

Log H-365

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: September 26, 1983

Forwarded to:

Mr. Henry Gray
Director
Arkansas Highway and
Transportation Department
P.O. Box 2261
Little Rock, Arkansas 72203

SAFETY RECOMMENDATION(S)
H-83-42 and -43

About 5:40 a.m. on March 25, 1983, a Jonesboro School District schoolbus was traveling westbound on State Highway 214 near Newport, Arkansas. The schoolbus was transporting 31 high school students and 7 teachers from Jonesboro, Arkansas, to the Annual State Skills Olympics for vocational-technical students in Little Rock, Arkansas. As the schoolbus traveled through a relatively sharp right curve leading to a T-intersection with State Highway 18, it slid across the centerline onto the opposing lane's shoulder and through a stop sign; it continued to yaw and slide across Highway 18, where it overturned and struck the far edge of a roadside drainage ditch. The teacher-driver, 4 other teachers, and 4 students were killed, and 2 teachers and 27 students were injured. 1/

Calculations based on guidelines published by the American Association of State Highway and Transportation Officials (AASHTO) indicate that the design speed of the curve for a 210-foot radius and a 0.09 foot per foot superelevation is 28.6 mph. 2/ Another reference 3/ states that the design speed should be used in determining the advisory speed for a curve. Because it is inadvisable to post an advisory speed that exceeds the design speed, the next lowest increment of 5 mph should be used as the advisory speed. 4/ In this case, the advisory speed should have been 25 mph, instead of 35 mph. The difference between the 55-mph approach speed on State Highway 214 and the calculated 25-mph advisory speed is 30 mph. Based on the large difference between the two speeds, the

1/ For more detailed information read Highway Accident Report—"Jonesboro School District Schoolbus Run-Off-Road and Overturn, State Highway 214 at State Highway 18, near Newport, Arkansas, March 25, 1983" (NTSB/HAR-83/03).

2/ "A Policy on Geometric Design of Rural Highways," American Association of State Highway and Transportation Officials (Washington, D.C., 1965), p. 157. Design speed: A speed determined for design as related to the physical features of a highway that might influence vehicle operation. It is the maximum safe speed that can be maintained over a specified section of highway when conditions are so favorable that the design features of the highway govern.

3/ "Transportation and Traffic Engineering Handbook," Institute of Transportation Engineers (1976), p. 860.

4/ Five-mph increments are to be used according to Section 2C-35 of the "Manual on Uniform Traffic Control Devices for Streets and Highways," Federal Highway Administration (Washington, D.C., 1978).

Safety Board believes that either another intersection design approach should have been considered or extraordinary steps should have been taken to alert drivers to the hazard at this location.

According to AHTD policy, the posted advisory speed is the nearest 5-mph incremental speed that registers 15 degrees or less on a ball bank indicator. The ball bank reading is a measure of the amount of lateral force on a vehicle while driving around a curve. The calculated advisory speed for the accident curve based on this requirement is about 30 mph, not 35 mph as posted. Therefore, the advisory speed at the curve was too high and did not comply with State policy or national guidelines.

According to the AASHTO guidelines, safe speeds on curves are indicated by ball bank readings of 14 degrees for speeds below 20 mph, 12 degrees for speeds between 25 and 30 mph, and 10 degrees for speeds 35 mph and higher. ^{5/} Therefore, there is a discrepancy between the single ball bank indicator reading method used by the AHTD to determine the posted advisory speed and the range of readings and speeds recommended by AASHTO. Such a difference in ball bank indicator readings in this case appears to have permitted the posting of an advisory speed limit that is 5 to 10 mph higher than the speed considered safe by national guidelines.


As a result of an independent study following the accident, the AHTD installed rumble strips before the combination curve warning and "35 mph" advisory speed signs, and before the "stop ahead" sign on the approach to the curve. During a followup trip through the accident site, a Safety Board investigator noted that traffic was maneuvering into the opposing traffic lane to avoid the rumble strips. The Safety Board commends the AHTD for expeditiously installing the rumble strips and endorses their use. However, the Safety Board believes that driver reactions to the rumble strips should be monitored and that, if a hazard exists, appropriate changes to the design of the rumble strips should be implemented.

Therefore, the National Transportation Safety Board recommends that the Arkansas Highway and Transportation Department:

Revise the ball bank indicator readings used to select and post advisory speeds for curves to conform to the guidelines published by the American Association of State Highway and Transportation Officials. (Class II, Priority Action) (H-83-42)

Determine if the design of the rumble strips installed at the approach to the curve on State Highway 214 has created a hazard because of traffic maneuvering into the opposing traffic lane to avoid the rumble strips, and take action to correct the problem if it is determined that a hazard exists. (Class II, Priority Action) (H-83-43)

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


By: Jim Burnett
Chairman

^{5/} "Design of Rural Highways," p. 154.