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NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: June 23, 1981

Forwarded to:
Honorable Raymond A. Peck, Jr.
Administrator
National Highway Traffic Safety
Administration
Washington, D.C. 20590

SAFETY RECOMMENDATION(S)
H-81-26 and -27

About 7:25 a.m., on November 10, 1980, southbound traffic on Interstate 15 suddenly encountered dense fog north of the Highland Avenue offramp near San Bernardino, California, that reduced visibility to between zero and 50 feet. Drivers, whose vehicles were traveling 55 mph on the well-maintained, eight-lane, divided freeway, said the visibility obscurement was immediate and unexpected. Some drivers slowed their vehicles partially as they entered the fogbank and others did not. A tractor-trailer combination vehicle braked suddenly to avoid a small car that changed lanes in front of it, and a pickup truck struck the trailer from the rear. This initiated a chain of collisions that involved at least 24 vehicles over a period of 5 to 10 minutes within a distance of 450 feet and resulted in 7 fatalities, 17 injuries, and extensive damage to all vehicles. 1/

The accident occurred during daylight about 1 hour after sunrise at an elevation of about 1,500 feet above mean sea level. The temperature was about 45° to 50° F with variable wind speeds of less than 5 knots. Fog was reported at airports near the accident site by certified weather observers. At Ontario, California, about 9 miles southwest of the accident site, obscured skies and surface visibility of zero were reported at 6:45 a.m., and surface visibility of 1/8 mile was reported at 7:47 a.m. At Riverside, California, about 13 miles south of the accident site, the visibility varied from 1/16 mile at 6:45 a.m. to 1/8 mile at 7:45 a.m. Norton Air Force Base, 15 miles east of the accident site, reported partially obscured skies with a visibility of 1 1/2 miles at 6:38 a.m. About 1 hour later, the visibility was reported at 1/16 mile. Dense fog or low clouds were forecast for the San Bernardino Valley by the National Weather Service (NWS) for the morning of November 10.

1/ For more detailed information, read Highway Accident Report--"Multiple-Vehicle Collisions and Fire in Fog, Interstate 15, near San Bernardino, California, November 10, 1980" (NTSB-HAR-81-2).

Those drivers who were interviewed stated that the visibility was good before the accident area and that they had encountered no previous low-lying fog. Some had heard fog conditions reported on the radio, but it generalized the area into "patchy fog in the valley." They stated that they observed the "curtain" of fog ahead but were unable to judge its density. Some of the drivers turned on their headlights and/or windshield wipers, some turned on flasher units, and most attempted to move to the right to the slower lanes. The local residents involved in this collision said that although there had been fog before at this location they had never encountered fog of this density. They stated that they were surprised at the density once they entered the cloud. Witnesses said the sight distance ranged from zero to 50 feet at various times. Most drivers interviewed stated that once they had entered the cloud it was so dense that they had to concentrate on the road ahead, and that when they did identify a hazard, they had little or no time to react.

Each of the drivers was driving in a clear environment descending a grade and could see the fogbank ahead. Some turned on their lights and some reduced their speed slightly because they had often experienced fog in this general area and were anticipating a reduced visibility of a limited nature. Others either gave the matter no thought or adopted a "wait and see" attitude and entered the fogbank at their regular cruising speed in the 55-mph range. Some drivers reduced their speed to 40 or 45 mph, and a few further reduced their speed to 10 or 15 mph, after entering the fog. Some drivers stopped in time to avoid colliding with vehicles ahead only to be struck from the rear by other vehicles.

Drivers' statements indicated that the lack of caution in some cases resulted from their past experiences with reduced visibility situations that were not so extreme. Other reasons given for lack of caution were lack of knowledge or failure to relate knowledge with actual circumstances and lack of training in evasive procedures.

This accident demonstrates the need to make safe speed decisions very quickly when entering fog. The collisions occurred very near the fog front. Two witnesses, without specifying a distance, stated that they ran back to the start of the fog to flag approaching traffic to prevent more vehicles from entering the area. Because of the confusion and the constant movement of the fog front, no accurate measurements were obtained. However, most witnesses agreed that they were just barely into the fog when it became extremely difficult to see and the collisions took place.

If, under limited-visibility conditions on high-speed highways, trucks and other heavy vehicles were required to travel in the right lane(s) and passenger cars and light vehicles were required to travel in the left lane(s), the extreme mix of vehicle size and weight could be avoided. Vehicles would be traveling with vehicles more their size and weight. In this accident, such a vehicle size/weight separation would have reduced the severity of the collisions. Fatalities might have been avoided, and the degree of injuries and property damage would have been less severe. Given the interaction between the 9 heavy trucks, the 2 standard-size pickup trucks, and the 13 compact cars at 2,000 pounds or less, the incompatibility of compact cars versus heavy trucks is graphically demonstrated. No fatal injuries occurred in collisions between vehicles of comparable size.

Following its investigation of a multiple-vehicle collision accident under fog conditions on the New Jersey Turnpike in 1969, ^{2/} the Safety Board issued a recommendation to the National Highway Traffic Safety Administration (NHTSA) on April 16, 1971, calling for the initiation of a program and procedures to minimize the

^{2/} Highway Accident Report--"Multiple-Vehicle Collision Under Fog Conditions Followed by Fires on the New Jersey Turnpike, November 29, 1969" (NTSB-HAR-71-3).

likelihood of catastrophic, chain-reaction collisions on high-speed, multilane highways in adverse weather or visibility conditions. The recommended actions included: (1) segregating heavy vehicles from light vehicles by the assignment of lanes whenever the safe speed is below the posted speed; (2) prohibiting the overtaking of slow vehicles; (3) use of four-way flashers by all vehicles; (4) prohibiting stopping on the traveled portion of the highway unless conditions will not permit otherwise; and (5) evacuating of stopped vehicles under such adverse conditions. The NHTSA referred the recommendation to its Research Institute and then, in 1974, to the Operations Subcommittee of the National Committee on Uniform Traffic Laws and Ordinances of the Uniform Vehicle Code (UVC). The subcommittee decided that this was a State jurisdictional matter and not a subject for inclusion in the UVC.

The Safety Board believes that the NHTSA should reconsider this recommendation for inclusion in Highway Safety Program Standard No. 4 and driver education curricula. This would be an efficient and effective approach to achieving national distribution of information and implementation of procedures for reducing accidents in adverse weather or poor visibility conditions.

In this accident there were six separate collisions in which five passenger automobiles and a pickup truck sustained severe frontal damage when they struck and underrode the overhangs of trailers stopped in their paths. Four of the total of seven fatalities occurred in three of these underride collisions, and all four persons were occupants of either the pickup truck or passenger vehicles.

All of the trailers struck were equipped with rear underride protection devices that met the criteria of Federal Motor Carrier Safety Regulations (FMCSR) 393.86, "Rear End Protection." However, the protective devices did not prevent the underride by the smaller vehicles in any of the collisions.

Following its investigation of a truck/automobile underride collision on Interstate 495 near New Carrollton, Maryland, on June 19, 1970, the Safety Board recommended on December 1, 1975, that the NHTSA initiate an additional effort to develop Federal Motor Vehicle Safety Standards for bumper protection of motor vehicles to provide predictable and compatible crash performance between vehicles of considerable difference in size and weight.

On March 24, 1977, the Insurance Institute for Highway Safety petitioned both the Bureau of Motor Carrier Safety (BMCS) of the Federal Highway Administration and the NHTSA to initiate rulemaking to establish motor vehicle safety standards for the rear ends of trucks, trailers, semitrailers, and similar types of vehicles to prevent or reduce the probability of other vehicles underriding them in rear-end collisions.

On August 26, 1977, the BMCS and the NHTSA issued a joint Advance Notice of Proposed Rulemaking (ANPRM) titled: "Rear End Underride Protection" (BMCS Docket No. 77; Notice 77-6 and NHTSA Docket No. 1-11; Notice 07). The stated purpose of the ANPRM was to request comments on the need to reassess FMCSR 393.86, "Rear Underride Protection," and the need for an FMVSS. On January 8, 1981, the NHTSA issued a proposal to amend 49 CFR Part 571 by adding a new safety standard titled "Rear Underride Protection." The proposed standard would establish rear underride protection requirements for heavy vehicles of a gross vehicle weight rating of more than 10,000 pounds. The standard would lower the vertical distance of the underride guard to 21.65 inches, as compared to the 30-inch requirement in FMCSR 393.86, and establish performance requirements. The proposed effective date for this standard is September 1, 1983.

In a letter to the public docket on April 8, 1981, the Safety Board supported the rulemaking proposal and suggested that the NHTSA modify the proposed ground clearance of the rear underride guard from 21.65 inches to no less than 18 inches. This would insure that the guard would engage the front tires and wheels of small cars. Actual measurement of seven popular-model small cars revealed that the top of the front tire was 20 to 23 inches above the ground and the top of the rim was 17 to 18 inches. At the Board's recommended height, the guard would engage the engine block as well, even if the striking car is in a preimpact braking mode. The lower measurement would also avoid the guard skimming the hood off and back through the windshield and into the occupant compartment.

The NHTSA should consider the Safety Board amendments and expedite the rulemaking.

Therefore, the National Transportation Safety Board reiterates its recommendation that the National Highway Traffic Safety Administration:

Initiate (through an appropriate demonstration project) a program and procedures for minimizing the likelihood of catastrophic chain-reaction collisions on high-speed, multilaned highways in adverse weather or visibility conditions; such program to consider, among others, requirements to: (1) segregate heavy vehicles from light vehicles by assigned use of lanes whenever safe speed is below posted speed; (2) forbid overtaking and passing by heavy vehicles; (3) use of four-way flashers by all vehicles; (4) prohibit stopping on the traveled portion of highways (unless conditions will not permit otherwise); and (5) evacuate stopped vehicles under certain conditions. (Class II, Priority Action) (H-71-17)

Further, the National Transportation Safety Board recommends that the National Highway Traffic Safety Administration:

Consider the circumstances of this and other similar limited-visibility accidents and develop a strategy such as that recommended in Safety Board Recommendation H-71-17 for inclusion in Highway Safety Program Standard No. 4, "Driver Education," to inform motorists faced with adverse, limited-visibility driving conditions about the safest actions to take to protect themselves from injury. (Class II, Priority Action) (H-81-26)

In developing the new standard related to Rear Underride Protection as proposed in NHTSA Docket No. 1-11, Notice 07, of January 8, 1981, incorporate the specification modifications submitted by Safety Board letter dated April 18, 1981, to the Docket. (Class I, Urgent Action) (H-81-27)

DRIVER, Vice Chairman, and McADAMS and BURSLEY, Members, concurred in these recommendations. KING, Chairman, and GOLDMAN, Member, did not participate.

By: 
James B. King
Chairman