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MACK MEETING

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4/7/09

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# **Brake Control Valve Study Update**

**April 7, 2009**



# History

- September 2008, Meritor Wabco and Haldex Mfg. companies informed NHTSA of brake valve investigation associated with possible oil contamination.
- October 2008, NHTSA opens PE08-058 to investigate matter. Initial PE focused primarily on equipment manufacturers with limited input from vehicle manufacturers.
- December 2008, Mack submits information to NHTSA pertaining to PE08-058
- March 2009, PE09-010 investigation opened. Alleged defect is malfunction of air brake system valves that could cause or contribute to extended vehicle stopping distance when braking (Response due on April 29, 2009)



# Mack's investigation

- Testing,
  - Limited physical testing of relay valves
  - Limited chemical analysis of residual material, oil deposits, at valve
- In depth study of warranty claims, field reports, customer complaints, etc. that may be related to alleged defect,
  - Primary focus thus far has been on relay valves



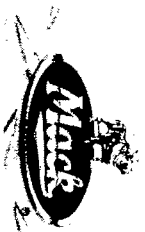
# Testing

- Chemical Analysis performed by independent lab showed,
  - Oil contamination
  - Deterioration or softening of the seal
  - Gas chromatography testing suggests N-Butyl Benzene Sulfonamide
- Physical testing of relay (delivery vs. outlet pressure)
  - Two samples tested that were removed from vehicles that were allegedly exhibiting the condition.
  - One sample was found to have an intermittent issue with the valve sticking while the other did not exhibit the condition.
  - Vehicle with sticking condition had 182,655 miles. The other valve without the problem had 297,571 miles on the vehicle.



# Warranty and Service

- Extensive review of warranty claims and service reports proceeding.
- Relay valve study complete.
  - Method of collecting claims, cases:
    - Key word search for all claims/cases with “valve” for time period of Jan. 1 2005 through April 3, 2009
    - Further refinement to identify control valves used in the air brake system (treadle, relay, park brake control etc.)
    - Even further refinement to identify claims where the valve was leaking or replaced.
    - Populate each claim with engine model, air compressor model, air dryer model, and valve supplier
    - Extraction of claims associated with the relay valve



# Results of relay valve study

- Parameters:
  - Any claim registered from Jan. 1 2005 through April 3, 2009 associated with a relay valve indicating replacement as a result of an air leak and/or brake degradation.
- Results:
  - 305 claims, of which 130 indicated degradation in brake performance (for example brakes slow to apply or release).
  - Fault frequency: 0.31% (total); 0.13% (indicating degradation of brake performance) over a population of 98,178 vehicles

**Important note: The claims reported above are unconfirmed reports and therefore may not be related to the alleged defect. All claims were considered to make the most conservative estimate.**



# Aggregate Data, Relay valve

		By valve manufacturer			
TOTAL # OF CLAIMS	305	Meritor 124	Bendix 177	Dana 1	Haldex 3
Total # claims w/ degradation	130	61	69	0	0

		By Air compressor		Cummins Wabco	
TOTAL # OF CLAIMS	305	Bendix TF 550 11	Bendix TF 750 21	18.7 4	MW 318 253
Total # claims w/ degradation	130	5	13	0	106
					MW 636 16
					6

		By Air Dryer		Cummins Wabco	
TOTAL # OF CLAIMS	305	Bendix System Guard AD9 102	Bendix system guard AD IP 27	M/W dual Dryer 5	M/W Syst Saver 1200 166
Total # claims w/ degradation	130	35	13	3	78
					M/W Syst Saver Twin 5
					1

		By Engine Model							
TOTAL # OF CLAIMS	305	AMI 27	AC 143	AI 80	MP7 20	MP8 24	ISX 4	?	?
Total # claims w/ degradation	130	12	59	37	7	10	0	5	

Mileage	0-10,000	10,001-20,000	20,001-30,000	30,001-40,000	40,001-50,000	50,001-75,000	75,001-100,000	100,001-150,000	150,001-200,000	greater than 200,000
	81	29	34	16	14	31	39	34	13	14



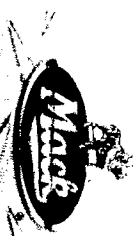
# Other relevant information

- Mack has not received reports of complete loss of brakes associated with the alleged defect.
- Mack has not received reports of accidents, deaths, injuries, or property damage associated with the alleged defect.



# Other Possible contributing factors

- Amount of oil by passing compressor
- Duty cycle and application
- Operating environment
- Maintenance



# Proactive Measures

- Introduced a coalescent filter in production
  - Both Mack and Volvo are producing vehicles with only the coalescent filters
- New Meritor relay valve with larger surface contact area introduced in January 2009
- Parts Publication recommending use of coalescent filter has been released to dealers
- Service bulletin on coalescent filter has been released to dealers



# Summary and Conclusions

- Data suggests that the condition is not widespread and has a low probability of occurrence.
- Reports suggest that the condition may be discernible to drivers



## Next steps

- Confirm conclusions by review of physical sampling of parts from customer vehicles.
- Vehicle brake testing to determine effect on brake performance.
- Protocol to be developed and submitted to NHTSA by end of April, 09.
- Continued monitoring
- Continued review of all returns

All information will be shared with NHTSA and we welcome NHTSA's participation in the test program.



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7/8/09

MACK - MERITOR WABCO - ODI/NHTSA

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TOM SOUPAL	MERITOR WABCO	248-435-1345
Randy Petresh	Haldex	816-801-2335
Daryl Sinclair	Meritor Wabco	248-420-2310

## **MERITOR WABCO**

### **Agenda Outline - PROPOSAL**

- Arrivals to Meritor WABCO – anticipated through mid-morning – Haldex, Volvo, NHTSA
- Organization meeting – C-340 conference room
  - Individual office area provided for guest companies
  - Review valve from TX (Waste Mgmt) and components from PA (Carbon express) – Tom / Jerry / Daryl / Glen
    - Review service history on PA vehicle
  - Review compressor inspection results to date – Daryl / Jon / WCMC conference call
- Valve and other component inspections – MW lab – All
  - All components
  - Action items needed? - All

## **MERRITOR WABCO**

### **Agenda Outline - PROPOSAL**

- Review vehicle inspection plan – C-340 conference room
  - Weeks of 7/13 & 7/20
  - Fleet sites – Tim
  - Test and product sample plan – All
  - MW / Haldex support resources
  - Sample testing protocols – All
- Review MW air compressor on pre-2007 engines – Daryl / Jon
- Action items and next steps? - All

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SITE VISIT

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BERGEY'S  
VOLVO - MACK  
446 HARLEYVILLE PIKE  
SOUTHERTON, PA

8/4/09

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