H-237

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

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Forwarded to:

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200 N.E. 21st Street
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SAFETY RECOMMENDATION(S)

H-80-48 and -49

About 12:45 a.m., on February 23, 1980, a two-door sedan was westbound on a two-lane section of U.S. Route 64, near Perry, Oklahoma. Traveling in the eastbound lane at an excessive rate of speed, the sedan crested a hill and collided head-on with an eastbound pickup truck. The sedan rebounded into the westbound lane and began to burn. The pickup truck was then struck by a following eastbound four-door sedan. Three of the five pickup truck occupants were ejected from the vehicle; all five suffered fatal injuries. The driver of the two-door sedan was killed. The two persons in the four-door sedan received minor injuries. 1/

U.S. Route 64 in the area of the accident site was a two-lane, rural, unlighted highway with a straight horizontal and a rolling vertical alignment. It is a Federal aid-primary route functionally classified as a minor artery between Interstate 35 and U.S. Route 177. It has an average daily traffic count of 2,500 vehicles. According to the Oklahoma Department of Transportation (OKDOT), the 11-mile section of the road from Perry to U.S. 177 had an accident rate of 80.4 accidents per 100 million vehicle miles, as compared to the Statewide rate of 121. Thus, the section would not be considered a high-accident location. Of the 41 accidents which occurred over the past 5 years (1974 to 1979), only 2.0 percent were wrong-side-of-road, head-on collisions. However, the potential for catastrophic accidents exists as is evidenced by this accident.

The accident occurred on the crest of a 400-foot vertical curve (hill crest). A vertical curve is a highway engineering term for the smooth transition provided for a vehicle to move through a change in grade on a highway. This smooth transition from one grade to another is called a "crest" if the point of intersection of the two grades is above the level of the roadway, and a "sag" if it is below the roadway. Any given hill will have at least three vertical curves and may have more depending on the number of grade changes. The design plans indicated that the eastbound grades for the hill were +4.71

1/ For more detailed information, read "Highway Accident Report--Head-on Collision of Sedan and Pickup Truck, U.S. Route 64, near Perry, Oklahoma, February 23, 1980" (NTSB-HAR-80-4).

percent and -3.54 percent. At the point of impact, the roadway was 24 feet wide, with 8-foot-wide sod shoulders. The pavement was marked in 1977 with a dashed yellow centerline and white edgelines. The point of impact was about 55 feet west of the end of a no-passing zone for westbound traffic and 26 feet west of the hillcrest. According to the design standards of the American Association of State Highway and Transportation Officials (AASHTO) Policy on Geometric Design of Rural Highways, 1965, the 400-foot vertical curve had a design speed of approximately 38 mph. A minimum length for this curve at a speed of 55 mph would be 1,000 feet.

The OKDOT design plans for this section of U.S. 64 were completed in 1927, and it is assumed that the road was constructed soon thereafter. In 1977, the pavement was overlaid with asphalt.

About midnight on February 25, 3 days after the accident, the Safety Board's investigative team, with the aid of the OKDOT Division Four Traffic Engineer, conducted tests for headlight-glow, visibility, and sight-distance levels for vehicles approaching the hill crest at the accident site. Vehicles similar to those involved in the accident were used to assure proper eyeheight and vehicle headlamp positions. The tests were conducted with the headlamps at both high and low beams. It was noted that as each vehicle approached the crest of the hill, no headlamp glow was observed until immediately before the direct light source came into view. When the vehicles were first visible to each driver, the vehicles were about 340 feet apart.

Much of the State of Oklahoma consists of many miles of highway built to design standards in use before 1965. Although the posted speed limit was 55 mph, 64 percent or 7 of the 13 crest curves near and including the accident site had a theoretical design speed of less than 55 mph. Using the accident site, which had a gradient difference of 8.25 percent (the highest of the group) to justify a design speed of 55 mph, the no-passing, stopping sight-distance should have been 460 feet, which would require a vertical curve of at least 1,000 feet. The State has a systematic program for improving these inadequately rated roads as resources become available. However, the accident hill crest is in competition with 39 percent of Oklahoma's 11,714 miles of highway (not including Interstate highways) for these resources.

Although it is impractical to flatten this hill crest, as a result of this accident, the State should consider reducing the speed limit for this section of the road to the mean safe speed, as indicated by the highway design, until sufficient resources are available to correct the hazard.

The driver of the two-door sedan was 20 years old, weighed 120 pounds, and held a valid Oklahoma driver's license with no restrictions. Her driving record listed one previous accident, on May 4, 1979.

From about 6:30 p.m. until 11 p.m. on the evening preceding the accident, the driver was at a local bar. About midnight she was observed leaving the tavern, alone, in her car. No person could be found who could testify to her whereabouts from midnight until the accident.

The 34-year-old, 210-lb driver of the pickup truck, an area resident, held a valid Oklahoma driver's license with no restrictions. He had no record of previous traffic violation convictions or accidents. He, his wife, and their three children had spent the evening at a friend's home in Perry; they arrived about 8 p.m. and left about 12:30 a.m.

According to his host, during the evening the driver drank about a "six-pack of beer." His host stated that he did not appear intoxicated when the family departed and that all five occupants were riding in the front seat of the pickup truck when they left.

Toxicological examinations were conducted by the Office of the Chief Medical Examiner of the State of Oklahoma. The blood alcohol level (BAL) for the driver of the two-door sedan was 0.21 percent by weight with a carbon monoxide level of 9 percent carboxyhemoglobin. The BAL for the pickup truck driver was 0.15 percent by weight. No autopsy was performed on the driver of the two-door sedan, and since her body was severely burned, no injury data were obtained.

Quoting from Chemical Tests and the Law:[2/]

> "Early in alcohol influence (at blood alcohol concentration of 0.04-0.08 percent) nerves which control coordinated activities of muscle groups become partially paralyzed. The resulting incoordination is seen in uncertain steps of the individual, slurred or 'thick' speech, and clumsy manipulative efforts to use the fingers. . . . It is quite apparent that there is little question that ability to operate a motor vehicle safely is definitely impaired by the time the blood alcohol level reaches 0.10 percent."

The effect of alcohol impairment on the judgment and driving ability of the two-door sedan driver could explain the vehicle's excessive speed and its being on the eastbound lane of traffic as the car topped the crest of the hill. The alcohol-impaired judgment and driving ability of the pickup truck driver was not a contributing factor in this accident. Without warning, he was suddenly confronted with an oncoming vehicle 340 feet away in his lane of traffic at a closing speed of about 135 mph (199 feet per second).

The Oklahoma Alcohol Safety Program was developed as an NHTSA Alcohol Safety Action Project (ASAP). At that time, it was concentrated primarily in its three major cities Oklahoma City, Tulsa, and Lawton. When the ASAP was no longer Federally funded (1977), the Statewide formal program ceased to exist. The cities have maintained their programs, but the emphasis is no longer at the same level in the rural areas or in the less populated communities.

In 1978, the Oklahoma Legislature passed Statute Title 47, Section 11-902.1, "Course for Drinking Drivers." This statute provided for the referral by the courts of offenders to driving while intoxicated (DWI) schools.

The Driver Improvement Bureau of the Department of Public Safety is authorized to certify all breath-test operators and all DWI schools. The highway aspects of the alcohol safety program are now performed by the Department of Public Safety. The Oklahoma State Highway Patrol trains all police officers in the State and alcohol countermeasures are a part of this training. There are about 20 certified, community funded and operated DWI schools throughout the State. These are operated by not-for-profit organizations.

2/ Donigan, R., Chemical Tests and the Law, pp. 286, 287, and 294.

Although the basic functions of the alcohol safety program continued, with the loss of Federal funding and the discontinuance of the formal program, emphasis on the program declined. For example, the DWI arrests have declined from a high of 6,664 arrests in 1977 (the last year of the formal program) to 6,517 in 1978 and 5,719 in 1979--a drop of 945 arrests in 2 years. This reduction was explained by an official of the Department of Public Safety as the result of a loss of operating funds, a change in priorities, and limited resources. Fatal accidents (where a driver was killed and also had a BAL of 0.10 percent or higher) amounted to 38 percent of all fatal accidents in the State wherein the driver was killed (198 out of 522 in 1978). This is the largest single causative factor of fatal accidents in the State.

Based on the foregoing information, the Safety Board believes that the State of Oklahoma should seek the funds necessary to enable them to renew their emphasis on the Alcohol Safety Program especially in the rural areas and less populated communities of the State.

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

> Study the series of vertical curves on a 3.7-mile section of U.S. Route 64 including the accident site and reduce the posted speed limit to a speed that is compatible with the highway design speeds. (Class I, Urgent Action) (H-80-48)
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> Seek the funds necessary to enable a renewed emphasis on alcohol safety especially in the rural areas and the less populated communities of the State. (Class II, Priority Action) (H-80-49)

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

By: James B. King
Chairman