



# National Transportation Safety Board

Washington, D. C. 20594

## Safety Recommendation

---

Date: October 23, 1992

In Reply Refer To: H-92-103

Honorable Andrew H. Card, Jr.  
Secretary  
U.S. Department of Transportation  
400 Seventh Street, S.W.  
Washington, D.C. 20590

---

Throughout its 25-year history, the Safety Board has conducted in-depth investigations of hundreds of highway accidents involving commercial vehicles over 10,000 pounds. Prior to the fall of 1991, Safety Board investigators cited a wheel failure as the causal factor in only one fatal case.

Beginning in fall 1991, the Safety Board investigated a spate of five truck-wheel runoff accidents in which a total of seven people died. In the 3-week period alone between October 14 and November 4, 1991, three fatal heavy truck-wheel separation accidents occurred, including an accident in which the front left wheel broke off of a two-axle cargo van truck and careened into the path of an oncoming schoolbus carrying 46 fourth-graders and their chaperones. The 365-pound wheel slammed through the bus windshield, killing two children and a chaperone.

The seemingly high incidence of similar fatal accidents aroused public and Congressional concerns about the potential magnitude of the wheel separation problem. Currently more than 1.5 million heavy trucks log more than 90 billion miles annually in the United States. The Safety Board therefore initiated a special investigation in November 1991 in order to determine the magnitude of the wheel separation problem, the types and causes of failures, and the adequacy of current truck wheel inspection and maintenance guidance and procedures.<sup>1</sup>

Because the Safety Board had investigated only six fatal accidents that had resulted from wheel separations, we recognized that we did not have a sufficient

---

<sup>1</sup>For detailed information, read Special Investigation Report--"Medium/Heavy Truck Wheel Separations" (NTSB/SIR-92/04)

database with which to perform a comprehensive analysis. To compile the data needed for this special investigation, the Safety Board researched numerous sources and worked with several transportation agencies, including the Federal Highway Administration's Office of Motor Carriers (OMC) and the National Highway Traffic Safety Administration (NHTSA).

A review of NHTSA's Fatal Accident Reporting System (FARS) data for the period January 1989 through December 1991 showed that highway fatalities totaled more than 117,000. Of that total, about 12,300 accidents involved medium/heavy trucks. FARS data include the category "Related Factors--Vehicle Level" that identifies "vehicle defects...indicated in the police report." NHTSA's reporting system allows for the differentiation between tire defects and wheel defects. However, a preliminary examination of the FARS data revealed that in 157 cases, NHTSA analysts were unsure from police reports whether a tire blowout or a wheel separation had occurred.

For this special investigation, Safety Board analysts requested that OMC compile all MCS 50-T reports for the period January 1989 through July 1991 to determine the incidence of accidents resulting from wheel defects. The OMC reports forms showed that nationwide over 540 accidents resulted from tire/wheel defects during the 30-month period. As in the case of most police reporting forms, OMC's Form MCS 50-T does not differentiate between wheel and tire defects. The Safety Board and other members of the investigation group suspected that most of the 540 tire/wheel accidents reported to OMC were tire blowouts.

Because OMC data files do not include carriers engaged in intrastate commerce, Safety Board analysts tried to obtain more complete information by surveying State highway enforcement agencies. However, a review of State accident reports revealed that only six States -- Alabama, Oregon, South Carolina, South Dakota, Texas, and Washington -- separate wheel defects from tire defects on reporting forms.

An independent study of OMC's MCS 50-T data files, published by the Urban Institute in 1991,<sup>2</sup> identified seven defect categories associated with highest crash costs for the period 1984-1988. In order of decreasing cost, the categories were brakes (\$199,040,376), wheels/tires (\$189,951,382), fuel system (\$89,832,313), engine, steering, lights, and the driveline.

The Institute's analysts developed cost-efficiency ratios to show how resources were allocated among crash types by defects. In their report, they stated, "Whether the goal is crash cost minimization or crash minimization, our analyses suggest that wheel/tires and the suspension system require more roadside inspection time than they received in 1988." Typically, wheels and tires ranked first, second, or third in all analyses that determined a relative effectiveness for inspection of the more common vehicle defects. The Institute's study determined that the time devoted to a vehicle's inspection averaged 20 minutes, of which 2 minutes were spent on wheels and tires. The Urban Institute study called for OMC to place additional emphasis on inspections of tires and wheels.

---

<sup>2</sup>Douglass, John B., T.R. Miller, "The Relative Efficiency of Out-of-service Criteria as Accident Deterrants", The Urban Institute, July 30, 1991.

Safety Board analysts determined from screening the FARS and OMC data that most failures reported as wheels/tires accidents are usually tire blowouts. The Safety Board therefore believes that before OMC alters its recommended inspection procedures, the States need to separate tire blowout accidents from wheel separation accidents in their data collection efforts, especially if OMC terminates the MCS 50-T data collection. This would provide policymakers with the information necessary for determining if more emphasis should be placed on tire inspection or on wheel conditions.

Therefore, the National Transportation Safety Board recommends that the Department of Transportation:

Encourage the States to separate wheel defects from tire defects in future accident data collection efforts (Class II, Priority Action)  
(H-92-103)

Also the Safety Board issued Safety Recommendations H-92-98 through -101 to the American Trucking Associations in cooperation with the National Wheel & Rim Association, the Motor Vehicle Manufacturers Association of the United States, Truck Trailer Manufacturers Association, and the Society of Automotive Engineers, and H-92-102 to the Federal Highway Administration.

VOGT, Chairman, COUGHLIN, Vice Chairman, and LAUBER, HART, HAMMERSCHMIDT, Members, concurred in this recommendation.

  
By: Carl W. Vogt  
Chairman