Do Speed Tables Improve Safety?

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Institute of Transportation Engineers
2003 Annual Meeting
Seattle, Washington
August 27, 2003
Session No. 56, 1:30 PM

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Abstract

Gwinnett County DOT (metro Atlanta, Ga.) has been installing speed tables since 1994. This study will evaluate the safety effectiveness of installing speed tables on 43 residential streets. The study will review the frequency of crashes 2 or 3 years before the installation and compare them to 2 or 3 years after installation.

The study found that total crashes dropped by 38% and total injuries decreased by 93 % after speed tables were installed. The total changes are considered statistically significant. Nine streets exhibited increases in crashes, thirteen had decreases and twenty-six streets had no change in the crash history.

Speed studies showed that speed tables reduced 85th percentile speed an average of 9.1 mph. Traffic studies showed that 24 hour traffic volume had an average reduction of 7% after speed tables were installed.

Introduction

Gwinnett County receives over 100 requests per year for speeding problems on residential neighborhood streets. A common concern is that vehicles are speeding on their street and a vehicle may leave the road and hit a child playing in their front yard. It has been our technical position that there are few reported traffic crashes in residential neighborhoods and crashes that are reported are minor crashes involving vehicles pulling out of driveways or hitting parked cars. In addition, assumption was made that fatalities that occur in neighborhoods tend to be very rare and usually “freak” crashes, not amenable to solving through traffic engineering.

This study will determine whether there are safety benefits installing speed tables on residential neighborhood streets. Additionally, the speed and traffic volume of the design will be reviewed in the study.

Study Design

The study looked at 43 speed tables installed in 1994 and 1995. Gwinnett County speed tables are 22 feet long (6’ ramps, 10’ table) and are 3 5/8” high. Speed tables are spaced 300 to 500 apart to control the speed on the street. All streets had at least two speed tables installed and one had seventeen speed tables installed. The total study included 184 speed tables located on 43 streets.

The crash data was analyzed two years before and after the 1994 installations because of data limitations. The crash data was analyzed for three years before and after the 1995

installations. The accident data was compiled for each road that speed tables were installed.

The 85th percentile speed was collected on 19 residential streets. The nineteen streets were chosen randomly. The speed data was collected before and after the speed tables were installed. Normally, the speed study location was in the middle of the series of speed tables midway between the speed tables. Additionally, 24-hour traffic volume counts were collected on 18 residential streets.

All crashes were counted within the study area, except crashes occurring at an intersection of a collector (or higher) road. Since these crashes are not affected by the speed tables, they were ignored. The study also ignored all crashes during the month the speed tables were installed to eliminate construction period bias.

Each individual crash report that was found was read for the study. Unfortunately, due to the limited nature of the crash reports, the crashes are rarely described in detail to the point where a clear determination could be made of the cause of the crash. This may be due to the fact that police officers usually give these low volume, low speed locations low priority in their responses and get to the crash site after vehicles have been moved. Therefore, all crashes are included in the study in hopes that the speed tables will decrease the operating speed on the road and thus decrease the total number of crashes and injuries on the street with speed tables.

Results

Of the forty-three installations, twenty-one exhibited no change in their crash history after the speed tables were installed. Either there were no crashes on the street prior to and following the installation, or the crash total remained unchanged after the tables were installed(two locations).

Nine streets showed increases on the number of crashes after the installation of speed tables. Seven of these were due to having no crashes before the installation.

Thirteen streets had a reduction in the number of crashes after speed tables were installed. The decrease averaged 82%reduction in crashes.

The overall totals for the study showed a 38% drop in the total number of crashes and a 93% drop in the total number of injuries.

A random speed sampling of 19 streets in the study was completed before and after the installation of speed tables. The reductions ranged from 5.9 to 14.5 mph, with an average reduction of 9.1 mph. The before 85th percentile speeds ranged from 35.5 to 47.0 mph, with an average of 38.2 mph. The after 85th percentile speeds ranged from 25.9 to 34.1 mph, with an average of 29.1 mph.

Twenty –four hour traffic counts were collected on 18 streets before and after the speed tables were installed. The before volumes ranged from 198 to 2102 vehicles/day and the after volumes ranged from 364 to 2061 vehicles/day. Twelve of the streets had a reduction in volume (range –25 to –374) and the remaining six has an increase in volume (range 16 to 244). The average change for all 18 streets was a reduction of 7% in traffic volume (range –48% to 33%).

A special speed study was conducted in the middle of the speed tables. The study looked at 5 speed tables. The average 85th percentile speed on top of the speed table was 25 mph. This means that the Gwinnett County speed table is a 25 mph design.

Conclusion

The study did not look at crash rates. Most streets were not studied for traffic volumes before and after the installation of speed tables. However, the 18 of 43 streets were studied for traffic volume changes. The study found that average traffic volumes were reduced by 7% after the installation of speed tables. However, the effect on traffic volume varied widely from a reduction of 48% to an increase of 33%.

At first glance, it appears that speed tables are not effective at reducing crashes. Nine streets exhibited increases, while thirteen streets exhibited decreases in crashes. There would not seem to be enough evidence to suggest that the speed tables have significantly lowered the crash totals.

However, of the nine streets with increases, seven increased by a single crash. In looking at residential areas, crashes tend to be irregular. For instance, the occasion where a motorist hits a parked car while backing out of a driveway does not usually follow any yearly pattern. Such crashes are rare and random. So it would seem to be by chance that an extra crash occurs in the time period following installation of speed tables. Excluding the cases which showed increases of a single crash, there are only two remaining sites of a significant crash increase. They are summarized as follows in Table 1:

Table 1
Significant Crash Increases

		Crashes	
Subdivision	Street Name	Before	After
Parker Woods	Oak Leaf Terrace	0	2
Peachtree Station	Clinchfield Trail	1	4

The same criticism may be made of the thirteen streets that experienced a decrease in crashes. Of these, five are streets where the decrease was by a single crash. As stated above, these may be attributed to the sporadic nature of crashes on residential streets. Therefore, judging these locations using the same criteria as the streets with an increase

in crashes yields eight instances of a significant crash decrease. They are summarized in Table 2 below:

Table 2
Significant Crash Decreases

Subdivision	Street Name	Crashes Before	Crashes After
Bromolow Woods	Gravitt Trail	4	2
Cardinal Lake Estates	Cardinal Lake Circle	3	1
Cardinal Lake Estates	Cardinal Lake Circle	10	3
Gravitt Place	Gravitt Road	3	0
Mountain Manor	Deshong Drive	2	0
Peachtree Station	Allenhurst Dr	2	0
Peachtree Station	Flippen Trail	3	0
Sweetwater Estates	Valley Road	2	0

It is true that the roads upon which the speed tables were installed did not have a crash problem prior to installation. And when combined with the relatively small sample size, it is difficult to numerically determine the effectiveness of speed tables based on crash rates, or the confidence in such numbers. But when looking at the raw crash numbers, it is found that four times the amount of streets experienced a significant crash decease as those that experienced a significant crash increase. These eight streets exhibited an average crash decease of 86%. These facts seem to suggest that the speed tables are positively affecting the occurrence of crashes on residential streets. It would follow that as speed tables slow drivers, they are helping to avoid a significant number of crashes and injuries, that might have been caused by excessive speed on residential streets. It would appear that as 85th percentile speeds are reduced, traffic crashes due to speed are reduced. The presence of speed tables seem to have the effect of forcing drivers to be more alert when traveling the road sections with speed tables.

Table 3 shows that speed tables have significantly reduced traffic crashes and injuries based on the total crashes before and after the installation of speed tables on the 43 streets.

Table 3
Total Crashes for Speed Tables

	Before	After	% Change (*)
Crashes	42	15	38 (Yes)
Injures	15	1	93 (Yes)

* Poisson's Distribution, statistical significance at 0.05 level

The results of this study were a surprise. Before the study, this author did not expect to see many before or after crashes on the 43 residential streets. The study did find many

before crashes on residential streets in Gwinnett County. It seems that the Gwinnett County Speed Table program effectively controls speed on residential streets. Because of the speed control, the residents of Gwinnett County enjoy safer residential streets.

Limitations of Study

The study could be improved by doing the following:

1. Increase the size of the study
2. Use only three years in the before and after study period
3. Use control sites for comparison of the study sites