Traffic Tech

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LITERATURE REVIEWED ON VEHICLE TRAVEL SPEEDS AND PEDESTRIAN INJURIES

There were about 84,000 pedestrian injuries and 5,585 pedestrian fatalities in the United States in 1995, for a ratio of 15 injured pedestrians for every pedestrian killed. This ratio varied substantially as a function of posted speed limits, from 57.1 on roadways with posted limits of 25 miles per hour or less to just 0.3 injuries per fatality for posted speed limits of 60 mph or higher.

Preusser Research Group, Inc. prepared a literature review and data analysis to reaffirm and quantify the relationship between vehicle speeds and pedestrian crash severities. They also described techniques that have been used to reduce vehicle speeds and reviewed their effectiveness.

Vehicle Speed and Pedestrian Injuries

The idea that the faster a striking vehicle is traveling, the more damage is done to a struck pedestrian has been documented in a number of studies. One estimate is that about 5 percent of pedestrians would die when struck by a vehicle traveling 20 mph at impact; about 40 percent would die for vehicles traveling 30 mph at impact; 80 percent at 40 mph; and nearly 100 percent would die when struck by vehicles traveling at speeds over 50 mph at impact.

One reviewed study examined about 1,000 urban crashes with pedestrians younger than 20 years of age. It found that compared to crashes with vehicle travel speeds of 10-19 mph, the risk of serious injury (or death) was 2.1 for speeds of 20-29 mph, 7.2 for speeds of 30-39 mph, and 30.7 for speeds of 40 mph or more. In Denmark, national speed limits were lowered several times beginning with the introduction of general speed limits in 1974. One summary study found that actual travel speeds came down with each speed limit reduction, and each time, pedestrian injuries were reduced in frequency and severity. Numerous additional European studies document the effects of traffic calming changes on crash reductions and pedestrian safety.

State of Florida

In Florida in 1993 - 1996, 32,651 of the pedestrians in crashes were in single-vehicle crashes (91 percent). For 23,831 of those pedestrians (74 percent), estimated travel speeds were provided for the striking vehicles. For those pedestrians, there were 1,550 (6 percent) fatalities, 6,414 (27 percent) with A (incapacitating) injuries, 9,206 (39 percent) with B (non-incapacitating) injuries, and 6,583 (28 percent) with C (possible) or no injuries. The proportion of serious injuries and fatalities increased steadily with increasing vehicle speeds (as estimated by the investigating police officer).

Vehicle travel speed and pedestrian injury severity (Florida, 1993-1996; pedestrians in single-vehicle crashes)

Pedestrian Injury Severity	Travel Speed (Officer Estimates)						Total
	1-20 mph	21-25 mph	26-30 mph	31-35 mph	36-45 mph	46 + mph	
Fatal (K) Injury	1.1%	3.7%	6.1%	12.5%	22.4%	36.1%	6.5%
Incapacitating (A)	19.4%	32.0%	35.9%	39.3%	40.2%	33.7%	27.0%
Non-incapacitating (B)	43.8%	41.2%	36.8%	31.6%	24.7%	20.5%	38.8%
Possible inj (C) or none	35.6%	23.0%	21.2%	16.6%	12.7%	9.7%	27.7%

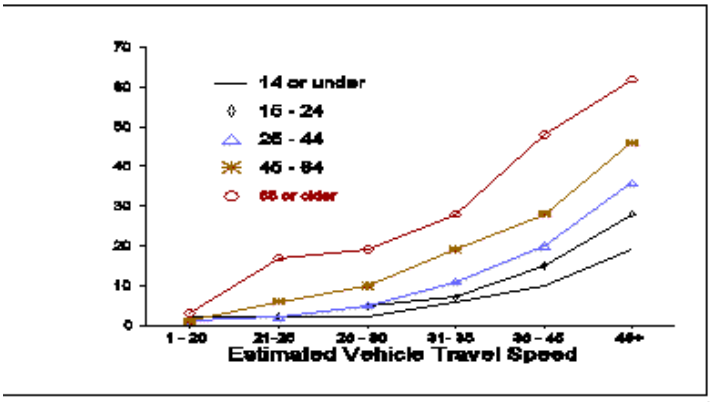
Older Pedestrians More Likely to be Injured

Younger pedestrians are generally more able to resist serious injury and death, while elderly pedestrians are much more susceptible to more serious consequences as crash victims. Within age groups, the fatality rate increases sharply with increasing vehicle speed, as illustrated in the next figure. Overall, pedestrians age 65 and older are more than 5 times as likely to die in crashes than pedestrians age 14 or less, and the likelihood of death increases steadily for ages in between. For vehicle travel speeds above 45 mph, pedestrians above age 65 die in about 5 of 8 crashes.

Speed Control Literature

In the United States, speed control traditionally emphasizes reduced speed limits, stop signs or traffic signals at intersections, and enforcement. Education, in the sense of informing the public of the dangers of excessive speed and the likely presence of police enforcement, is also used. Increasingly in the U.S., and commonly in Europe,

Fatal Injury Rates by Vehicle Speed, by Pedestrian Ages in Florida 1993-1996,



Australia, and Canada, roadways and intersections have seen engineering changes (*traffic calming*) designed to encourage or require drivers to reduce speeds. The report documents these approaches and concludes with recommendations to reduce pedestrian crashes.

HOW TO ORDER

For a copy of ***Literature Review on Vehicle Travel Speeds and Pedestrian Injuries***,(56 pgs), write to the Office of Research and Traffic Records, NHTSA, NTS-31, 400 Seventh Street, S.W., Washington, DC. 20590, fax (202) 366-7096, or download from *www.nhtsa.dot.gov/people/injury* Marv Levy, Ph.D., and Patty Ellison-Potter, Ph.D., were the contract managers.

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