Setting Speed Limits on Local Roads

Speed limits are an important tool for promoting safety on streets and highways. Limits tell drivers what is the reasonable speed for a road section. They also help traffic enforcement by setting standards for what is an unsafe speed.

The state sets speed limits for all roads. However, municipalities can change speed limits for roads under their authority, following guidelines in the *Wisconsin Statutes.* Selecting the appropriate speed limit can be a challenge because people often disagree. Residents frequently seek lower speeds, especially after a serious crash. Drivers tend to choose speeds that seem reasonable for the physical environment and that satisfy their personal needs, like saving time or seeking enjoyment.

Local officials have a key role in setting limits. They must balance the competing concerns and opinions of drivers, residents and law enforcement agencies with statutory requirements and traffic safety.

This booklet is designed to help. It includes background information and research recommendations, summarizes statutory limits, describes the process for changing limits, and discusses signs, enforcement, advisory speeds, and other speed issues on local roads. This edition reflects updates from the *2009 Wisconsin Statewide Speed Management Guidelines*.

Background

Speed-related vehicle accidents in Wisconsin from 2004 to 2008 accounted for 38% of all fatalities, 30% of all injuries and 27% of all crashes.

High speeds contribute to the severity of crashes. For example, 85% of pedestrians struck by vehicles traveling 40 mph are likely to be killed while only 5% are likely to be killed when the speed is 20 mph.

Common sense says that regulating speed is a good way to make streets and highways safer. As a result, citizens may demand lower speeds, especially if there has been a severe crash or a frightening "near miss."

However, driving behavior is not so easy to manage. A 1997 federal speed study shows that simply lowering speed limits has little effect on actual speeds, usually reducing speeds by only one-to-two miles per hour. The difference in speeds between vehicles traveling on the same road—a common cause of crashes—usually increases when speed limits are unreasonably low, making roadways less safe. Drivers generally choose their speed based on what they think is safe and reasonable for the conditions present. An unreasonable posted speed gets little consideration from drivers.

An alternative for managing vehicle speeds is called "traffic calming." This emphasizes physical changes to local streets—such as making them appear narrower or more restricted, adding speed bumps or traffic circles—so drivers consistently and voluntarily choose lower speeds that are both safe and comfortable.

Philosophy

Prevailing speed—the one most drivers choose—is a major consideration in setting speed limits. Engineers recommend setting limits at the 85th percentile speed, where 85% of freely flowing traffic travels at or below

that speed under ideal road conditions. The 85th percentile method is considered the best way to represent what is "reasonable" and "proper" as perceived by the motorists. When 85% of drivers voluntarily comply with speed limits, it is possible and reasonable to enforce these limits.

A recent study on Wisconsin roads compared crashes on roads with reasonable speed limits, or those accepted by the majority of drivers, with roads displaying posted speed limits considered unreasonable or irrational. The study showed that roads with reasonable speed limits had four times fewer crashes than roads with unreasonable speed limits. Other studies indicate the lowest risk of being in a crash occurs when a motorist travels at or near the 85th percentile speed. They also show that the 15% of motorists who exceed this limit cause many of the roadway crashes. These motorists are the most effective targets for enforcement.

Research in this area emphasizes considering the road's design speed in setting speed limits. Design speed is the highest safe speed for which the road was designed. It takes into account road type, road geometry and adjacent land use. Studies show that accident rates go down when speed limits are no less than 10 mph of the design speed. When the speed difference is greater, motorists choose a wider variety of speeds. This variance in speed between vehicles, more than the speed itself, results in higher crash rates.

However, pedestrians, bicyclists and other road users may find the prevailing speed and design speed hazardous. Modern roads often are over-designed, particularly in residential areas where they emphasize the accommodation of functions like emergency vehicles or street parking. The resulting wide and unobstructed roads can encourage drivers to travel too fast for the safety of other road users. Simply setting lower speed limits is unlikely to produce the desired results, especially without effective enforcement. In these cases, authorities may wish to consider using some traffic calming techniques.

Speeds should be consistent, safe, reasonable and enforceable. When 85% of drivers voluntarily comply with speed limits, it is possible and reasonable to enforce the limits with the 15% who drive too fast. Unreasonably low limits can promote disrespect for and disregard of other reasonable posted limits. They also promote a false sense of security among residents and pedestrians who may expect that posting lower limits will change driver behavior. Unreasonably high limits create unnecessary risks.

Speed limits and authority to change

Fixed Limits – Statute 346.57(4)[a]	Local Government Authority[b] – Statute 349.11(3) and (7)[a]
65 mph Freeway/Expressway	WisDOT only
55 mph State Trunk Highways (STHs)	WisDOT only
55 mph County Trunk Highways (CTHs), town roads	Lower speed limit by 10 mph or less
45 mph Rustic roads	Lower speed limit by 15 mph or less
35 mph Town road (1,000 ft min) with buildings on either side spaced an average of less than 150 ft apart	Lower speed limit by 10 mph or less
25 mph Inside corporate limits of city or village (other than outlying district)	Raise speed limit to 55 mph or less / Lower the speed limit by 10 mph or less
35 mph Outlying district[c] within city or village limits	Raise speed limit to 55 mph or less / Lower the speed limit by 10 mph or less
35 mph Semi-urban district[d] outside corporate limits of a city or village	Raise speed limit to 55 mph or less / Lower the speed limit by 10 mph or less
15 mph School zone, when conditions are met	Raise speed limit to that of the roadway / Lower speed limit by 10 mph or less
15 mph School crossing, when conditions are met	Raise speed limit to that of adjacent street / Lower speed limit by 10 mph or less
15 mph Pedestrian safety zone with public transit vehicle stopped	No changes permitted
15 mph Alley	Lower by 10 mph or less
15 mph Street or town road adjacent to a public park	Lower by 10 mph or less
Construction or maintenance zones, as appropriate[e]	State and local agencies have authority to establish

Notes:

(a) Source: Updated 2007-2008 Wisconsin Statutes Database

(b) All speed limit changes ***shall*** be based on a traffic engineering study, including modifications allowed under State Statute. Local governments can implement speed limit changes on the local road system without WisDOT approval when proposals are within the constraints identified above.

(c) Per Statute 346.57(1)(ar) "outlying district" is an area contiguous to any highway within the corporate limits of a city or village where, on each side of the highway within 1,000 feet, buildings are spaced on average more than 200 feet apart.

(d) Per Statute 346.57(1)(b) "semiurban district" is an area contiguous to any State or County highway where, on either or both sides of the highway within 1,000 feet, buildings are spaced on average less than 200 feet apart.

(e) Guidance on establishing speed limits in work zones is available in ***http://dotnet/dtid_bho/extranet/manuals/tgm/13/13-05-06.pdf.***

Modified from original published in WisDOT Traffic Guidelines Manual, Chapter 13-5-1, Figure 1, June 2009.

Authority

Power to set speed limits rests with the state. Chapter 346.57 *Speed Restrictions* of the *Wisconsin Statutes* requires drivers to use a speed that is "reasonable and prudent," to exercise "due care," *[346.57(2)]* and to reduce speed under a variety of conditions such as "going around a curve...passing school children, highway construction or maintenance workers...and when special hazard exists..." *[346.57(3)]*.

The *Statutes* give fixed limits for more than a dozen situations depending on the road type, jurisdiction and land use *[346.57 (4) (a-k)]*. See Table on page 2.

Local or state officials have authority to change these limits within the limitations in Chapter 349.11, as summarized in the Table. They must conduct an engineering and traffic investigation to determine a reasonable and safe speed limit. The limit must then be legally adopted by the local authority and appropriate signs erected. When properly changed, such limits do not create additional liability. In addition, changes beyond those specified in the statutes are possible in consultation with and approval by the Wisconsin Department of Transportation (WisDOT).

All limits, whether set by statute or local authority, are only effective and enforceable when official signs have been erected to give drivers adequate warning.

Speeds also may be temporarily reduced in work zones where highways are being constructed, reconstructed, maintained or repaired *[Ch.349.11(10)]*. These changes must be properly posted and are not restricted by the other limitations in Chapter 349.11. A Transportation Information Center publication, *Work Zone Safety: Guidelines for Construction, Maintenance and Utility Operations,* describes correct work zone signing and set up.

The local agency that maintains the roadway has jurisdiction for determining the speed limit. In most cases the responsibility is clear. If a roadway segment has joint jurisdiction, such as a road that borders two cities, then both agencies must agree on the speed limit. Obviously, the speed must be the same in both directions. In cases where the county or state maintains a road within the corporate limits of a city or village, the county or state is responsible for setting the speed limit. Coordination with local officials and law enforcement agencies is essential to set effective speed limits.

Required studies

Local authorities are required by the statutes to conduct engineering and traffic speed studies to modify all speed limits on local roads including those shown in the Table on the previous page. Engineering studies should include the following:

1) Measure and determine the 85th percentile speed, 50th percentile speed, design speed and pace speed.
2) Evaluate crash data for the past three to five years.
3) Document roadside development including land use, driveway locations, and school locations.
4) Document roadway geometrics including lane widths, shoulder width, sight distance limitations at hills, curves and intersections, plus parking, pedestrian and bicycle activity.
5) Determine the functional classification of the roadway and the practical function of the road within the state and local system.
6) Document the current speed limit and level of enforcement.

A well-done traffic and engineering speed study requires a comprehensive effort by a trained professional. Look for additional details in the *2009 Wisconsin Statewide Speed Management Guidelines* report. Contact local law enforcement, County Traffic Safety Commissions, the WisDOT and consultants for assistance in conducting speed studies.

Doing a speed study is time consuming but it is a necessary step for local agencies to legally modify speed limits. The effort also has the advantage of creating consistency in how ***enforceable*** speed limits are set across the state and increasing safety.

Speed zone recommendations

Local road authorities can initiate action to modify a speed limit and create a new speed zone on a local road. Citizens or other agencies also can request a change. Requests should be in writing and submitted to the local authority. The local agency should prepare a written response to the request describing their action and recommendations.

Speed study recommendations for modifying a speed zone should accomplish the following:

- Reduce the speed differential of vehicles
- Be reasonable so a majority of motorists will comply
- Reflect traffic engineering guidelines

When making speed zone changes, ***do not*** base the decision on these reasons:

- Noise complaints
- Accommodate specialty vehicles
- Correct spot safety problems
- Future concerns that have not yet occurred

Recommendations from a speed study generally fall within 5 mph of the 85th percentile speed. Factors that can alter this guideline include road function, access density, road geometry, parking, and pedestrian and bicycle activity. Using these secondary factors to

determine a recommended speed may require more law enforcement and result in increased crashes. Consider changing the road's physical environment to lower speeds where possible.

Speed zones should be at least 0.3 miles in length. Limit the number of speed limit changes along a route. Generally, it is advisable to change speed zones outside incorporated limits in 10 mph increments.

Submit speed limit changes that require WisDOT approval to a WisDOT Regional office. Changes outside the limitations outlined in Chapter 349.11 require department approval. Local governments take on liability when they make changes outside the outlined limitations without this approval.

Post speed limit changes as soon as possible using flags or other means to call attention to the change. Monitor speed limit changes once they are made to identify any problems or need for further investigation.

Proper signage

A speed limit is not in effect until the area has been properly signed. Conversely, signs must not be installed until the limit has been approved and officially authorized. The *Manual on Uniform Traffic Control Devices (MUTCD)* governs signs. Two types may be used: one for passenger cars and another for special limits for trucks and buses.

No more than three speed limits should be displayed on any one speed limit sign or assembly. Signs with special limits for trucks or other vehicles should include the word TRUCKS or a similar appropriate message. Display this below the standard message or on a separate plate that refers to SPEED or MPH.

The standard speed limit sign must be 24 by 30 inches. Locate signs at:

- Each point where the speed limit changes
- Beyond major intersections
- Other locations where it is necessary to remind motorists of the limit

REDUCED SPEED AHEAD SIGNS also may be used to give advance warning of a lower speed zone. This sign should be used in rural areas to alert motorists when they need extra time to slow to the posted limit.

Always follow it with a speed limit sign at the beginning of the new zone. Near schools, use the appropriate SPEED LIMIT sign after a school zone rather than the END OF SCHOOL ZONE sign.

Enforcement

Enforcement is critical. Without it, speed limits are not effective. When enforcement is increased considerably, violations and crashes have been reduced.

Local officials should actively involve enforcement personnel in setting speed limits to ensure they are reasonably enforceable. Always inform enforcement agencies when changes are adopted.

Enforcement requires wide public support. A first step is to ensure that the public perceives the speed limits as reasonable and fair because the voluntary cooperation of most drivers is essential. A second step is vigorous public information and education that stresses the safety benefits of enforcement. Make this a cooperative effort between highway and enforcement officials. Any information campaign should target specific aspects of the speeding problem such as young drivers, nighttime, school zones, work zones, or specific roads where potential traffic and pedestrian conflicts are high.

Within law enforcement agencies, traffic enforcement does not compete well with criminal and drug enforcement. That means local highway officials must actively seek adequate agency enforcement. These efforts are most effective when the safety benefits are clear and there is strong support from local elected officials.

Aggressive, targeted enforcement, combined with education, effectively produces better public compliance with traffic laws. The Federal Highway Administration recommends targeting enforcement programs to locations with a high incidence of crashes where speed was a contributing factor and to areas with high traffic volume.

Long-term, low-intensity speed enforcement can produce meaningful results. Studies indicate some amount of the enforcement effort (15% is recommended) be directed to random locations and times. Stationary, marked patrol vehicles are most effective in creating longer-term enforcement benefits.

Minimum speed limits and slow moving vehicles

Except on Interstate highways, there is no specific minimum speed on Wisconsin highways. However, statutes prohibit driving a motor vehicle "at a speed so slow as to impede the normal and reasonable movement of traffic, except when necessary for safe operation or to comply with the law." *[Section 346.59 Wis. Stats.]*

Vehicles that normally travel slower than 25 mph must display slow moving vehicle emblems. *[Section 347.245 Wis. Stats.]* In addition, the operator of a vehicle moving so slowly it impedes traffic must yield the roadway to overtaking vehicles, if practicable, when the operator of an overtaking vehicle gives an audible warning. *[Section 346.59(2) Wis. Stats.]*

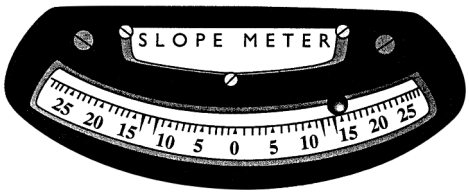
Advisory speed signs

Advisory speed signs are used to tell drivers that a lower speed may be necessary at curves, turns, intersections and other localized conditions. These signs add emphasis and specific information to other warning signs, and recommend a comfortable and safe speed to drive in these locations. Do not confuse advisory speeds with enforceable speed limits. Advisory speeds do not imply the maximum operating speed at which skid and rollover occurs.

The advisory speed must be determined by an accepted traffic engineering procedure but no ordinance is required. Maintenance or sign supervisors can erect the signs. They must be in accordance with guidelines in the *MUTCD, 2C-35.*

As with other traffic signs, advisory speeds should be consistent and reasonable to promote driver respect and compliance. This is not always the case. Research published by the national Transportation Research Board (TRB) found that on the two-lane highways in the study, posted advisory speeds at most curves were well below prevailing traffic speed, and below speeds established using recommended devices and criteria.

Advisory speeds are set based on average curve speeds for different angles of deflection. One device widely used for establishing advisory speeds on curves is the ball bank indicator. Relatively inexpensive, this curved level is mounted in an engineer's car. The engineer makes successive trial runs through a curve, taking care to drive parallel to the centerline of the curve, increasing speed by 5 mph each time. The indicator shows the angle of deflection in degrees.



The TRB study reports that the generally accepted criteria, based on tests conducted in the 1930s, produce unrealistically low speeds with modern cars and should be revised upwards. The authors say ball bank readings of 12 degrees above 40 mph, 16 degrees between 30 and 40, and 20 degrees below 30 would better reflect average curve speeds.

Ball bank readings tend to fluctuate rather widely during a trial run and can be affected by loose-surfaced roads and vehicle suspension systems. As a result, setting a recommended speed depends to a significant extent on the judgment and experience of the person making the tests. The recommended speed should feel comfortable for the average driver and be lower than the maximum safe speed. It should also be sensible in comparison with prevailing speeds.

Summary

Establishing and enforcing reasonable and safe speed limits is the responsibility of local officials. This often includes balancing conflicting issues of safety, traffic movement, and community concerns.

Coordination with local law enforcement is vital to effective speed control. Most speed zones should encourage voluntary compliance by using reasonable speed limits. Traffic calming techniques that involve physical and perceptual changes also can help. Consulting enforcement officials when determining effective limits is important and they can help work with the community in difficult areas.

The traffic engineering staff of WisDOT also is a good resource. Since they participate on county Traffic Safety Commissions, this is an easy way to contact them for assistance.

Several sample speed limit ordinances are shown on page 6.

"Badger County" traffic ordinance

SPEED LIMITS. (1) The provision of sections 346.57 & 346.59 of the Wisconsin Statutes, relating to the maximum and minimum speed of vehicles, are hereby adopted as part of this section as is fully set forth herein, except as specified by section 2 of this ordinance, pursuant to section 349.11(3)(c) of the Wisconsin Statutes. (2) No vehicle shall exceed noted speed limits on the following county trunk highways:

(a) County Trunk Highway "A"

(1) **Unincorporated Village of Estesville, Town of Terry.** Thirty-five miles per hour from its junction with STH 78, in Estesville, southwesterly 0.35 miles.

(2) **City of Covington, Town of York.** Thirty-five miles per hour from its intersection with CTH "N" (Veterans Drive), easterly to a point 0.15 miles east of its intersection with Race Track Road.

(b) County Trunk Highway "AB"

(1) **Town of Finis.** Thirty miles per hour from the bridge over the Yahara River located on a line common to sections 13 and 14, Town of Finis, southwesterly to USH 51.

(2) **Chestnut Road, City of Centerton.** Thirty miles per hour from the intersection of USH 51, easterly to Droster Road.

Sample amendment to a speed ordinance

AMENDING CHAPTER 1 OF THE
BADGER COUNTY CODE OF ORDINANCES

SPEED LIMIT CHANGES

The County Board of Supervisors of the County of Badger does ordain as follows:

ARTICLE 1. Unless otherwise expressly stated herein, all references to section and chapter numbers are to those of the Badger County Code of Ordinances.

ARTICLE 2. Section(2)(b)(2) is created to read as follows:

1) Chestnut Road, City of Centerton. Twenty-five miles per hour from its intersection with USH 51 to its intersection with Winona Drive.

Sample municipal ordinance

Section 3. SPEED LIMITS. [Towns, Cities, and Villages] The _____ [Council or Village Board] hereby determines that the statutory speed limits on the following streets or portions thereof are unreasonable, unsafe and imprudent and modifies such speed limits as follows:

(1) SPEED LIMITS INCREASED. Speed limits are increased as follows upon the following designated streets or portions thereof:

(a) Outlying Districts

45 miles per hour on _____ Avenue between _____ Street and the _____ [City or Village] limits;

(2) SPEED LIMITS DECREASED. With the approval of the Wisconsin Department of Transportation, the speed limits are decreased as hereinafter set forth upon the following highways or portions thereof:

(a) Semi-Urban Districts

25 miles per hour on _____ Road between County Trunk _____ and the _____ [City or Village] Limits;
30 miles per hour on _____ Road between County Trunk _____ an d the limits

Sample speed limit ordinances *Local boards of elected officials must adopt speed limits in ordinance form. Here are sample ordinances for county and municipal governments. Local ordinances also may include details on forfeitures and law enforcement authority. The ordinance should be reviewed by the agency's attorney.*

References

Wisconsin Statewide Speed Management Guidelines, WisDOT, June 2009

Speed Management Safety, FHWA resource website at *http://safety.fhwa.dot.gov/speedmgt/*

Evaluation of Criteria for Setting Advisory Speed on Curves, Mashrur A. Chowdhury, Davey L. Warren, Howard Bissell, & Sunil Taori, Transportation Research Board Paper No. 980133, January 11-15, 1998, 21 pp.

Factors Affecting Speed Variance and Its Influence on Accidents, Nicholas J. Garber & Ravi Gadiraju, Transportation Research Record 1213, Transportation Research Board, 1998, 10 pp.

A Policy on Geometric Design of Highways and Streets, AASHTO, 2004, pp 66-72.

Spot Speed Studies, Ch.3 of Manual of Transportation Engineering Studies, Institute of Transportation Engineers, H. Douglas Robertson, Ed., 2000, pp 33-51.

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