



# Traffic Guidelines Manual

ORIGINATOR State Traffic Engineer	13-5-12
CHAPTER 13	Traffic Regulations
SECTION 5	Speed Limits
SUBJECT 12	Posted versus Design Speeds

## Purpose

To clarify the relationship between the posted speed and design speed and to clarify the roles between Traffic Section and Projects Group related to the design and posted speeds.

## Background

A 2006 article in the Transportation Research Record had this to say about reasonable speeds for multi lane highways.

### **REASONABLE SPEED LIMITS ON SUBURBAN MULTILANE HIGHWAYS WITH CURBS**

*By Jongdae Baek, Joseph E. Hummer, Billy M. Williams and Christopher M. Cunningham*

When some two-lane roads with 55 mph speed limits are widened to four through lanes, curb and gutter are installed to address issues such as access control, difficult terrain and limited right-of-way. Posted speed limits along such highway segments are typically decreased to 45 mph in North Carolina because of guidance in the AASHTO Green Book and elsewhere that vertical curbs *should not* be placed next to high-speed lanes. Shoulders are required in accordance with FDM standards in Wisconsin.

Although much money is spent to improve such roadways, the results *may* be viewed negatively by the public, design professionals and law enforcement. Drivers *may* be unhappy about getting tickets or driving more slowly; designers are unhappy about being blamed by the public; and police are unhappy about the increased enforcement burden. To help resolve such a dilemma, in this research, the team collected relevant data such as speeds and collisions on four-lane road sections with curbs that have 45 or 55 mph speed limits and non-traversable medians or two-way

left-turn lanes. The team found that the speed limit does not seem to make an important difference in collision rates or severities for the roads the team examined. The higher speed limit also made relatively small differences in the mean speeds and speed variances observed. Considering all results, the researchers recommended that the North Carolina Department of Transportation continue its current policy of allowing 55 mph speed limits on four-lane roads with curbs on a selective, case-by-case basis.

The research was published in 2006 in the *Transportation Research Record: Journal of the Transportation Research Board*, Issue Number: 1969.

## Guidance

**When designing curb for a new roadway, the expected posted speed is used.** The posted speed limit is not required to correspond to the design speed or to an individual design element within a project. **Consult with the Region traffic engineer to determine the appropriate posted speed that will be implemented following completion of an improvement project. (See TGM 13-5-1 of the WisDOT Traffic Guidelines Manual for guidance relating to posted speed limits).** In the case of a local roadway or connecting highway, also consult with the local municipality having jurisdiction over the roadway when determining the appropriate posted speed limit".

The 85<sup>th</sup> percentile is used as the primary bases of establishing posted speed limits and, by extension, design speeds. Geometric and cross-section elements are based on design speed. Exceptions to Design Standards *may* be necessary for some individual geometric or cross-section elements. Although the posted speed is not reduced because of these exceptions, some mitigation is usually desirable - for example:

Cross-sectional features *should not* dictate posted speed limits, rather:

- **Free flow ramps** - At system and service interchanges the design speed **shall not** dictate the speed limit. Rather, ramps are signed with advisory speed warning sign plaques (W13-1) mounted under a horizontal alignment sign and ramp speed warning sign, because raising and lowering the speed limit for each ramp results in differential speeds.
- **Curves and turns with a speed rating less than design speed on a section of highway** - are not signed with a change in speed limit; rather, they are signed with horizontal alignment signs and an advisory speed plaque with the safe operating speed of the curve or turn. For example: A 55 MPH rural section of highway often has turns and curves where it is necessary for the driver to lower their speed in order to safely negotiate the curve or turn. The speed limit is not changed for each one of these turns or curves.

- **At transition sections from 4 to 2 lanes** - the speed limit is not reduced because of the transition area merely because of the divided highway to undivided highway change.
- **Individual design features** - do not determine speed limit; such as the presence of curb, wider or narrower shoulders, or other design features. Rather, it is determined based on the 85<sup>th</sup> percentile speed as the primary indicator.
- **Curb offsets** also are not a determining factor in establishing speed limits.
- **Sloped curb** without offset *should not* dictate speed limit

The 85<sup>th</sup> percentile is used as the primary basis of establishing speed limits. Motorist's behavior will account for road characteristics such as shoulder condition, grade, development and sight distance.

Where local roads are converted to State Highways or built on relocation; such as bypasses, the speed limit *should* be based on the new geometrics of the roadway and the function of the highway as either an expressway or conventional highway. The function of the highway includes adjacent land use, spacing of access points and proximity to the roadway. The speed limit *may not* necessarily be retained that existed prior to the conversion to a State Highway. Evaluate the proper speed limit based on the characteristics of the highway and how it will function.

## Policy

- Posted speeds *may* be higher than the design speed for a section of highway.
  1. Individual design features such as isolated horizontal and vertical curves and shoulder width narrowing *should not* dictate posted speed; rather, overall design features *should* determine the appropriate posted speed.
  2. Drivers perceive the overall design features to determine a safe operating speed.
- The Projects Development Group engineers need to obtain approval from the Regional Traffic Unit at the scoping meeting to establish the proper speed limit for the improvement plan.
- Additionally, the Regional Traffic Unit will need to create a speed limit declaration for any speed zone that is an exception to state statute. Traffic Section *should* issue the speed zone declaration at the PS&E.
- The traffic engineer **shall** establish the speed limit of a roadway in consultation with projects group.

The DSR **shall** be routed through the Regional Traffic Unit for establishing the posted speed, where posted speed is suggested to be changed.

Conversion of a 2-lane roadway to a 4-lane roadway **shall not** automatically constitute changing the speed limit from 55 MPH to 45 MPH.