel size.				
	GAWR (lbs.)	14,500	14,500	14,500					
	Air Chamber Size (type)	30	24	Various					
	Cam Brake Slack Adjuster Size (in.) -	5.5	5.5	Not Req'd.					
	Tire Size, Rolling Radius (in.)	15.3	15.3	15.3					
	Range of Tire Sizes on Vehicle	15.1 - 16.3	15.1 - 16.3	15.1 - 16.3					
17.5 In.	Brake Size (Drum - Dia./Width, in., Disc - Rim Size, in.)	12.25x7.5 Drum	12.25x7.5 Drum	17.5 Disc					
	GAWR (lbs.)	19,200	19,200	19,200					
	Air Chamber Size (type)	30	24	Various					
	Cam Brake Slack Adjuster Size (in.) -	5.5	5.5	Not Req'd.					
	Tire Size, Rolling Radius (in.)	14.6	14.6	14.6					
	Range of Tire Sizes on Vehicle	14.1 - 17.0	14.1 - 17.0	14.1 - 17.0					

The above sets of FMVSS 121 test conditions - which depend on gross axle weight rating (GAWR) and air chamber size - can be used to test and evaluate brake lining friction materials. The test conditions simulate vehicle configurations which are commonly used in on-highway tractor-trailer operations.

Unlike FMVSS-121 this makes the test results all a real *"apples to apples"* comparison. No using a 6" slack arm drilling to *"enhance"* the test results as mentioned in Part 1. The QPL records a primary brake torque output value at the 40 psi application, one for normal stopping at 20 psi and a panic stop at 80 psi. These brake torque output values recorded in the QPL come from the brake effectiveness (or retardation) part of the FMVSS-121 test. Below is the brake effectiveness graph for our DP23 friction material from Part 1.



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You'll see across the bottom of the graph air pressure is marked off in 10 lb increments. In the QPL the primary brake torque to match is at 40 psi. In the DP23 graph at the 40 psi application the retardation ratio is .277. To calculate the total brake torque output you want to use the following formula –

Retardation Ratio x (tire) Rolling Radius x Wheel Load

In the box in the upper left hand corner of the graph we find the other two values. The rolling radius is 19.6 and the actual wheel load is 11,451.7. So let's plug these into our formula and see what we get.

40 psi application - .277 x 19.6 x 11,451.7 = 62,171 in/lbs

So the total brake torque output value for DP23 at the 40 psi application is 62,171 in/lbs. Now we'll use the same formula for the 20 and 80 psi applications to get the other brake torque output values that are recorded in the QPL –

20 psi application - .128 x 19.6 x 11,451.7 = 28,723 in/lbs
80 psi application - .538 x 19.6 x 11,451.7 = 120,758 in/lbs

These three brake torque output values will give you a good assessment of any block for comparison to other formulas at normal drum temperatures. This program provides two things that FMVSS-121 doesn't provide.

1. To be considered for the QPL any friction material must first undergo the FMVSS-121 test. Frankly, the original 121 standard should have been written that way. If you want to manufacture friction materials for the heavy truck market then you should be required to *certify* that your formula(s) meet the same standard as the OE approved materials to be sold in the market.

2. There are set criteria for the test set-up by tire size, brake size, air chamber size and slack arm drilling. I understand the NHTSA wouldn't know the detail here but the standard could have been written to say that the test set-up must reflect the common brake assembly for the friction material's application.

Here the industry filled in where the government standard was lacking. Good *"give and take"* here with both entities working towards the same goal, safer roadways. Now on to the final subject for this edition of WHEN.

Friction Materials and Reduced Stopping Distance –

I get calls regularly asking if the reduced stopping distance requirements for Class 8 trucks also required changes in friction materials as well. That's a good question. Let's see if we can find an answer. All of the information I'm about to share comes from the following document -

Department of Transportation
National Highway Traffic Safety Administration
49 CFR Part 571
Docket No. NHTSA-2009-0083
RIN: 2127-AJ37
Federal Motor Vehicle Safety Standards;
Air Brake Systems

This document covers the final rule amending the stopping distances for FMVSS-121. What follows is page 115 of this document in its entirety. The two parts that I think are of importance are shown in bold type and italicized.

Several commentators expressed concerns regarding the current state of heavy truck tractor maintenance. Brake Pro, Haldex and HDBMC (Heavy Duty Brake Manufacturers Council) all commented that ***current vehicle maintenance procedures in many cases do not maintain braking systems at the same level as original equipment.*** Brake Pro added that ***aftermarket and foreign produced brake lining material may be less efficient than materials included as original equipment. While these may be valid concerns, they are outside the scope of this rulemaking. This rulemaking addresses only new vehicles and the equipment sold on new vehicles; it does not apply to maintenance procedures once the vehicles are sold to end users.***

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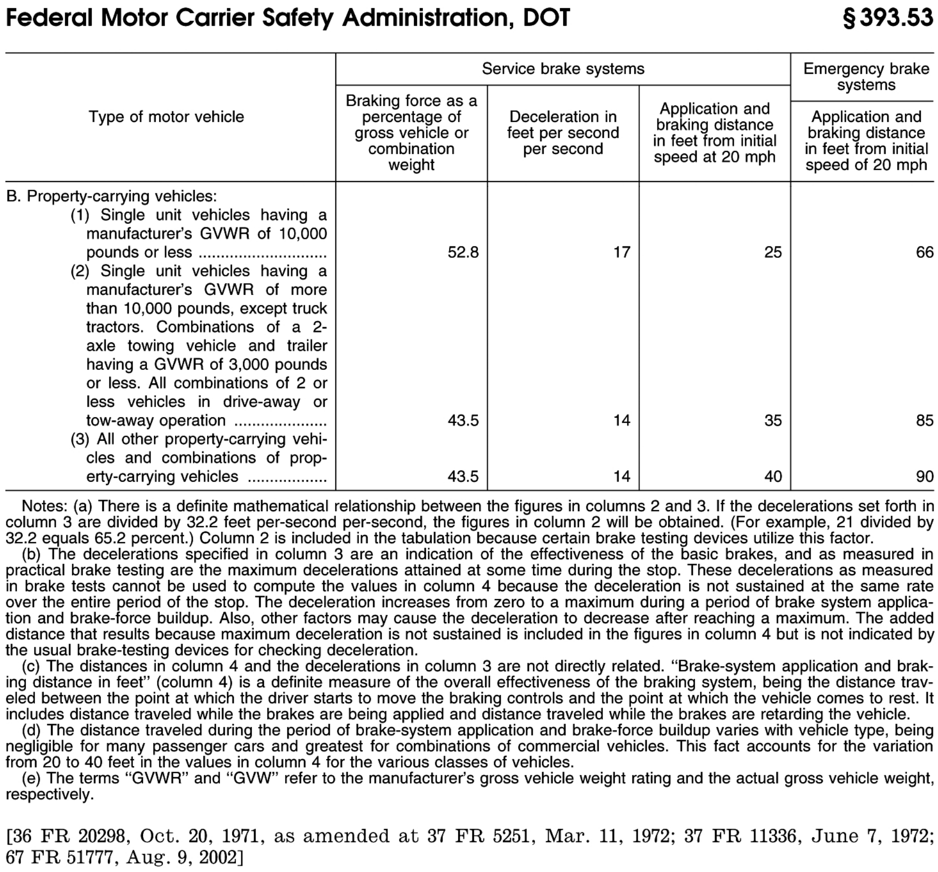
In-service performance requirements for brake systems on commercial vehicles are covered under the Federal Motor Carrier Safety Administration's (FMCSA's) Federal Motor Carrier Safety Regulations (FMCSRs), as cited in the Code of Federal Regulations at Title 49, Part 393, Section 52, Brake Performance. That regulation sets service and emergency brake stopping distance requirements for various categories of passenger and property carrying commercial motor vehicles from an initial speed of 20mph. It also includes minimum vehicle deceleration requirements for service brake systems. ***While it may be appropriate to set new standards for tractors that will be required to comply with shorter stopping distance requirements, it is not clear how that would be done at the present time, given the influences of trailer braking and operating weight versions the FMVSS No. 121 testing that is performed at full GVWR using an unbraked control trailer. Presumably, additional research or study would need to be conducted to derive proposed revisions to the FMCSR's. However, that work has not yet been performed.***

As you can see this final rule from the NHTSA is very clear that it has nothing to do with friction material. Next we'll go to the Federal Register website and find FMCSR Title 49 Part 393 Section 52 Brake Performance mentioned in the NHTSA document and see what that regulation actually says. Below is table 393.53 from FMCSR Title 49, Part 393, Section 52, part B which deals with property-carrying vehicles (Part A of this table deals with passenger-carrying vehicles so it's not replicated here) -



Federal Motor Carrier Safety Administration, DOT **§ 393.53**

Type of motor vehicle	Service brake systems			Emergency brake systems
	Braking force as a percentage of gross vehicle or combination weight	Deceleration in feet per second per second	Application and braking distance in feet from initial speed at 20 mph	Application and braking distance in feet from initial speed of 20 mph
B. Property-carrying vehicles:				
(1) Single unit vehicles having a manufacturer's GVWR of 10,000 pounds or less	52.8	17	25	66
(2) Single unit vehicles having a manufacturer's GVWR of more than 10,000 pounds, except truck tractors. Combinations of a 2-axle towing vehicle and trailer having a GVWR of 3,000 pounds or less. All combinations of 2 or less vehicles in drive-away or tow-away operation	43.5	14	35	85
(3) All other property-carrying vehicles and combinations of property-carrying vehicles	43.5	14	40	90

Notes: (a) There is a definite mathematical relationship between the figures in columns 2 and 3. If the decelerations set forth in column 3 are divided by 32.2 feet per-second per-second, the figures in column 2 will be obtained. (For example, 21 divided by 32.2 equals 65.2 percent.) Column 2 is included in the tabulation because certain brake testing devices utilize this factor.

(b) The decelerations specified in column 3 are an indication of the effectiveness of the basic brakes, and as measured in practical brake testing are the maximum decelerations attained at some time during the stop. These decelerations as measured in brake tests cannot be used to compute the values in column 4 because the deceleration is not sustained at the same rate over the entire period of the stop. The deceleration increases from zero to a maximum during a period of brake system application and brake-force buildup. Also, other factors may cause the deceleration to decrease after reaching a maximum. The added distance that results because maximum deceleration is not sustained is included in the figures in column 4 but is not indicated by the usual brake-testing devices for checking deceleration.

(c) The distances in column 4 and the decelerations in column 3 are not directly related. "Brake-system application and braking distance in feet" (column 4) is a definite measure of the overall effectiveness of the braking system, being the distance traveled between the point at which the driver starts to move the braking controls and the point at which the vehicle comes to rest. It includes distance traveled while the brakes are being applied and distance traveled while the brakes are retarding the vehicle.

(d) The distance traveled during the period of brake-system application and brake-force buildup varies with vehicle type, being negligible for many passenger cars and greatest for combinations of commercial vehicles. This fact accounts for the variation from 20 to 40 feet in the values in column 4 for the various classes of vehicles.

(e) The terms "GVWR" and "GVW" refer to the manufacturer's gross vehicle weight rating and the actual gross vehicle weight, respectively.

[36 FR 20298, Oct. 20, 1971, as amended at 37 FR 5251, Mar. 11, 1972; 37 FR 11336, June 7, 1972; 67 FR 51777, Aug. 9, 2002]

Sub category (3) at the bottom of this table is the one at applies to heavy trucks. Here's what paragraph (3) of this regulation says –

(3) Stopping from 20 miles per hour in a distance, measured from the point at which movement of the service brake pedal or control begins, that is not greater than the distance specified in the table of this section for motor vehicles or motor vehicle combinations that have a GVWR or GVW greater than 4,536 kgs or 10,000 lbs.

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As you can see, this regulation specifies a maximum stopping distance from a speed of 20 mph as stated in the NHTSA document which for heavy truck/tractors is a distance of 40 feet. The deceleration rates are an indication of the effectiveness of the entire brake system however the stopping distance and deceleration rate are not directly related because deceleration starts at zero and builds to a maximum rate as the vehicle comes to a complete stop. In other words it's not a constant force but one that builds on a curve. However there is a definitive mathematical relationship between the deceleration rate and the braking force as a percentage of GVW. If you take 14ft/sec2 divided by 32.2ft/sec/sec you'll get .435 which as a percentage you move the decimal point two places to the right or 43.5% as shown in the table. ***Nowhere in this regulation does it say anything about friction material.*** However, as stated in the NHTSA document, the regulation of the braking ability of heavy trucks (usually measured in stopping distance) after their initial production could change in the future.

Remember what's driving all of this is having safer roadways and the government gauges that by the number of traffic fatalities. The NHTSA is constantly looking for ways to bring down this number. If they ever deem that poor maintenance practices and/or the use of sub standard parts on heavy duty trucks (especially brake systems) are part of the problem make no mistake about it, they will step in and they will fix it. However in all honesty that is their job as the roadways are publicly owned. For the time being they have left that part mostly up to us.

As always I hope you found this edition of WHEN informative.

Regards,

Steven S. Wolf

Steven S. Wolf
Axle Group Product Manager
Dayton Parts, LLC

In the next edition of WHEN we'll look at the brake configurations (drum, drum & disc or all disc) that heavy truck manufacturers are using to meet these shorter stopping distances and the impact that will have on our industry going into the future.