Pedestrian Accidents in Utah

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The objectives are to investigate the trend of Utah's pedestrian accident rate and to analyze and discuss some of the factors involved in Utah's pedestrian accidents. The results show that Utah's accident rate for fatally injured pedestrians decreased in 1980 but held fairly constant after that with minor fluctuations. It appears that Utah's accident rate for nonfatally injured pedestrians increased steadily over the same 9-year period with the exception of 1985. The analysis also indicates the following (a) age 5–10 is the major grouping involved in Utah's pedestrian accidents; (b) most pedestrian accidents occurred in daylight and in the peak from 3:00 p.m. to 7:00 p.m.; (c) the majority of pedestrian accidents are caused by pedestrian error; (d) pedestrian accidents tend to be more serious—about 4 percent are fatal; (e) more pedestrian accidents occurred between intersections than at intersections; (f) men and boys are involved in more than twice as many pedestrian accidents as are women and girls; (g) adverse road, weather, and light conditions are not a factor in most pedestrian accidents; and (h) traffic-control devices do not guarantee a safety zone for pedestrians. The analysis for school-age pedestrian accidents reveals similar findings. Because most pedestrian accidents are caused by pedestrian error, more emphasis must be placed on modifying the training and behavior of pedestrians in crossing techniques, particularly for school-age pedestrians.

According to national accident reports (*1*), nearly 45,000 Americans die each year in traffic-related accidents. Approximately 16 percent of these victims are pedestrians. It is widely accepted that pedestrian-involved accidents tend to be more severe than vehicle-with-vehicle accidents because of the lack of protection for pedestrians. For years, traffic engineers and researchers have made a great effort to identify and analyze pedestrian accidents and recommend countermeasures. The efforts have been successful in the United States as shown by the declining trend in accident rates of both the fatally and nonfatally injured pedestrians (Figures 1 and 2).

The accident rate is a better indicator of trends than simple numbers in analyzing accidents because it takes into account exposure to traffic. The relatively small percentage of pedestrian accidents at a location, particularly at an intersection, makes it difficult to predict potential accident locations using historical accident data. Normally, improvements at pedestrian crossings are based on the amount of traffic and the number of pedestrians. Accident history is usually used to justify additional improvements, particularly when accidents result in public outcry. It is the safety engineer's responsibility to analyze available data at pedestrian-crossing locations and to make recommendations. The objectives of this study are to investigate the trend of Utah's pedestrian accident rate for the period 1979–1987 and to analyze and discuss some of the factors involved in Utah's pedestrian accidents. School-age pedestrian accident statistics are also reviewed and discussed.

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TREND OF UTAH'S PEDESTRIAN ACCIDENT RATES

The accident data used come from FHWA and cover 1979 through 1987 (*1*). Review of Utah's accident rates for fatally injured and nonfatally injured pedestrians (Table 1) indicates that the rate for fatally injured pedestrians decreased in 1980 but held fairly constant after that with minor fluctuations. It appears that Utah's accident rate for nonfatally injured pedestrians increased steadily over the same 9-year period with the exception of 1985.

Regression analysis was used to formulate a relationship between vehicle-miles and the number of fatally and nonfatally injured pedestrians in Utah. The result reveals very little relation between vehicle-miles and the number of fatally injured pedestrians. However, the R^2-value of .68 indicates that the number of nonfatally injured pedestrians is moderately dependent on the number of vehicle-miles. If fatally injured and nonfatally injured pedestrians are combined as a dependent variable, the R^2-value of .66 indicates that the total number of fatally injured and nonfatally injured pedestrians has a moderate relationship with the vehicle-miles. Because the regression equation is valid only in the range of the data set used to construct the relationship, use of increasing vehicle-miles jeopardizes predictions made with this relationship.

PEDESTRIAN ACCIDENTS IN UTAH

The Traffic and Safety Division of the Utah Department of Transportation is maintaining a centralized accident records system. The following accident statistics and review are based on the pedestrian accidents that occurred during the period from 1984 through 1988. This paper's purpose is to identify factors involved in Utah's pedestrian accidents.

Figure 3 shows that Age 5–10 is the major grouping involved in Utah's pedestrian accidents, accounting for approximately 28 percent of the total. Figure 4 indicates a peak from 3:00 p.m. to 7:00 p.m., which may be the result of the conflict between the school-age and adult pedestrians and the increased exposure to peak-hour traffic.

Figures 5–14 show statistics of the 5-year average for some factors involved in Utah's pedestrian accidents. The following findings can be obtained from these figures:

1. Most pedestrian accidents occurred in daylight conditions (Figure 5).
2. Only 30 and 18 percent of drivers were cited for violation in pedestrian-related accidents at intersections and between intersections, respectively (Figures 6 and 7).

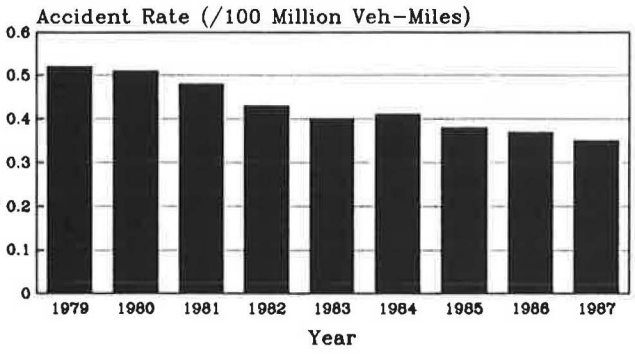

FIGURE 1 Fatal pedestrian accident rate in United States.

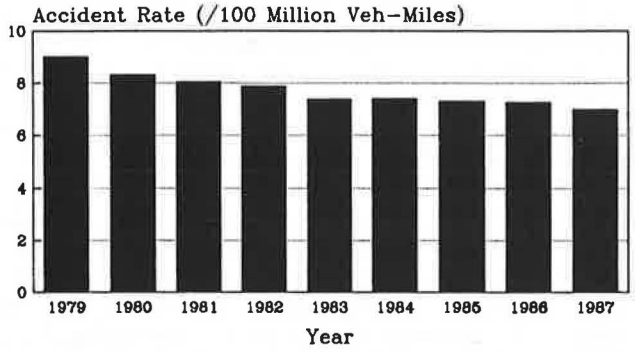

FIGURE 2 Nonfatal pedestrian accident rate in United States.

TABLE 1 PEDESTRIAN ACCIDENT RATES IN UTAH

Year	Fatally Inj	Non-fatally Inj
1979	0.81	11.60
1980	0.52	10.21
1981	0.49	11.61
1982	0.40	12.45
1983	0.54	12.39
1984	0.45	12.30
1985	0.46	10.63
1986	0.38	13.22
1987	0.50	13.78
Average	0.51	12.07

NOTE: Rate is Acc/100 Million Veh-Miles

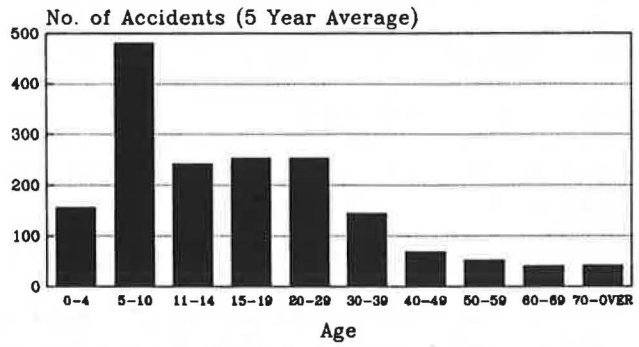

FIGURE 3 Pedestrian accidents by age group.

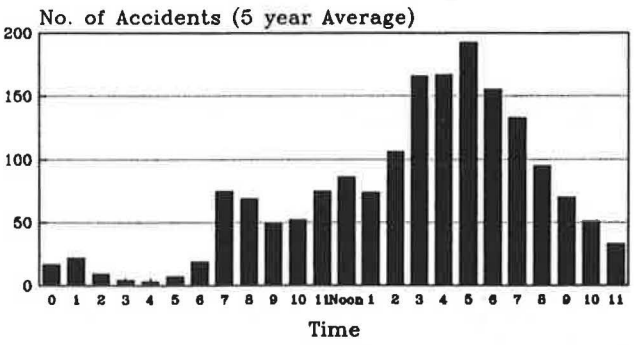

FIGURE 4 Pedestrian accidents by time of day.

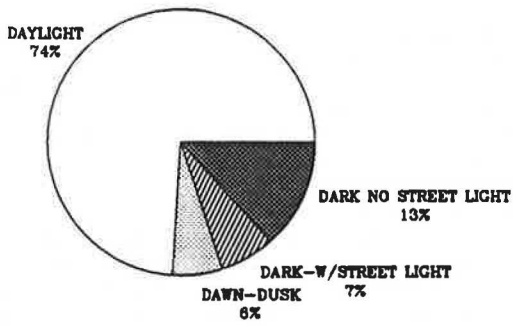

FIGURE 5 Pedestrian accidents by daylight conditions (5-year average).

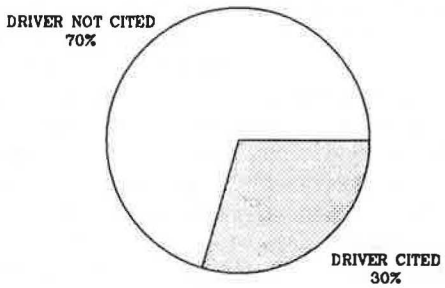

FIGURE 6 Pedestrian accidents by driver violation at intersections (5-year average).

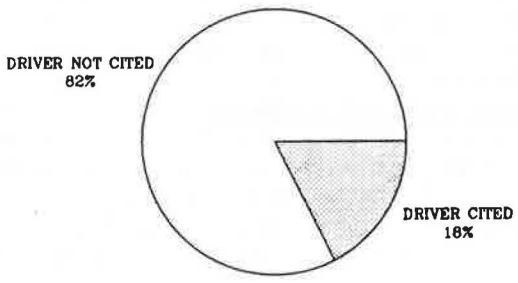

FIGURE 7 Pedestrian accidents by driver violation between intersections (5-year average).

3. Pedestrian accidents tend to be more serious—about 4 percent of them are fatal (Figure 8).

4. Traffic-control devices, such as traffic signals and signing, do not guarantee a safety zone for pedestrians (Figure 9).

5. Seventy-eight percent of the pedestrian accidents occurred between intersections without traffic-control devices (Figure 10).

6. Men and boys are involved in more than twice as many pedestrian accidents as are women and girls (Figure 11).

7. Adverse road, weather, and light conditions are not a factor in most pedestrian accidents (Figures 12–14).

The study also found that about 23 percent of the pedestrians killed had been drinking (*2*). However, fatalities linked

FIGURE 8 Pedestrian accidents by severity (5-year average).

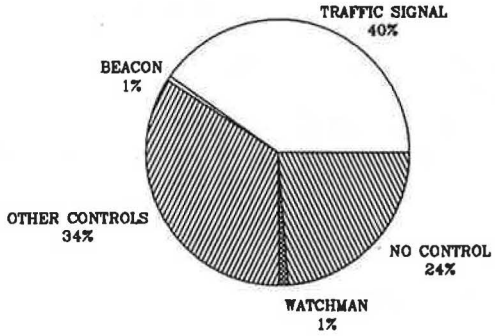

FIGURE 9 Pedestrian accidents by traffic-control devices at intersections (5-year average).

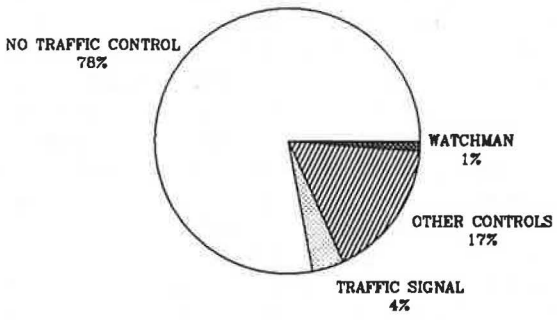

FIGURE 10 Pedestrian accidents by traffic-control devices between intersections (5-year average).

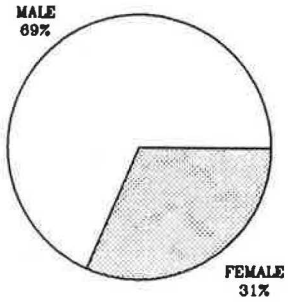

FIGURE 11 Pedestrian accidents by sex (5-year average).

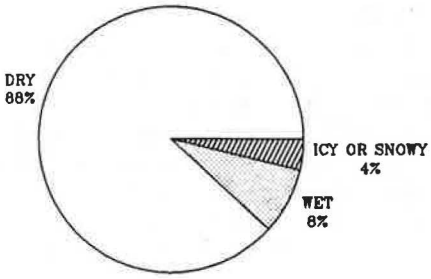

FIGURE 12 Pedestrians accidents by road surface conditions (5-year average).

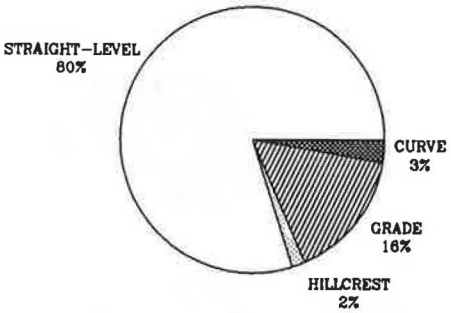

FIGURE 13 Pedestrian accidents by roadway alignment (5-year average).

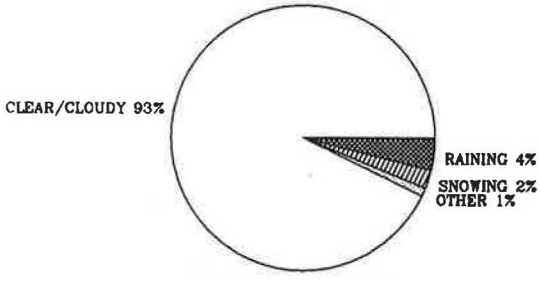

FIGURE 14 Pedestrian accidents by weather conditions (5-year average).

to drinking decreased steadily from 36 percent in 1984 to 7 percent in 1988. About 7 percent of the pedestrians were killed in crosswalks.

SCHOOL-AGE PEDESTRIAN ACCIDENTS IN UTAH

School-age pedestrian accidents have long been a major concern of traffic safety engineers. The following statistics are also based on data from 1984 through 1988. School age as used herein is defined as 5 to 18 years old.

The review of the school-age pedestrian accident data revealed pertinent information and several conclusions.

1. The age group 5–10 is involved in most school-age pedestrian accidents (about 52 percent). The percentage of involvement decreases as the age range increases (Figure 15).
2. Male children are involved in more than twice as many pedestrian accidents as female children (Figure 16). This mirrors the information in Figure 11.
3. Only 20 and 13 percent of drivers were cited in school-age pedestrian accidents at intersections and between intersections, respectively (Figures 17 and 18).
4. More accidents occurred between intersections than occurred at intersections. Traffic signals do not prevent school-age pedestrian accidents at intersections. Traffic-control devices cannot be placed at all locations between intersections where pedestrians cross or interact with traffic (Figures 19 and 20).
5. School-age pedestrians suffer 75 percent serious injury (Figure 21).
6. Adverse road, weather, and light conditions, again, are not major contributors to child pedestrian accidents (Figure 22–25).

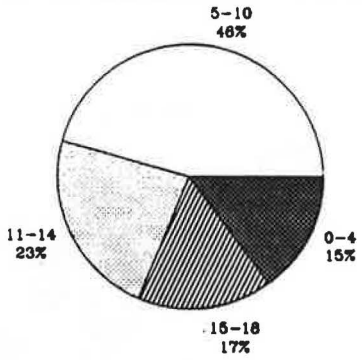

FIGURE 15 School-age pedestrian accidents by age group (5-year average).

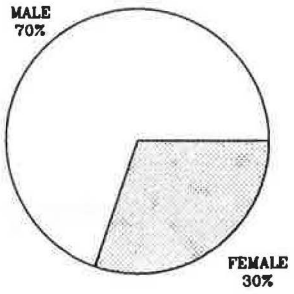

FIGURE 16 School-age pedestrian accidents by sex (5-year average).

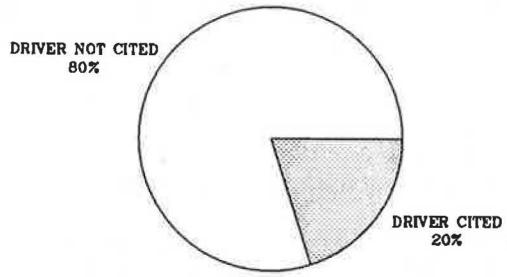

FIGURE 17 School-age pedestrian accidents by driver violation at intersections (5-year average).

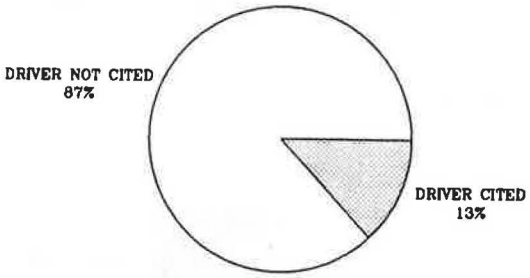

FIGURE 18 School-age pedestrian accidents by driver violation between intersections (5-year average).

DISCUSSION OF RESULTS

Most previous studies, nationwide and worldwide, have concluded that the majority of the pedestrian accidents are caused by pedestrian error. Utah's statistics confirm this finding. Because school-age children make up the majority of victims in pedestrian accidents, more emphasis must be placed on teaching school-age pedestrians correct crossing techniques. Parents and teachers may be the best sources of such instruction. However, a long-range continuing safety program that involves all pedestrian age groups is necessary. A national pedestrian safety program called Walk Alert, initiated in 1986, has been implemented in at least 10 states. Many agencies from different government levels and community organizations are involved in this program (*3*).

Pedestrian safety is a major field of traffic safety. It can be greatly improved by the cooperation of pedestrians, traffic engineers, enforcement officers, drivers, parents, educators,

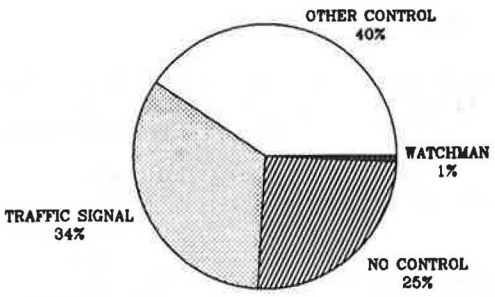

FIGURE 19 School-age pedestrian accidents by traffic-control devices at intersections (5-year average).

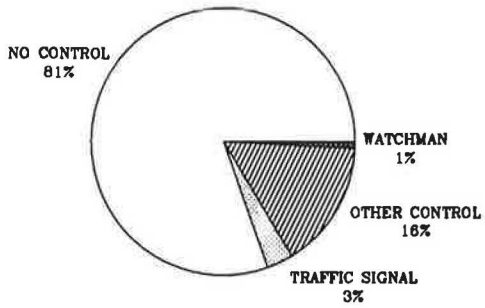

FIGURE 20 School-age pedestrian accidents by traffic-control devices between intersections (5-year average).

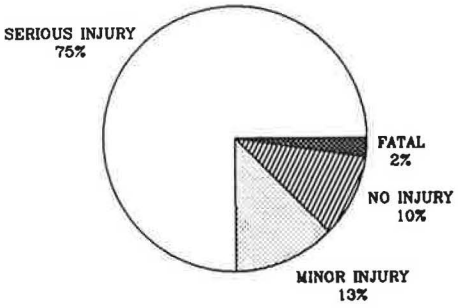

FIGURE 21 School-age pedestrian accidents by severity (5-year average).

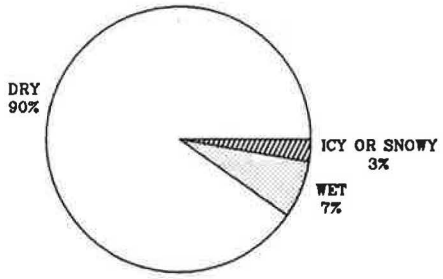

FIGURE 22 School-age pedestrian accidents by road surface conditions (5-year average).

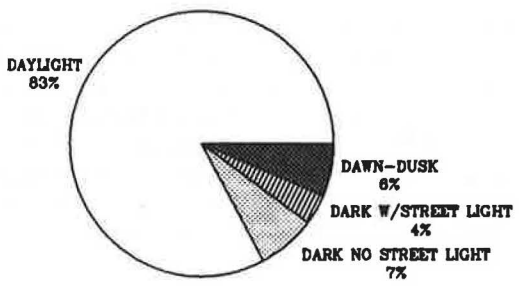

FIGURE 23 School-age pedestrian accidents by daylight conditions (5-year average).

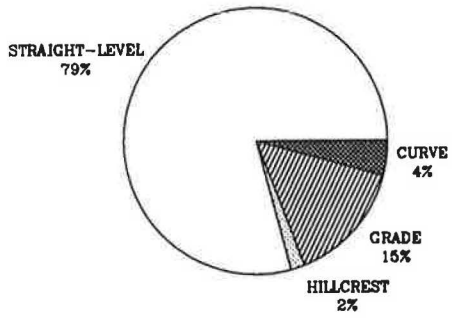

FIGURE 24 School-age pedestrian accidents by roadway alignment (5-year average).

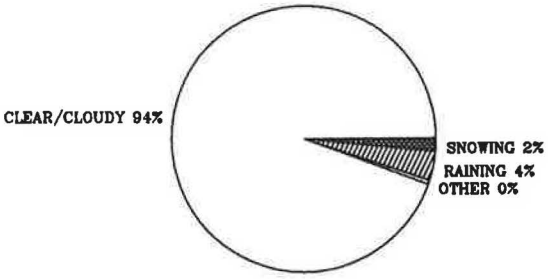

FIGURE 25 School-age pedestrian accidents by weather conditions (5-year average).

and so on through an effective program. Traffic engineers should use safety studies and design to provide a safe walking environment for pedestrians. Some essential improvements should be considered, such as lighting systems, sidewalks, overpasses, pedestrian signals, warning devices, and original geometric design. However, improvements in geometrics are meaningless unless the pedestrian's behavior is safety-oriented, particularly for school-age children.

Utah Department of Transportation (UDOT) has recently standardized the signing and regulation for school crossing zones. It is one of UDOT's efforts in improving safety for school-age pedestrians. New rules set differing distances for

signing in advance of school zones, depending on the posted speed of the highway at that point. It also requires that a crossing guard, who should carry stop paddles instead of flags, be employed with the flashing yellow sign. Statewide standard signing and regulation for school crossing zones will give drivers uniform expectations and allow them to take appropriate action as they approach school zones. Hence, a reduction in school-age pedestrian accidents can be expected.

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