

Setting speed limits

1. The proposed guidance for setting a speed limit reads

When a speed limit is to be posted, it should be the 85th-percentile speed of free-flowing traffic, rounded up to the nearest 10 km/h (5 mph) increment on non-residential streets and rounded up or down to the nearest 10 km/h (5 mph) increment on residential streets.

This could be more clearly expressed by replacing "rounded up to the nearest" with "rounded up to the next" and deleting the words "up or down". When rounding up, one is not rounding to the "nearest". In ordinary rounding to nearest, "up or down" is implicit. Proposed replacement text:

When a speed limit is to be posted, it should be the 85th-percentile speed of free-flowing traffic, rounded up to the next 10 km/h (5 mph) increment on non-residential streets and rounded to the nearest 10 km/h (5 mph) increment on residential streets.

2. The new guidance to round speed limits differently in residential areas is consistent with prior FHWA recommendations, and is at least arguably consistent with prior practice. (AASHTO used to recommend a higher percentile speed on high speed rural roads.) However, to prevent double-counting, a comment like this should be added:

Support: Options (C) and (D) are not usually applicable in residential areas because the guidance already takes into account typical conditions.

3. The recommendation of a five year maximum review period is a good change. FHWA should consider a STANDARD maximum period as well. Legislative approval is often required for speed limits changes. While traffic engineers on their own might review speed limits based on MUTCD guidance, resistance to change by municipal legislative bodies has resulted in many non-statutory speed limits in my area not being reviewed for 50 years or more. Legislative bodies tend to ignore "should." A firm maximum period, even if it is much longer than five years, will help keep speed limits relevant.

Proposed new text:

Standard: A posted speed limit shall be reviewed at least every ten years.

4. Some agencies use design speed in speed zoning. This is not supported by established engineering practices. Particularly troubling is the policy of some jurisdictions to use a speed 10 or 15 MPH below the design speed as the maximum allowable speed limit.

These policies were encouraged by statements in past editions of the “green book” that the design speed is the maximum safe speed. Research has proved that speed limits in excess of the design speed are not generally unsafe, and that most traffic engineers do not think design speed should be the basis of speed zoning. The latest edition of the green book (published after the millennium MUTCD) has deleted the prior language.

Proposed new text:

Standard: Design speed shall not be used for speed zoning.

Option: On a new facility where the design speed exceeds the statutory speed limit, the design speed may be used as the speed limit for up to six months until an engineering study is complete.

or, if FHWA wants to use a less forceful statement,

Support: Although design speed is not appropriate for speed zoning, knowledge of the design speed can be helpful in determining whether warning signs are warranted.

5. Even with the new standard emphasizing use of the 85th percentile speed for speed zoning, and studies showing the continued validity of this old practice, agencies continue to give inappropriate weight to subjective, non-quantifiable, or simply inappropriate factors.

Some agencies say they use the 85th percentile speed for speed zoning, but on closer examination it can be seen that every engineering study determines that a limit 5 or 10 MPH (or more) below the 85th percentile is appropriate. Sometimes this is due to fear of liability, other times due to political pressure.

There are three changes that could alleviate this problem:

(a) To dispel common misconceptions about the purpose and effect of speed limits, an explanation of what speed zoning can and cannot do, or how it should or should not be used, could be helpful:

Support: Drivers generally choose reasonable speeds on their own and crash involvement is lowest for vehicles within approximately 5 mph of the average speed of traffic. For this reason, posting a speed limit that would result in a high violation rate does not usually promote safety. Reduced speed zoning is most appropriate in response to conditions not readily apparent to drivers.

Speed limits are very helpful in identifying and controlling the fastest drivers, but in the absence of strict and frequent enforcement a speed limit is not likely to have any effect on the average speed of traffic.

Some of the text from the following documents, especially the first, may be helpful:

- “Effects of Speed Zones” in the MassHighway speed zoning manual,
<http://www.mit.edu/%7Ejfc/speed/MassHighway/manual.html#effect>
- *Speed Limits — a Case of Majority Rule*
<http://www.dot.state.az.us/ROADS/traffic/speed.htm> and
<http://www.ink.org/public/kdot/burtrafficsaf/speed.html>

(b) To reflect the fact that the 85th percentile should be the rule and not the exception, change the first sentence of the option to:

A speed limit different from the 85th percentile speed may be justified when the engineering study finds that one or more of the following factors are present or absent to an unusual degree:

(c) Some of the options are too subjective. The “character” of a stretch of road is often invoked to justify arbitrary speed limits.

What sort of roadside environment justifies a 40 mph speed limit, or a speed 15 mph below the 85th percentile? You will probably find many different answers. In the

absence of generally accepted weights and formulas to be used with subjective factors, FHWA should require that they be given lesser weight than quantifiable factors.

In the first sentence of the option, I propose replacement text like this:

...a speed limit up to 12 km/h (7 mph) [or 16 km/h (10 mph)] different from the 85th percentile may be justified...

The 7 and 10 mph figures represent common maximum permissible deviations found in the survey of speed zoning practices.

REDUCED SPEED AHEAD (Items 32 and 82)

The new reduced speed ahead signs are an unjustified change to existing practice. In particular, the symbolic sign looks too "busy" and the text size is too small.

Unlike a curve warning sign, an advance speed warning sign has a partially regulatory nature.

If existing black on white signs are too easily confused with speed limit signs, a simple solution is to change the color to black on yellow while retaining the rectangular shape and "SPEED LIMIT xx AHEAD" legend.

In addition to calling for use of engineering judgment, FHWA should require the use of reduced speed ahead signs before large reductions in the speed limit. Requiring advanced signs before any reduction by more than ten miles per hour, or on freeways, would be appropriate. The Uniform Vehicle Code already prohibits local governments from posting speed limit reductions greater than 10 MPH.

Advisory Curve Speeds (Item 72)

The current MUTCD permits a curve advisory speed to be determined using any method the traffic engineer considers justified. The proposed new option, using a 16 degree ball-bank indicator reading, neither increases nor decreases the range of options, nor recommends a course of action. Thus the proposed language is not helpful.

The idea of using a 16 degree ball bank indicator reading for curve warnings has merit. Research has found that while a 10 degree maximum was appropriate 60 years ago, a 16 degree maximum is more appropriate today. On the other hand, consistency of driver expectation is as important as the absolute value displayed on advisory signs.

If FHWA considers a general conversion to 16 degrees to be appropriate, this should be put into guidance:

Guidance:

Unless an engineering study finds unusual circumstances justifying a different speed, a curve advisory speed should be the 85th percentile speed of free-flowing traffic or the speed corresponding to a sixteen degree ball-bank indicator reading.

Option:

A ten degree angle, or an intermediate angle between ten and sixteen degrees, may be used instead.

Guidance:

The method used should be uniform within a jurisdiction.

Support:

The ten degree maximum ball bank indicator reading is based on research from the 1930s. In modern vehicles, the 85th percentile speed on curves approximates a sixteen degree reading. This is the speed at which most drivers' judgment recognizes incipient instability along a ramp or curve.

The word "driver" is more appropriate than "road user" here. Curve advisory speeds are intended for motor vehicles, not bicycles and pedestrians.

Also, FHWA may want to specify whether limited sight distance may justify a reduced curve advisory speed.