

Speed Reduction in School Zones

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The use of flashing beacons together with signing has become somewhat standard throughout the country to alert drivers to the presence of school children and to regulate vehicle speed in school zones. Yellow beacons, usually two flashing alternately, may be used with both warning signs and regulatory signs. The only regulatory signs related to school zones are speed limit signs. Both hazard identification beacons and speed limit sign beacons are intended to operate only during hours when the warning and speed regulations are in effect. The effectiveness of signs and flashing lights in reducing speed in school zones has been questioned.

The purpose of this study was to determine the effectiveness of flasher beacons in reducing vehicle speeds in Kentucky. Speed measurements were made during flashing and nonflashing periods at 48 locations. The physical characteristics of each site were identified and compared to speed reductions. A large sample of flashers (120 of 424 school flashers currently maintained by the Bureau of Highways in 33 counties in central, northern, and northeastern Kentucky) was inspected to ascertain condition and operation. This information was helpful in determining the reliability of the beacons in everyday operation.

In Kentucky, pedestrians between the ages of 5 and 9 represent less than 10 percent of the total population but account for more than 16 percent of all pedestrian fatalities. This percentage exceeded all other age groups (1). Of the 167 pedestrian deaths in 1973, 27 were child fatalities (5 to 9 years old). Approximately 600 children pedestrians (5 to 14 years old) were injured in Kentucky by motor vehicles.

Fourteen findings and conclusions were based on analysis of physical and geometric features of the sample locations.

1. Speed reductions attributable to flashers were statistically significant at the 95 percent level at 84 percent of the locations; the average speed reduction was 5.8 km/h (3.6 mph). Seventy-one percent of the locations showed speed reductions of less than 6.4 km/h (4 mph). Only two locations yielded speed reductions of more than 16.1 km/h (10 mph).

2. The 85th percentile speeds decreased by about

8.0 km/h (5 mph) for all locations. The higher speed locations had lower reductions [3.2 km/h (2 mph)] than the low-speed locations [6.4 km/h (4 mph)].

3. The 85th percentile speeds at all locations during flashing periods exceeded the 40.2-km/h (25-mph) limit by about 30.6 km/h (19 mph).

4. Uniformity of driving speeds was the same at low-speed [40.2 to 56.3 km/h (25 to 35 mph)] and medium-speed [57.9 to 72.4 km/h (36 to 45 mph)] locations whether the flashers were on or not. However, at high-speed locations [74 to 88.5 km/h (46 to 55 mph)], a 15 percent drop of vehicles in the 16.1-km/h (10-mph) pace was noted, which indicates that the intervehicle accident potential is increased when the flashers are on.

5. Crossing guards contributed to a drop in vehicle speeds of about 14.5 km/h (9 mph), and the average speeds were under 40.2 km/h (25 mph) at four of the five locations. Without the crossing guards at these same locations, the speed reduction averaged only 4.34 km/h (2.7 mph). Crossing guards were stationed at about 10 percent of all locations.

6. Regular speed enforcement in school zones by police agencies caused average speed reductions of 13.5 km/h (8.4 mph) at seven locations.

7. Speed reductions at high-speed locations were slightly higher than at other locations. However, the average speeds exceeded the 40.2-km/h (25-mph) limit by about 29.0 km/h (18 mph) at high-speed locations compared to 15.6 km/h (9.7 mph) and 6.8 km/h (4.2 mph) at medium- and low-speed locations respectively. Only 8 percent of the vehicles traveled below the speed limit when flashers were not operating.

8. Pedestrian volumes (increasing from 50 to 400/day) in the school zones contributed to a slight decrease in vehicle speeds [3.2 km/h (2 mph)]. Also school bus volumes (increasing from 0 to 32 buses/day) contributed to a slight decrease in vehicle speeds [about 3.2 km/h (2 mph)].

9. Highway width did not appear to affect speed reductions. Short sight distances between motorists and school flashers contributed to the ineffectiveness of flashers at five locations.

10. Average decreases in speed of less than 1.6 km/h (1 mph) during flashing periods were attributed to traffic

volume increases at only two locations.

11. Signalized or stop-sign intersections adjacent to or between school flashers resulted in virtually no speed reductions in 4 of 5 such locations. Excessively long flashing periods at 10 locations resulted in speed reductions of less than 4.2 km/h (2.6 mph). School flashers at 3 locations, with a recent history of inappropriate flashing, yielded an average speed reduction of only 2.7 km/h (1.7 mph).

12. Several flasher installations were not warranted because of low pedestrian volumes and low vehicle speeds and volumes. A few continually flashing lights were also found.

13. Nearly all school flasher locations have favorable as well as unfavorable features that contribute to driver compliance or noncompliance with the 40.2-km/h (25-mph) speed limit. A single, significant defect can render the flasher ineffective.

14. About 14 percent of the school flashers were defective or malfunctioned. Major malfunctions included inoperative clocks and defective bulbs or fuses. Other deficiencies included flashers mounted among commercial signing, obstructed view, deteriorating signs, worn pavement markings, nonuniform signs, and erratic flashing periods.

REFERENCE

1. C. V. Zegeer. Pedestrian Accidents in Kentucky: 1972-1973. Bureau of Highways, Kentucky Department of Transportation, March 1975.