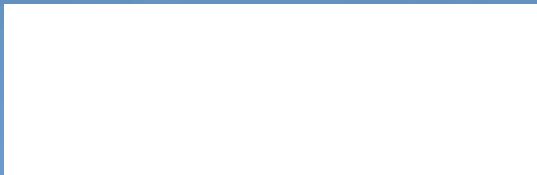




Impact of Air Disc Brakes on CVSA

**Brake Safety Symposium
December 5-7, 2006**

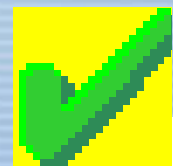
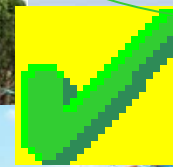
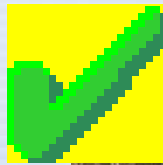
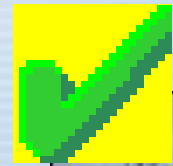
**Paul Johnston, Sr. Director Compression & Braking
Meritor WABCO**



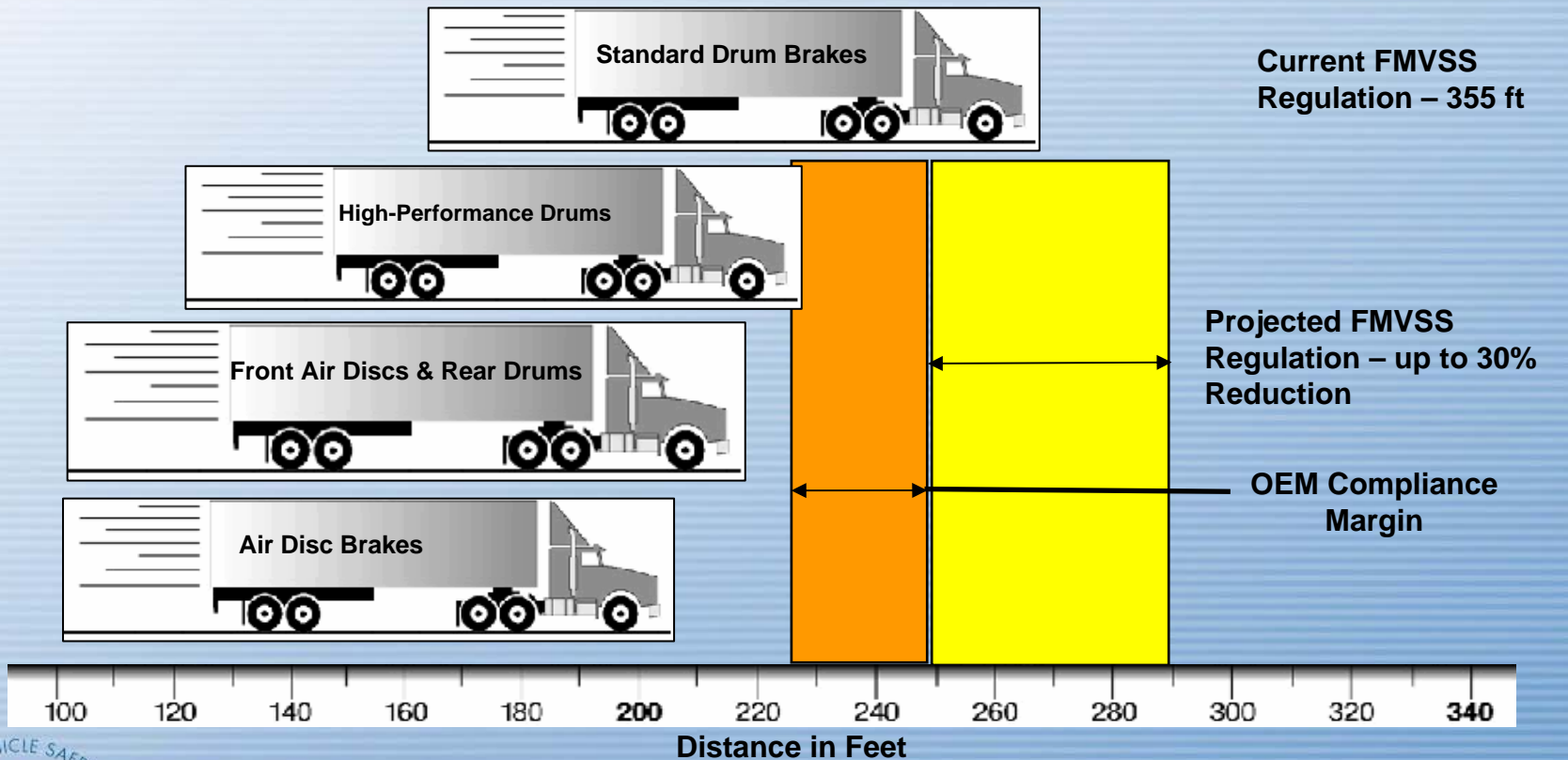
Regulation Activities

- NHTSA proposal to reduce stopping distances on **NEW** air braked **tractors**
 - **20 to 30% reduction under all loading and system conditions**
 - **60 MPH not 75 MPH test requirements**
- Industry response was supportive
 - **No agreement on level of reductions**
 - **Certain vehicle configuration concerns**
 - **Burnish test procedure concerns**
- **Projecting** final rule by March 2007
 - **Implementation by 2009 for “typical highway tractors**
 - **Implementation by 2011 for “special configuration tractors**
 - **No retrofit requirements**





FMVSS-121 Tractor Stopping Distance 60 MPH Laden Tractor with Un-braked Trailer



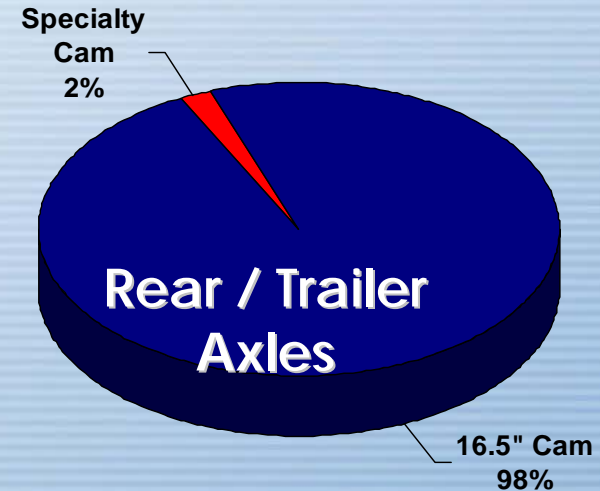
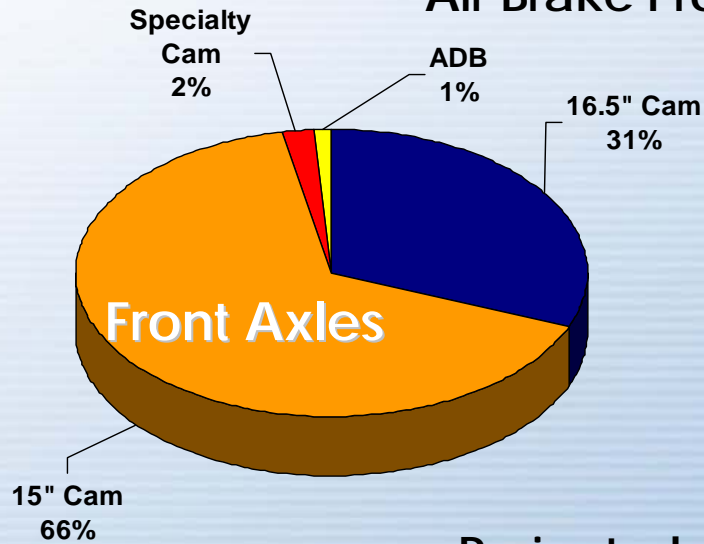
Targeted stopping distance reductions can be achieved with higher performing drum or air disc brakes

Brake Solutions to Meet the Regulations

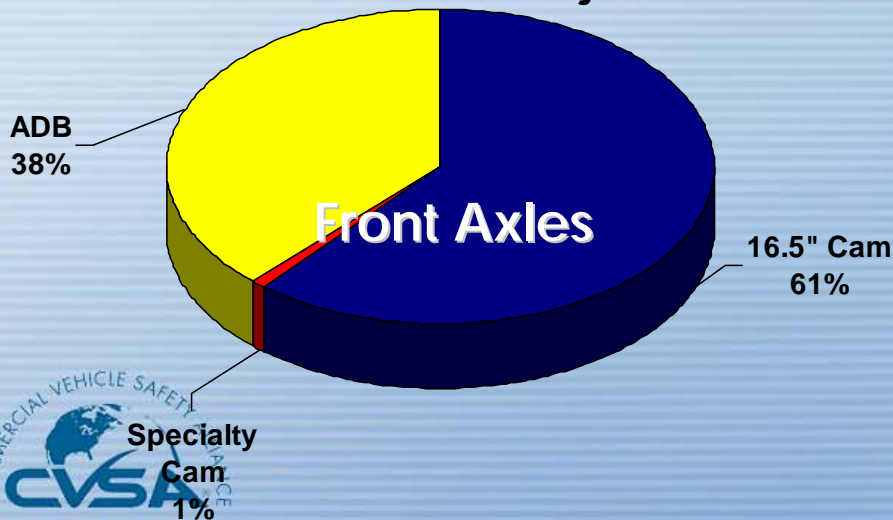
- **Two brake alternatives available to meet the new requirements**
 - Disc Brakes
 - Higher Performance Drum Brakes
 - Larger front 16.5” x 5” S-Cam replaces 15” x 4”
 - Optional wider rear 16.5” x 8” or 8.63” S-Cam (7” current)
- **Projecting higher performance drum brakes will be the primary OEM solution**
- **Disc brake penetration will continue to grow**

Air Brake Mix – Today & Tomorrow

Air Brake Product Mix In 2006...



Projected Air Brake Product Mix In 2011



New Air Braked Vehicle and Brake Build Projection

Vehicle Type	Calendar Year				
	2007	2008	2009	2010	2011
Class 8 Tractors	196,240	223,000	276,520	196,240	231,920
Class 7 Tractors	42,240	48,000	59,520	42,240	49,920
Trailers	333,000	245,000	245,000	245,000	245,000
Class 8 Trucks	23,760	27,000	33,480	23,760	28,080
Class 6-7 Trucks	76,560	87,000	107,880	76,560	90,480
Specialty	20,000	20,000	20,000	20,000	20,000
Total	691,800	650,000	742,400	603,800	665,400

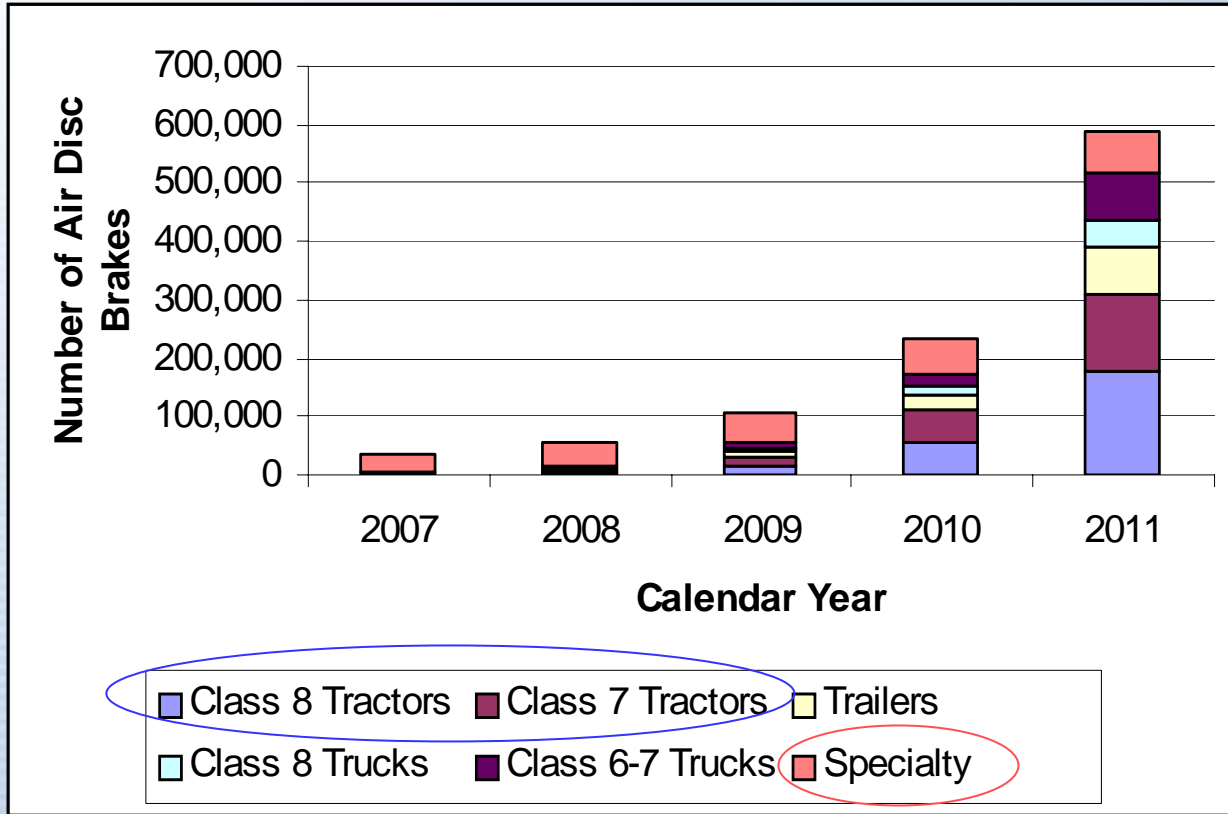
Vehicles

Vehicle Type	Calendar Year				
	2007	2008	2009	2010	2011
Class 8 Tractors	1,079,320	1,226,500	1,520,860	1,079,320	1,275,560
Class 7 Tractors	168,960	192,000	238,080	168,960	927,680
Trailers	1,232,100	906,500	906,500	906,500	906,500
Class 8 Trucks	142,560	162,000	200,880	142,560	168,480
Class 6-7 Trucks	306,240	348,000	431,520	306,240	361,920
Specialty	110,000	110,000	110,000	110,000	110,000
Total	3,039,180	2,945,000	3,407,840	2,713,580	3,750,140

Brakes



Air Disc Brake Population - Projection



1% to 16%
Conversion in
Next 5 Years

Vehicle Type	Calendar Year				
	2007	2008	2009	2010	2011
Class 8 Tractors	1,000	6,133	15,209	53,966	178,578
Class 7 Tractors	500	2,000	15,000	60,000	129,875
Trailers	1,000	3,000	10,000	24,000	81,585
Class 8 Trucks	300	2,000	6,000	12,000	45,490
Class 6-7 Trucks	300	3,000	11,000	24,000	83,242
Specialty	30,000	40,000	50,000	60,000	71,500
Total	33,100	56,133	107,209	233,966	590,270



Summary

- Today's ADB's are significantly more reliable than earlier products
- ADB's are in production
- There are 3 proven ADB suppliers
- There are 4 ADB design variations
- There are similar and unique differences between them
- ADB product service and support capabilities are in place



ADB Supplier Concerns

- Disc Brake inspection approach must consider unique differences from drum brake installation
 - Direct mounted chambers
 - Caliper slide system
 - Internal automatic adjustment
 - Pad and rotor wear limits
 - “Wear Indicator” features

Common and Unique Solutions May be Required



Recommendations to CVSA

- Utilize ADB suppliers to define ADB inspection procedures and vehicle OOS criteria

ADB Supplier	Contact Information	Website
Bendix Spicer	Ron Plantan 440-329-9494	Ron.Plantan@bendix.com
Haldex	Randy Petresh 816-801-2335	Randy.Petresh@hbpus.haldex.com
Meritor WABCO	Paul Johnston 248-435-4701	Paul.Johnston@meritorwabco.com



THANK YOU

