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National Traffic Speeds Survey I: 2007

Vehicle speeds are a crucial factor in traffic safety. NHTSA estimates that speeding is involved in approximately 31% of fatal motor vehicle crashes, costing society over $40 billion per year.[1] Since speeding is such a pervasive traffic safety issue, NHTSA funded a field survey to measure driving speeds for all types of motor vehicles on freeways, arterial highways, and collector roads across the United States and to produce national and regional estimates of travel speeds for various types of roads and vehicles.

The speed survey was designed as a geographic cluster sample of primary sampling units (PSUs), which can be a city, county, or group of two or three counties. PSUs were chosen to represent a range of combinations of regions of the United States, level of urbanization, and type of topography (flat, hilly, mountainous). Speeds were acquired on randomly drawn road segments on limited access highways, major and minor arterial roads, and collector roads. Speed measurement sites were selected in road segments with various degrees of straight, curved, flat, and hilly geometry. Twenty to 60 sites were selected in each PSU.

Speed data were collected during spring and summer 2007. Speeds were measured using small, self-contained, on-road sensors temporarily placed on the road surface for a single 24-hour period at each site.

About half of the observations were free-flow vehicles. Mean, 85th percentile, and other measures of traffic speeds and speed variation for free-flow traffic compared to all traffic did not differ by more than 1.4 mph.

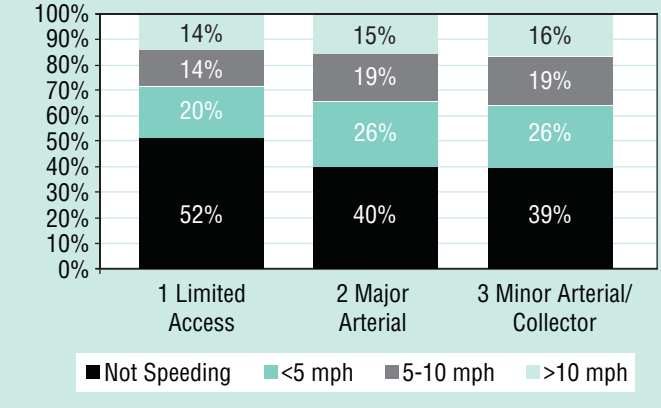
Overall, speeds of free-flow traffic on freeways averaged 64.7 mph and were approximately 11 mph higher than on major arterials, which at 53.6 mph were in turn about 7 mph higher than the average speed of 46.9 mph on minor arterials and collector roads. For the 85th percentile of free-flow traffic, speeds on freeways averaged 73.8 mph, speeds on major arterials averaged 64.5 mph, and speeds on minor arterials and collector roads averaged 58.3 mph (see Table 1).

Table 1. Overall Speed Estimates (in MPH) by Road Class (Free-Flow)

	FCC ROAD CLASS		
	1 Limited access	2 Major arterial	3 Minor arterial/collector
Mean	64.69	53.62	46.85
Median	64.86	54.10	45.85
Quantile (0.85)	73.77	64.46	58.30
Quantile (0.95)	79.20	70.64	65.95

Most traffic exceeded the speed limits. Nearly half (48%) of traffic on limited access roads and around sixty percent of traffic on arterials and collectors exceeded the speed limit. Somewhere between 14 and 16 percent of drivers on all types of roads exceeded the speed limit by more than 10 mph (see Figure 1).

Figure 1. Proportion of Traffic Exceeding the Speed Limit by Road Class and MPH Over Posted Speed Limit



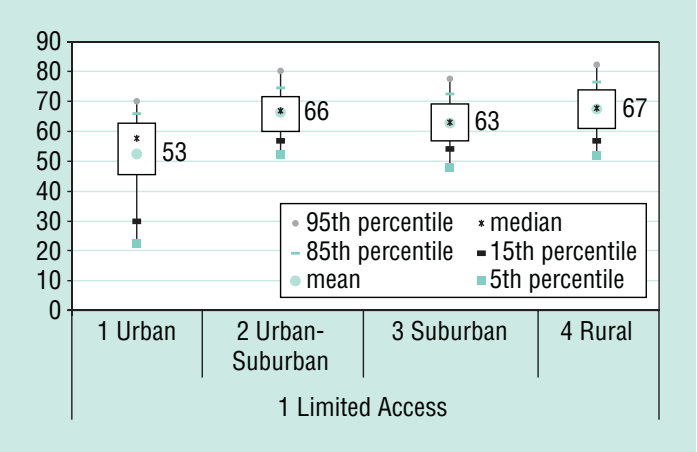
Time of day and light conditions had little effect on traffic speeds. Variations by day of the week were insignificant for freeway speeds, but major arterial speeds varied by as much as 10 mph by day of week and minor

[1] Traffic Safety Facts, 2008 Data: Overview

arterial/collector speeds by 6 mph, both peaking during midweek.

Speeds were lowest on urban roads and highest on rural roads of all types. On all types of roads, rural traffic was about 12–14 mph faster than urban traffic. On limited access roads, urban areas had the widest range of travel speeds compared to other levels of urbanization (see Figure 2).

Figure 2. Travel Speeds (in MPH) on Limited Access Roads by Urbanicity



However, the range of traffic speeds on major arterials and minor arterial/collector roads was slightly lower in urban areas than the range of speeds for all other levels of urbanization.

Vehicle length influenced speed on various road classes. Speeds of passenger size vehicles and light trucks (up to 29 feet) were generally 2–5 mph higher than for medium trucks on limited access and major arterial roadways. The largest vehicles were up to 7 mph faster than other vehicles on arterials and collectors.

Speeds on straight sections of freeways and minor arterials/collectors were about 4–6 mph higher than on moderate horizontal curves; however, speed on sharper horizontal curves on freeway, arterials and collectors are higher than speeds on moderate curves. Speeds on flat sections of freeways were about 2–4 mph higher than on moderate or steep hills. Speeds on steep hills on minor arterials/collectors were about 5–6 mph lower than on flat or moderately hilly sections, while speeds on vertical curves on major arterials were 2–3 mph higher than on flat sections.

Greater horizontal and vertical curvature was generally associated with slower speeds. The impact of vertical curvature on speeds was more prevalent on the smallest road classes. Generally, passenger vehicles, light trucks, and the biggest trucks on straight freeway segments had the fastest speeds while the lowest speeds were for the biggest trucks on sharply curved minor arterials and collector roads. For vertical curvature, the highest speeds were for passenger vehicles, light trucks, and the biggest trucks on flat freeway segments, while the lowest speeds were for the medium and large trucks on minor arterials/collector roads with the steepest gradients.

Note: This survey was originally designed with the secondary objective of exploring the relationship between driving speeds and crashes on various classes of roadways. However, the required crash data were not available prior to the conclusion of this project and we were unable to conduct this analysis. The over-sampling of crash sites resulted in a smaller sample of non-crash sites (assuming a fixed overall sample size) and differential weights between crash and non-crash sites, thereby increasing the variance for estimates that are not specific to crash sites.

How to Order

To order *Survey of National Traffic Speeds I: 2007* (98 pages), prepared by WESTAT, write to the Office of Behavioral Safety Research (NTI-130), NHTSA, 1200 New Jersey Avenue SE., Washington, DC 20590, fax 202-366-7394, or download from www.nhtsa.gov. Randolph Atkins, Ph.D., was the Contracting Officer's Technical Representative for this report.

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