



Truck Brakes & the Large Truck Crash Causation Study

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Coding LTCCS Crashes

- **1. Critical Event:** Makes crash unavoidable
- **2. Critical Reason for Critical Event:** Immediate reason for critical event
 - **Not the cause of the crash**
- **3. Associated Factors:** All factors that could be important



1. Critical Events – All Trucks

<u>Events</u>	<u>Number</u>	<u>%</u>
Over lane line or off road	25,000	32%
Lost control (speeding, etc.)	22,000	29%
Other vehicle in Lane	18,000	23%
Turning, crossing intersection	8,000	10%
Other (pedestrian, fire)	4,000	6%
<i>Total</i>	77,000	100%
C.E. not coded to truck	64,000	



2. Critical Reasons – Trucks, all Crashes

<u>Reasons</u>	<u>Number</u>	<u>%</u>
Non-Performance (sleep, sick)	9,000	12%
Recognition (inattention)	22,000	28%
Decision (speed, aggressive)	29,000	38%
Performance (overcompensate)	7,000	9%
Vehicle	8,000	10%
Environment (roadway, weather)	2,000	3%
<i>Total</i>	77,000	100%
C.R. not coded to Truck	64,000	



2. Truck Vehicle Critical Reasons

- **Brakes – 23 (40 percent)**

 - 21 out-of-service violations**

 - 2 non out-of-service violations**

- **Cargo Shift – 16**

- **Tires/Wheels – 11**

- **Suspension – 2**

- **Other – 5**

 - Total – 57 (10% of vehicle critical reasons)**



3. Relative Risk: Truck Associated Factors

<u>Factor</u>	<u>Number</u>	<u>Risk Ratio</u>
Legal Drug Use	52,000	1.00
Traffic Flow Interruption	40,000	.85
Brake Problems	39,000	1.67
Too Fast for Conditions	32,000	2.05
Unfamiliar with Roadway	31,000	1.39
Inadequate Surveillance	20,000	1.87
Fatigue	19,000	1.82
Distraction	14,000	1.64
Brake Failure	3,000	1.37



3. Relative Risk: Associated Factor – Brake Problems

Relative Risk

Calculation to get
Relative Risk Ratio
(in thousands):

$$48 / (48 + 55) = .466$$

$$30 / (30 + 9) = .777$$

$$.777 / .466 = \mathbf{1.67}$$

Brake Pro- blems	Critical Reason	
	Yes	No
Yes	29,977	8,617
No	47,863	54,743

3. Brake Factor Standard Errors

Brake Problems:

- Estimate – 39,000 (28 percent)
- Range – 20,470 to 57,530 (15 to 41 percent)

Brake Failure:

- Estimate – 3,000 (2 percent)
- Range – 384 to 5,616 (.2 to 4 percent)

2. Critical Reason Brake Problems

Out-of-Service violations – 19 trucks

- Out-of-adjustment – 13
- Inoperative/defective – 9
- Brake lining – 4

Non Out-of-Service violations – 2 trucks

- Out-of-Adjustment – 1
- Brake lining – 1

No inspection records – 2

- Degraded braking – 2
- Brake failure - 1



3. Associated Factors – Brake Problems: **106 Trucks coded with Critical Reason**

<u>Violation</u>	<u>Number</u>
Out-of Adjustment	80
Inoperative/defective	23
Brakes – General	17
Inadequate brake lining	14
Hose/tubing chaffing and/or kinking	4
Hose/tube connection	4
No or defective brake warning system	3
Connections with leaks/constrictions	2
No/improper tractor protection valve	2



3. Associated Factors – Brake Problems:

76 Trucks not coded with Critical Reason

<u>Violation</u>	<u>Number</u>
Out-of-adjustment	61
Inoperative/defective	13
Brakes – general	9
Inadequate brake lining	9
No or defective brake warning device	5
Connections with leaks/constrictions	3
No/improper breakaway or emergency	2



Top 9 Brake OOS - FY 2005 Inspections

<u>Violation</u>	<u>Number</u>
Out-of-Adjustment	95,529
Inoperative/defective	44,320
Inadequate brake lining	39,270
Brakes – General	38,574
No/improper breakaway/emergency	19,407
Tubing and/or hose inadequacy	18,536
No/defective warning device	18,397
Hose/tubing chaffing and/or kinking	14,402
Reserve system pressure loss	6,522



For More Information

Go to www.fmcsa.dot.gov

Under Facts & Research click on the LTCCS

LTCCS Webpage has:

- Downloadable database
- Users Manual
- Codebook
- Report to Congress
- 20 data tables
- Two analysis briefs on study methodology
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