



Guidelines for Determining Speed Limits on Municipal Roadways

**Stonebrooke
Engineering**

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Reducing speed limits to increase public safety is an emotional, political, and controversial topic that has been debated by safety advocates, engineers, politicians, transportation officials, and the public for many years. A recent statutory change spotlighted the topic, requiring a deeper look into how speed limits are established and the effectiveness that lowering speed limits has on reducing vehicle traveling speeds, as well as the impacts on pedestrian and bicycle traffic.

This document examines the history of speed limits, the recent statutory change, and the consequence of the change to communities. In addition, it examines the effectiveness of speed limit changes, outlines a process for agencies to follow when deciding to make a change, and offers alternative strategies for pedestrian and bicycle safety.

History of Speed Limits

MN Statute 169.14 was passed in 1937, establishing consistent statewide speed limits for alleys, streets in urban districts, local roads, expressways, and interstate highways. Previously, speed limits were set locally. When established locally, speed zones were not consistent from city to city, were widely ignored and were thought to have been influenced more by local desires to generate revenue than considerations for safety.

Statutory speed limits on most roadways include:

- 10 mph in alleys
- 30 mph on streets in urban districts (can be reduced to 25 mph if a speed zone is adopted and the roadway is properly signed)
- 55 mph on other roads
- 65 mph on expressways
- 65 mph on urban interstate highways
- 70 mph on rural interstate highways

However, if state or local authorities believed that the statutory limits would not be effective, the statute allowed for speed zones (non-statutory regulatory speed limits) to be established. Establishing a speed zone required that a speed study be conducted by MnDOT, and that the Commissioner of Transportation approved the change.

Speed studies were conducted in accordance with guidance provided in the Federal Manual on Uniform Traffic Control Devices (MUTCD - Minnesota adopted their own version of this document commonly referred to as MN MUTCD). The MN MUTCD defines the standards used by road managers to install and maintain traffic control devices on public streets, highways, bikeways, and private roads open to public travel in Minnesota. The intent of these standards is to create uniformity and consistency in all public transportation systems.

Establishing a speed zone involved completing an engineering and traffic investigation (speed study). Speeds limits were then set within 5 mph of the 85th percentile speed or within 10 mph of the pace mean speed. This process was chosen based on past research that indicated where the prevailing speeds are seven to eight mph over the 50th percentile speed (approximately the 85th percentile speed), overall crash rates are at a minimum. Use of the 85th percentile rule and the pace mean speed is consistent with conclusions of available transportation research as well as MnDOT and FHWA's MUTCD guidance. This approach has successfully

resulted in a high level of consistency in the establishment of speed limits among roads that have similar characteristics as well as a high level of compliance by road users. This approach is believed to provide the overall safest conditions with fewer crashes by ensuring uniform vehicle operating speeds.

Recently changes have been proposed to the MUTCD that would reinforce the idea that other factors, in addition to the 85th-percentile speed, also have a role in setting speed limits including:

- Road type and condition
- Location and type of access points (intersections, entrances, pedestrian access, etc.)
- Sufficient length of roadway (1/4 mile minimum)
- Existing traffic control devices (signs, signals, etc.)
- Crash history, traffic volume, sight distances (curve, hill, etc.)
- Travel speed samples
- Test drive results speed study
- Road users (such as pedestrian activity, bicycle activity)

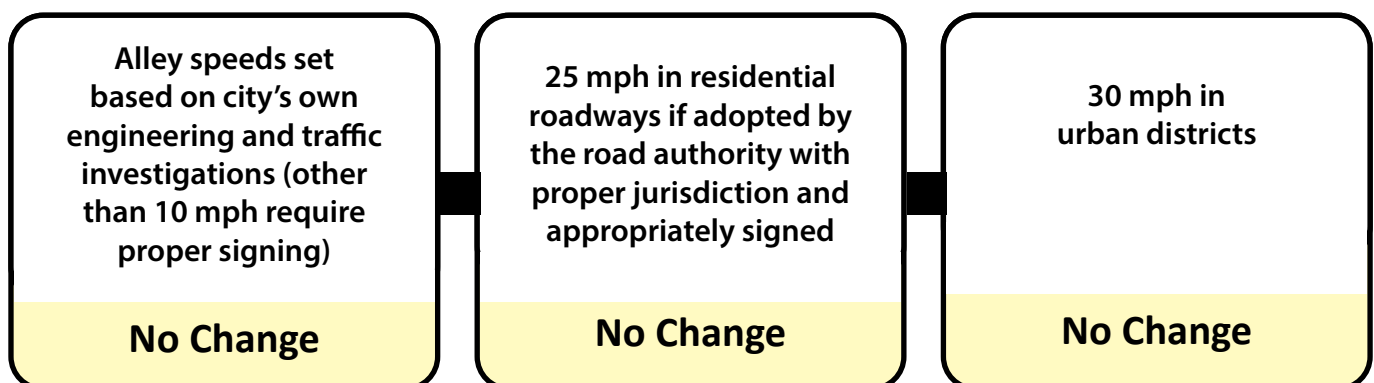
2019 Statute Change

Minnesota Statute Section 169.14, subd. 2 was updated August 1, 2019, by the Minnesota State Legislature. The change gave cities the authority to establish speed limits for streets under their jurisdiction without having MnDOT conduct a speed study, and without approval by the Commissioner of Transportation provided that:

- Speed limits are implemented in a consistent and understandable manner.
- The city erects appropriate signs to display the speed limit.
- The city develops procedures to set speed limits based on the city's safety, engineering, and traffic analysis considering national urban speed limit guidance and studies, local traffic crashes, and methods to effectively communicate the change to the public.

The change was the result of a request by the city of Minneapolis who wanted to have the ability to modify speeds on local roads to help improve pedestrian safety. A consistent legislative priority for the city was to either lower the statutory speed limit or give Minneapolis or cities of the first class the ability to set their own limits.

The state legislature agreed to allow the statute change as requested by Minneapolis, but also felt the authority should be granted to all Minnesota Communities.



What Does that Mean for Your City?

Prior to the change, the statutory speed limit in urban districts was 30 mph unless otherwise posted. A city also had the option to reduce a limit to 25 mph provided that the change was adopted by the local road authority and the roadway was properly signed. The revised statute maintains these limits and does not require any action by a community. The change simply affords communities the opportunity to change speed limits on roads under their jurisdiction. This authority is granted only to city streets and does not apply to town roads, county highways, or trunk highways located in the city.

Effectiveness of a Speed Limit Change

Nationally, FHWA has examined over 100 sites in 22 states and found no change in vehicle speeds due to a change in the speed limit. Similar studies¹ conducted by various cities in the US and Canada as well as studies by the Insurance Institute for Highway Safety have also found that changing the speed limit alone had no effect on driver behavior.

Some studies do however report the successful reduction of speeds when the speed limit change accompanies other mitigation strategies. For example, the city of Seattle examined five corridors² and reported a small reduction in both the 50th and 85th percentile speeds when the frequency of speed limit signs was increase from every 1-1.5 miles to one every ¼ mile.

Another study conducted on local streets in Woodbury, MN (statutory limit 30 mph) and River Falls, WI (statutory limit 25 mph) found similar 85th percentile speeds at these locations despite the difference in statutory limit. However, it did identify that the roadway width does affect travel speeds.

IN 50% OF PEDESTRIAN AND BICYCLE CRASHES NO PARTICULAR ACTION BY DRIVERS COULD BE IDENTIFIED THAT CONTRIBUTED TO THE CRASH.

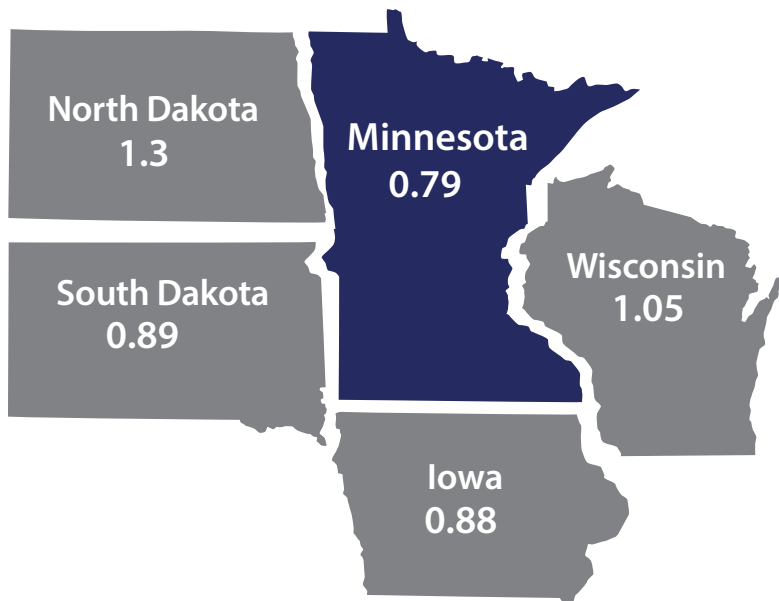
Based on all available data, effectively lowering vehicle speeds requires a combination of physical, operational, and regulatory measures to be successful. Changing driver behavior and reducing speeds will require added enforcement and changes to the road environment to adjust driver perception.

1 [Effects of Raising and Lowering Speed Limits on Selected Roadway Sections](#), FHWA, 1997
2 [Speed Limit Case Studies](#), SDOT, 2020

The most common actions that contribute to pedestrian and bicycle crashes include:

- Failure to yield - 11%
- Distracted Driver- 8%
- Careless/Reckless driving - 5%
- Failure to Obey Signal/Sign - 1%
- Speeding - 1%

Another notable data point is that the Minnesota pedestrian and bicycle fatal crash rate is lower than neighboring states, despite having higher statutory speed limits.



In fact, 92% of communities in Minnesota experienced 0-1 serious pedestrian and bicycle crashes in the 10-year period between 2011 and 2020.

- 69% of communities had zero serious or fatal crashes
- Law enforcement cited speed as a contributing factor in 4% of serious pedestrian and bicycle crashes
- A plurality of crashes occur on city streets (44%) and a majority of these occur on the Municipal State Aid (MSA) system
- 50% of crashes occur at intersection (42% highway and 62% MSA streets)

Of intersection crashes:

- 47% of intersection crashes occur at signals (61% for highways and 17% for city streets)
- 24% occur at stop signs (13% for highways and 44% for city streets)

Despite this data, public perception is that reducing speeds limits will save lives. This perception is supported by the fact that the survivability of a pedestrian crash increases dramatically with lower speeds. However, studies have shown that many speeders on the local system tend to be the residents that live in the area and travel the streets most often.

What Resources are Available?

The newly revised statute requires that the safety, engineering, and traffic analysis done when considering a speed limit change must consider national urban speed limit guidance and studies. Therefore, it is important to understand the difference between national guidance, research, and advocacy documents.

National Guidance

The Federal MUTCD is the national standard for all traffic control devices installed on any street, highway, bikeway, or road open to public use. It also provides guidance on establishing speed limits. Minnesota agencies are statutorily bound to comply with MUTCD guidance.

The MN MUTCD was developed to establish standards and to provide a uniform policy for the use of traffic control devices in the State of Minnesota. The MN MUTCD correlates with and conforms closely to the current system as approved by the American Association of State Highway Officials (AASHTO) and the national MUTCD.

Other Studies and Research

Guidance for the Setting of Speed Limits (NCHRP 17-76) ¹

This study created two tools (one with macros and one without) that could better inform speed limits beyond the 85th percentile. These tools take factors such as urban vs rural, other roadway users, and roadway type into account.

Design Speed, Operating Speed and Posted Speed Practices, (NCHRP Report 504) ²

This report summarized previous research and data collected through mail surveys. The findings were that there needs to be guidance added for the relationship between the 85th percentile and the posted speed limit. Speed limits are generally set 4-6 mph less than the 85th percentile speed. This report also added the need to specify radius, grade, access density, median presence, on-street parking, pedestrian activity, and signal density when determining speed.

Effects of Raising and Lowering Speed Limits on Selected Roadway Sections (FHWA) ³

Although the changes in vehicle speeds were small, driver violations of the speed limits increased when the posted speed limits were lowered. Conversely, violations decreased when the speed limits were raised. This does not reflect a change in driver behavior, but rather, a change in how compliance is measured. No evidence supports crash experience changing with speed limit changes.

Speed Concepts: Informational Guide (FHWA) ⁴

The study found that as speed increases, crash severity increases. There is not proper guidance on speed limit through the design phase. The 85th percentile may be higher than anticipated, especially on low or moderate speed roads. The design speed is NOT the maximum safe speed. Reducing speeds without other changes is likely to result in a small reduction of operating speed. Posted speed limits should always be within 5 mph of the 85th percentile speed.

1 [Guidance for the Setting of Speed Limits](#), NCHRP, 2019

2 [Design Speed, Operating Speed, and Posted Speed Practices](#), NCHRP, 2003

3 [Effects of Raising and Lowering Speed Limits on Selected Roadway Sections](#), FHWA, 1997

4 [Speed Concepts: Informational Guide](#), FHWA, 2009

Methods and Practices for Setting Speed Limits (FHWA and Institute of Transportation Engineers)¹ Identifies four methods for establishing speed limits (Engineering approach, Expert System Approach, Optimization and Injury Minimization). This is the Safe Speed Approach. This report provides practitioners with guidance on how to set speed limits in their jurisdiction without making specific policy recommendations or suggestions. The Safe Speed Approach resulted in speed limits that were at the lower end of the range of speeds enacted by the practitioners.

ITE Speed Zoning Guidelines (Institute of Transportation Engineers Committee) ²

Identifies factors such as geometric design, roadside development, shoulder and road surface characteristics, pedestrian and bicycle activity, speed limits on adjoining highway segments, accident experience or potential that should be considered as part of an engineering speed study. In no case should the speed limit be set below the 67th percentile of free-flowing vehicles. The speed limit should be set to the nearest 5-mph increment to the 85th percentile or the upper limit of the 10-mph pace. No speed zone should be established in a location where 85th percentile speed is within 3 mph of the statutory speed limit.

Reducing Speeding Related Crashes involving Passenger Vehicles (National Transportation Safety Board)³

The NTSB focused on five measures of speeding: speed limits, data-driven approaches for enforcement, automated speed enforcement, intelligent speed adaptation, and national leadership. They state higher speeds are likely to lead to a higher number of, and more serious, crashes. The Safe System approach in determining other factors leading to safety issues needs to be considered. There is not strong evidence that the 85th percentile equates to the lowest crash involvement on all road types.

Managing Speed: Review of Current Practice for Setting and Enforcing Speed Limits (TRB report 254)⁴

Limiting speed is not the only thing that should be considered for increased safety. Cutting down on impaired driving and increasing safety belt use have higher safety reduction. An increase in the age of the population also has a toll on safety. Congestion also increases driver frustration and encourages unsafe driving. Technology can help with the speed limit considerations. Technology can help the efficiency and effectiveness of enforcement.

Advocacy

The National Association of City Transportation Officials (NACTO)⁵ is “an advocacy group of major North American cities and transit agencies formed to exchange transportation ideas, insights, and practices and cooperatively approach national transportation issues.” A NACTO working group recently developed recommendations for setting speed limits on urban streets with the intent of providing an alternative to federal guidance.

In addition, the Minnesota Department of Transportation recently conducted a statewide Speed Limit Vision⁶ project. This effort has resulted in a collection of educational and informative data that can be useful for addressing speed related issues. The stated goal is to develop a unified vision related to speed limits that was supported by cities, counties, and special interest groups, as well as public safety and enforcement professionals. The visioning project is based on Minnesota speed limit history, as well as local and national research. A Technical Advisory Group was formed that included state, county, and city transportation professionals, as well as transit users, pedestrians, bicyclists, public health, law enforcement, and mobility impaired users.

1 [Methods and Practices for Setting Speed Limits](#), FHWA, 2012

2 [ITE Speed Zoning Guidelines](#), ITE

3 [Reducing Speeding Related Crashes involving Passenger Vehicles](#), NTSB, 2017

4 [Managing Speed: Review of Current Practice for Setting and Enforcing Speed Limits](#), TRB, 1998

5 [City Limits, Setting Safe Speed Limits on Urban Streets](#), NACTO, 2018

6 [A Minnesota Vision for Speed Limits](#), MnDOT, 2020

What are Your Options

The revised statute does not require any action. All statutory limits are still in place, the only significant change is that cities now have the ability to set speed limits on local roads if they choose. As a city, there are three options: you can maintain status quo, reduce speed limits on local street, or invest in alternative safety strategies.

I. Maintain Status Quo

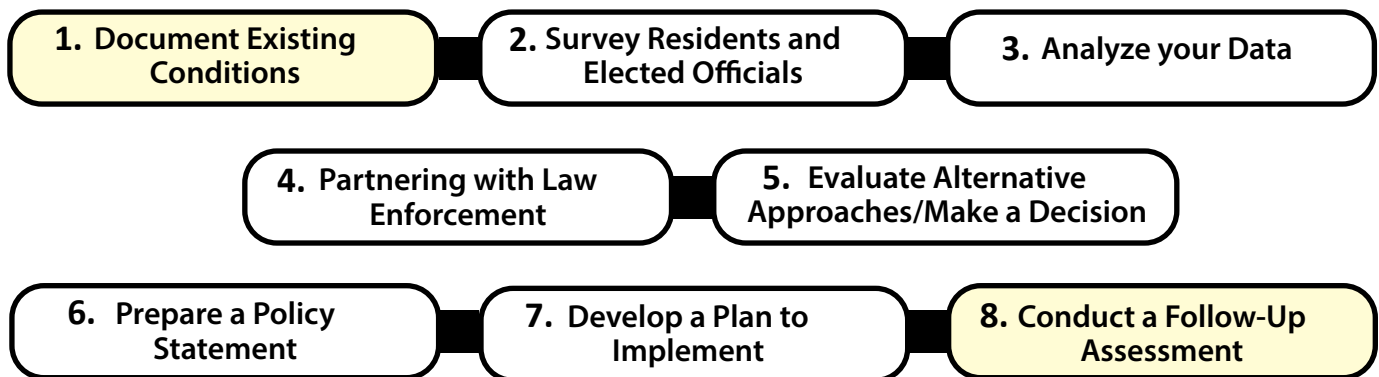
Keeping the status quo doesn't mean do nothing, it means identifying a problem and implementing a solution on a case-by-case basis using existing countermeasures currently being employed in the city.

This approach would maintain current statutory city speeds (i.e., 30 mph on local streets) but would not prohibit reduction of speeds on certain city streets if deemed appropriate based on engineering studies and judgement.

II. Reduce Speed Limits

When considering lowering urban speed limits we recommend that you follow a best practices process. This process is based on a review of published research, discussions with public works professionals and law enforcement in Minnesota, analysis of data from both national and Minnesota data and consideration of risk management practices.

The best practices process includes the following steps:



Process for Changing Speed Limit

1. Document Existing Conditions

Thoroughly understand the existing speed, safety, and traffic characteristics on your system. The outcome of this effort will establish the facts about how your road system is operating and will help you determine if there are real problems that need addressing or only the perception of problems.

Establishing how your system is working is a key input to the subsequent effort to evaluate and ultimately select an approach to determine speed limits on your city's streets.

Collect speed data on a representative sample of roadways, covering the spectrum of roadways, including low volume residential streets, streets in central business areas, school zones, parks, urban collectors, and urban/suburban arterials. It is likely that these different types of roadways have different operating and safety characteristics, and it is important to be aware of these differences.

Document safety characteristics using MnCMAT including total numbers of crashes, the number of serious crashes and fatalities, locations of crashes and contributing factors. MnCMAT can provide both city-wide overviews of crash data and specific information about corridors, individual intersections with documentation of numbers of crashes, types of crashes, crash severity and contributing factors.

2. Survey Residents and Elected Officials

Understand the concerns of city residents and elected officials regarding safety and vehicle speeds. Separate fact from perception and determine if most residents and elected officials feel a certain way or if there is only a vocal minority. Conversations with public works professionals around the state have found that there is not uniform support for changing urban speed limits. It is important to know where your residents and elected officials stand on this topic as you go through the evaluation of alternatives.

3. Analyze Your Data

Most city streets have a 30 mph limit based on the state statute covering urban areas. Collectors and minor arterials generally have higher speed zones that were determined by MnDOT. The traditional approach to analyzing speed data involves determining three performance measures:

- 50th percentile speed – the speed at which one-half of the drivers are travelling at or less
- 85th percentile speed – the speed at which 85 percent of the drivers are travelling at or less
- 10 mph pace – the 10 mph range that contains the greatest number of vehicles

Conduct an analysis of the speed data collected and determine the 50th and 85th percentile speeds and the 10 mph pace. Identify the current prevailing speeds across the various classes of streets in your system.

Note: Conversations with public works professionals indicate that some cities are finding the 85th percentile speed on their residential streets was around 25 mph, which supported changing the speed limit on those streets as well as an expectation that there would be a high level of compliance. Other cities with different roadway characteristics are finding prevailing speeds that supported retaining the current 30 mph limit.

4. Partnering with Law Enforcement

It is well known by traffic professionals that that drivers will generally pick an operating speed based on their perception of the road environment. If a community decides to lower the speed limits on streets when drivers are comfortable traveling at higher speeds, merely announcing a new speed limit will not change their behavior.

Law enforcement can provide information about prevailing speeds and help identify problem areas. It is also helpful to understand current levels of enforcement effort and whether they have the capacity to provide increased enforcement in support of lower speed limits. It is also important to understand if there are conditions attached to these efforts.

If you are considering lowering the speed limit on streets where prevailing speeds are higher, the best chance of changing operating speed without other changes to the roadway environment is through the application of high levels of enforcement. Therefore, it is important that law enforcement be on board with the decision.

5. Evaluate Alternative Approaches & Make a Decision

After evaluating your system there are two likely outcomes: retain the historic speed limits or adopt new lower speed limits across your city's system of streets.

If the data supports retaining the 30 mph limit but elected officials decide that lower limits are called for, a possible plan of action would include the following steps:

Conduct an informational session with the council and residents to share information.

Potential topics should include:

- A discussion of published research. Adopting a lower speed limit and changing the number on a sign has never (by itself) changed the operating speeds selected by drivers. Changing the road environment will be required and until that is achieved additional enforcement will need to be provided to have any chance of lowering speeds.
- Discussions with law enforcement. Document what resources they would need to provide a higher level of speed enforcement and what other conditions they would place on the effort.
- Establishment of a performance measure associated with the lowered speed limit, so that at some point it can be concluded that the lowered speed limit did or did not achieve the desired outcome.

Propose a temporary reduction in the speed limit (and an increased level of enforcement) for a specified period (six months to one year) combined with the collection of speed data to monitor the results.

The idea would be to secure an agreement with the council that at the end of the specified period of the test, if the performance measure is achieved, the lower speed limit would be retained. However, if the performance measure for speed reduction is not achieved, the speed limit could revert to the statutory limit.

The case for lowering speed limits should be based on determining that current speed profiles on some parts of the system indicate that prevailing speeds are lower than the statutory limit and the opinion of residents and elected officials in fact support a change.

The suggested system-based speed limits are as follows:

- Local Residential Streets 25 mph
- Urban Collectors 30 mph
- Urban Minor Arterials 35 mph
- Multi-lane Suburban Minor Arterials 40 mph

6. Prepare a Policy Statement

The implementation of any new approach to managing speed along city streets creates an opportunity for claims of negligence and having a policy documenting your city's approach to managing speed limits is a proven, effective technique for improving operations and managing risk.

Specific benefits associated with policy development include:

- Guiding allocation of resources to cover initial and annual maintenance costs
- Providing direction to staff
- Establishing the procedures to be followed
- Setting priorities
- Supports establishing discretionary immunity

A typical policy for establishment of speed limits on city streets should include the following:

- Background, Purpose and Goal
- Which roadways are to be covered by the policy – all city streets, low volume streets, various roadway classifications – residential, collectors, minor arterials, etc.?
- Document the approach/approaches selected for implementation – no change, new approach to all city streets, new approach to some city streets, combination of approaches, etc.
- How will changes be communicated to drivers – will speed limit signs be added to all roads or will notification of the changes be placed at entrances to the city?
- Document the impact of signing decisions on your sign maintenance budget.
- Document the level of coordination with law enforcement and any changes in enforcement practices.
- Document the effect of speed limit changes on future street design practices – design speed selection, street widths, etc.
- Commitments to deploy other infrastructure-based safety strategies, including expansion of sidewalks and trail systems, road diets, installation of curb extensions and median refuge islands, additions of rectangular rapid flash beacons and pedestrian hybrid beacon systems, and pedestrian enhancements at traffic signals (countdown timers and leading pedestrian interval).

7. Develop a Plan to Implement

The objective of the implementation plan is to successfully convey the message to both drivers and residents that speed limits in your city have changed. Even though most drivers on your city streets are residents, many are not. Therefore, it is important to communicate any change or variance from state statute in a variety of ways. Suggestions to communicate a planned or pending change include:

- As part of the publication of city council minutes and in your city's newsletter.
- Placing traffic signs (either permanent or temporary on Type III Barricades) on the major entrances to your city notifying drivers that there is a change in traffic control.
- Social media campaign.
- Finally, installing new speed limit signs on all streets where there has been a change in the limit.

To provide uniformity between communities and minimize driver confusion it is important to effectively convey the speed limit to drivers. Conveying speed limit in a consistent and uniform manner to which drivers are accustomed to will minimize driver confusion as well as enforcement issues.

While seemingly easy to implement the changing limits using a citywide approach opens several questions and concerns regarding “appropriate” signing. Some communities are choosing to install Gateway signs at their jurisdictional boundaries.

The use of the gateway signing alone is likely to cause confusion if motorists enter the community on a non-jurisdictional road such as a state highway or county road where a gateway sign may not be allowed. Additionally, gateway signs are not something that motorists are accustomed to in Minnesota. As a result, a motorist traveling between jurisdictions, or transitioning between non-signed local streets and other roadways, may not be aware when a speed limit has changed. Discussion with law enforcement officers has also identified a reluctance to write citations without a visible regulatory sign.

The citywide approach may provide consistent expectations across a city. However, to avoid confusion given that other regulatory speeds are also still in effect, it is recommended that regulatory speed limit signs be installed at appropriate locations and intervals. At a minimum, regulatory signs should be placed anywhere a transition of speed occurs including at community boundaries, and when transitioning from major roads onto local streets.

8. Conduct a Follow-Up Assessment

To know if any changes in speed limits have been effective, a follow-up assessment is required. The best practice begins with documenting existing conditions and then conducting annual assessments each year following the change. Be aware that small changes, especially in vehicle speeds, may be statistically significant but they may not be practically significant.

The outcome of the assessment could prove that the changes in speed limits achieved the performance measures and the effort to match driver behavior with the lower speed limit was a success. On the other hand, if the outcome indicates that driver behavior was not changed, two possible courses of action are suggested. First, continue the experiment with lower speed limits but add more features to modify the driver’s perception of the road environment – for example, median refuge islands and curb extensions – and increase enforcement efforts. Second, revert to the previous statutory limit.

III. Invest in Alternative Pedestrian and Bicycle Safety Strategies

If your city decides to take actions to improve pedestrian and bicycle safety, you will need to consider two important items – (1) WHERE to make improvements and (2) WHAT strategies to invest in. However, research into pedestrian and bicycle safety suggests that traditional thinking about WHERE and WHAT is unlikely to yield positive results.

WHERE to make Improvements:

Traditionally, safety analysts would review their road systems and then focus their safety investments on locations with large numbers of priority crash types (Road Departure, Right Angle, etc.) However, after Minnesota adopted serious crashes (those involving severe injuries and fatalities) as the State's safety performance measure, it was determined that this reactive approach of chasing after serious crashes around the system was not an effective strategy. Serious crashes were widely scattered and for the most part occurred at locations that did not have any prior serious crashes during the study period. It was concluded that the presence of one serious crash at a particular location was not a good predictor of a second serious crash. **It appears that safety analysts focused on serious crashes involving pedestrians and bicyclists face these same challenges:**

- Serious pedestrian and bicycle crashes are widely scattered among cities in Minnesota
- 588 (69%) of Minnesota's 856 cities had NO serious pedestrian and bicycle crashes during a 10-year study period (2011-2020).
- 228,000 (99%) of the approximately 230,000 locations in Minnesota's crash mapping tool had NO serious pedestrian and bicycle crashes during the 10-year study period.
- Only six (0.7%) cities (Brooklyn Center, Duluth, St. Cloud, Columbia Heights, St. Paul, and Minneapolis) had two or more locations with multiple serious pedestrian and bicycle crashes during the 10-year study period.
- Only ONE location in the entire State (University Avenue at Northtown Drive in Blaine) had TWO pedestrian and bicycle crashes that resulted in fatalities during the study period.

This information supports a conclusion that using a reactive approach based on prior serious crashes would not be effective in identifying high priority locations for safety investment. This information also supports the use of a proactive, systemic approach that is based on identifying the characteristics of the locations with serious pedestrian and bicycle crashes and then searching road systems for other locations with similar characteristics.

Previous safety studies have identified several roadway characteristics as being over-represented at the locations with serious pedestrian and bicycle crashes, including:

- Streets with a MSA designation: Streets on the MSA system account for 3% of statewide road mileage but 26% of serious pedestrian and bicycle crashes.
- Intersection Traffic Control: Along MSA streets, more than 60% of serious pedestrian and bicycle crashes occur at intersections and almost 50% of these are controlled by traffic signals.
- Transit Stops: In Minnesota cities, approximately 80% of locations with a serious pedestrian and bicycle crash had a transit stop.

All of this suggests that the determination of where to invest in safety improvements should be based on a systemic review of a city's road system that is primarily focused on MSA streets and secondarily at signalized intersections with transit stops.

WHAT strategies to invest in:

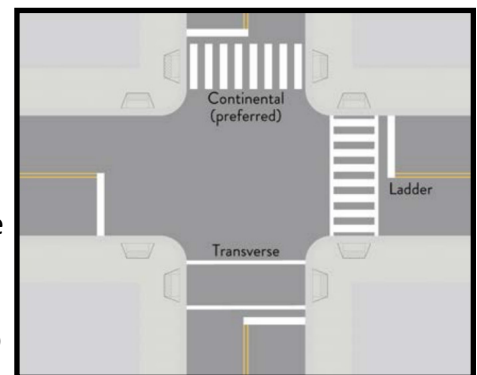
The process of evaluating the dozens of potential safety strategies to address pedestrian and bicycle safety is often complicated by perceptions held by residents and elected officials that are based on their intuition, but are often contrary to the facts. A way to deal with the challenge of addressing these perceptions is for city staff to be aware of facts documented by research regarding the effectiveness of pedestrian and bicycle strategies and where on the spectrum of proven not effective to proven effective does each strategy fall.

Examples of strategies proven not to be effective include:

- Marked Crosswalks: The addition of marked crosswalks alone, without more substantial roadway or traffic control treatments, has NOT been found to reduce pedestrian crash rates.
- Traffic Signals: Traffic signals are used to assign right of way to conflicting streams of traffic (vehicles, pedestrians and bicycles) at intersections. By themselves, traffic signals are not considered to be effective safety devices for vehicles, pedestrians or bicycles. Signalized intersections have the highest rate and severity of crashes among intersection traffic control devices and more than one-half of pedestrian and bicycle crashes in Minnesota occur at signalized intersections.
- Reduced Urban Speed Limits: There is no information in published research to support the notion that lowering urban speed limits either reduces actual operating speeds or serious crashes involving pedestrians and bicycles. MnDOT has conducted more than a dozen local studies and FHWA conducted a national study where speed limits were artificially lowered by changing the numbers on regulatory speed limit signs. In no case was driver behavior changed. Regarding the safety effect of lowering urban speed limits on serious pedestrian and bicycle crashes, it should be noted that each of the four states that border Minnesota have a 25 mph statutory urban speed limit but has a fatal pedestrian and bicycle crash rate that is 11% to 64% higher than Minnesota's.
- On-road Bike Lanes: On-Road bike lanes have been deployed extensively around the country and in Minnesota but are not considered to be an effective safety strategy because research results are almost equally divided between locations where bike crashes increased versus locations where bike crashes decreased.

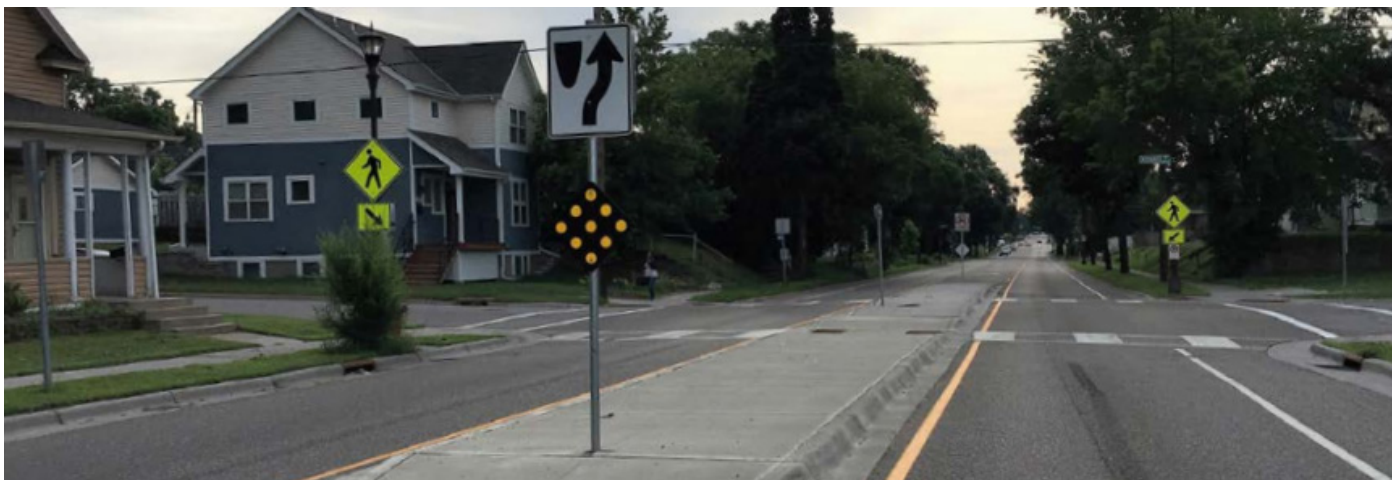
Examples of strategies proven effective include:

- Sidewalks: Constructing sidewalks has been found to decrease "Walking in Roadway" pedestrian crashes by 50%-90%.
- Median Crossing/Refuge Islands: Adding Median Crossing/Refuge Islands has been found to reduce pedestrian and bicycle crashes by 39%-46%. Curb extensions have been found to reduce pedestrian and bicycle crashes by 39%-46%.
- Crosswalk lighting: Adding Crosswalk lighting has been found to reduce pedestrian and bicycle crashes by 33%-44%.



Source: MnDOT

- Road Diets: “Road Diet” is a term used for the reallocation of roadway lanes and/or space to integrate features such as bike lanes or pedestrian refuge islands on existing roadways. A common roadway reconfiguration involves converting an undivided four-lane (two-way) road into a three-lane road made up of one through lane in each direction, a center two-way left turn lane and a shoulder/bike lane. Modifying roads from four lanes to two travel lanes with a left turn lane has been found to reduce vehicle crashes by 29%-46%. Safety effects on crashes involving pedestrians and bicyclists associated with Road Diets are still being documented but positive benefits have been noted including:
 - Typically lower speeds due to one travel lane in each direction and no passing,
 - The reduction to a single travel lane in each direction eliminates the possibility of a “multiple-threat” crash (where a driver in one lane stops to yield to a pedestrian but the driver in the adjacent lane continues at speed because the other vehicle blocks the line of sight to the pedestrian)
 - The reallocation of space creates an opportunity to construct median refuge islands at pedestrian crossing locations.
- Pedestrian Hybrid Beacon: A Pedestrian Hybrid Beacon system is a traffic control device that remains dark until a pushbutton is activated by a pedestrian, at which time the beacon flashes a sequence of amber warning followed by a red stop for vehicles. The system has been found to have a 97% compliance rate for vehicles stopping during the steady red beacon phase and a 69% reduction in vehicle-pedestrian crashes.
- Rapid Rectangular Flashing Beacon: A Rapid Rectangular Flashing Beacon is a dynamic warning device that is activated when a pedestrian pushes a button at the crosswalk. The system uses an irregular flash pattern similar to emergency flashers on police vehicles with a pulsing light source. Studies are still under way to document pedestrian and bicycle crash reductions but completed studies have found “yield to pedestrians” compliance rates ranging from 80% - 100% and these rates are four to five times higher than at standard beacons.
- Leading Pedestrian Interval: Use of a LPI extends the All-Red portion of the traffic signal cycle and provides the pedestrian walk indication two to three seconds ahead of the vehicle green, allowing pedestrians a head start and the ability to enter the crosswalk before right turning vehicles can turn into the crosswalk. Studies have found the LPI to reduce pedestrian crashes by up to 60%.
- Countdown Timers: Countdown Timers replace the traditional Walk/Don’t Walk pedestrian indications and are flashing timers which provide the number of seconds remaining during the pedestrian phase. Studies have found that converting from standard pedestrian signals to countdown timers was associated with up to a 25% reduction in pedestrian crashes.



Addressing Citizen Concerns

Creating an open dialogue with citizens is an important step in understanding perceived and actual safety issues of the public. The “Addressing Citizen Requests for Traffic Safety Concerns” Local Road Research Board Report 2017RIC05 from 2017 identified steps for addressing citizen concerns for safety.

1. Problem Identification – Record their concern and ask questions regarding pertinent details to best understand their issue.
2. Evaluation – Arrange for a site inspection and collect necessary data. Identify if there is an issue and what steps can be made to mitigate. If there is no issue, communicate the appropriate reasoning.
3. Response / Follow-up – If the evaluation takes more than a month, periodically update the citizen. If the decision is to make a change, document this change and understand your agencies processes.

This report also examines things to make the public aware of surrounding speed and safety.

- Speed complaints are often the residents’ “perceived” safety concern rather than an “actual” safety concern. Collect data using a radar gun to determine if this is a perception or a reality.
- Speed humps/tables are larger issues involving more time and money to evaluate. They often do not affect speed between humps.
- A change in speed is not likely to affect the safety concern. If speed is the key issue, install a speed trailer to inform drivers of their speeds.
- Speed limits in neighborhoods are already likely at the state minimum based on law.
- Speed limit signs often advertise that a given speed is acceptable even though it is desired that drivers drive slower.
- Roadway narrowing to reduce speeds can be effective, but expensive. On-street parking can be a lower-cost solution.
- Often the speed offenders are people that live in the neighborhood. Encourage citizens to talk to their neighbors to have the discussion.
- Other measures to help reduce speed include posting yard signs or figures mentioning to slow down, and also increasing compliance patrols with the police department.

Summary & Recommendation

When considering the effects of vehicle speeds on public safety, pedestrian and bicyclist safety is always a primary concern. It is often difficult to pinpoint causes and identify the best countermeasures due to the rarity and randomness of these crashes. Minneapolis and St. Paul are the only communities in Minnesota that have enough serious pedestrian and bicycle crashes to obtain statistically reliable data to analyze the causes of crashes and potential mitigations. All other cities will need to rely on statewide summaries to indicate trends, causes and possible mitigation strategies.

This analysis of serious statewide pedestrian and bicycle crashes found that the Municipal State Aid (MSA) system was more at risk than other city streets. The MSA system was found to have a serious pedestrian and bicycle crash density that is almost nine times higher than on other city streets. It is speculated that this higher risk is associated with typically wider streets, higher volumes and adjacent commercial development. This analysis also found that the almost half of serious pedestrian and bicycle crashes occurred at intersections, and almost half of these had traffic signal control. Police crash reports cited speed as a contributing factor in only four percent of serious pedestrian and bicycle crashes.

The 85th percentile speed continues to be a reasonable approximation of the prevailing speed selected by drivers on local streets based on their perception of the road environment. However, this approach has been criticized, especially by pedestrian safety advocates in urban area because it does not directly consider pedestrians and bicycles. That critique is correct, but most city streets have speed limits based on statute and not the analysis of prevailing speeds.

There is no evidence to suggest lowering speed limit will result in lower travel speeds. Reducing speed will require changes to the roadway environment and/or increased enforcement. However, speeds on local roads in some communities already lower than statutory limits lending credibility to a reduction in speed limits.

Whenever possible local agencies should **implement proven alternative strategies and modify the roadway environment to reduce travel speeds**. Also, whenever possible speed limits should be reduced when documented travel speeds are less than the statutory limit.

Prior to implementing a citywide reduction in speed limits, public outreach and a robust public involvement campaign should be implemented. This step is crucial to separate fact from perception and determine if residents and elected officials understand the likelihood of achieving a reduction in travel speeds.

It is also important to determine if the community actually supports a change, or is there only a vocal minority. **If a change is made, partnering with law enforcement is essential**; while often challenging and unpopular a true reduction in speeds without modifications to the roadway environment will require increased enforcement. If a speed change is desired, it is recommended that the agency **install regulatory signs instead of gateway signing alone**. Regulatory signs should be installed whenever speed zones change, and at community boundaries.

The suggested system-based speed limits include:

- Local Residential Streets 25 mph
- Urban Collectors 30 mph
- Urban Minor Arterials 35 mph
- Multi-lane Suburban Minor Arterials 40 mph

Changing speeds limits is new to Minnesota, and there is insufficient data to support a conclusion as to whether or not it will improve pedestrian safety. It is strongly encouraged that communities track their results so additional future evaluations and recommendations can be performed.

APPENDIX A: Full Language of the Statute

Minnesota Statutes, Section 169.14

169.14 SPEED LIMITS, ZONES; RADAR.

Subdivision 1. Duty to drive with due care.

No person shall drive a vehicle on a highway at a speed greater than is reasonable and prudent under the conditions. Every driver is responsible for becoming and remaining aware of the actual and potential hazards then existing on the highway and must use due care in operating a vehicle. In every event speed shall be so restricted as may be necessary to avoid colliding with any person, vehicle or other conveyance on or entering the highway in compliance with legal requirements and the duty of all persons to use due care.

Subd. 1a. License revocation for extreme speed.

The driver's license of a person who violates any speed limit established in this section, by driving in excess of 100 miles per hour, is revoked for six months under section 171.17, or for a longer minimum period of time applicable under section 169A.53, 169A.54, or 171.174.

Subd. 2. Speed limits.

(a) Where no special hazard exists the following speeds shall be lawful, but any speeds in excess of such limits shall be prima facie evidence that the speed is not reasonable or prudent and that it is unlawful; except that the speed limit within any municipality shall be a maximum limit and any speed in excess thereof shall be unlawful:

(1) 30 miles per hour in an urban district;

(2) 65 miles per hour on noninterstate expressways, as defined in section 160.02, subdivision 18b, and noninterstate freeways, as defined in section 160.02, subdivision 19;

(3) 55 miles per hour in locations other than those specified in this section;

(4) 70 miles per hour on interstate highways outside the limits of any urbanized area with a population of greater than 50,000 as defined by order of the commissioner of transportation;

(5) 65 miles per hour on interstate highways inside the limits of any urbanized area with a population of greater than 50,000 as defined by order of the commissioner of transportation;

(6) 10 miles per hour in alleys;

(7) 25 miles per hour in residential roadways if adopted by the road authority having jurisdiction over the residential roadway; and

(8) 35 miles per hour in a rural residential district if adopted by the road authority having jurisdiction over the rural residential district.

(b) A speed limit adopted under paragraph (a), clause (7), is not effective unless the road authority has erected signs designating the speed limit and indicating the beginning and end of the residential roadway on which the speed limit applies.

(c) A speed limit adopted under paragraph (a), clause (8), is not effective unless the road authority has erected signs designating the speed limit and indicating the beginning and end of the rural residential district for the roadway on which the speed limit applies.

(d) Notwithstanding section 609.0331 or 609.101 or other law to the contrary, a person who violates a speed limit established in this subdivision, or a speed limit designated on an appropriate sign under subdivision 4, 5, 5b, 5c, or 5e, by driving 20 miles per hour or more in excess of the applicable speed limit, is assessed an additional surcharge equal to the amount of the fine imposed for the speed violation, but not less than \$25.

Subd. 2a. Increased speed limit when passing.

Notwithstanding subdivision 2, the speed limit is increased by 10 miles per hour over the posted speed limit when the driver:

(1) is on a two-lane highway having one lane for each direction of travel;

(2) is on a highway with a posted speed limit that is equal to or higher than 55 miles per hour;

(3) is overtaking and passing another vehicle proceeding in the same direction of travel; and

(4) meets the requirements in section 169.18.

Subd. 3. Reduced speed required.

(a) The driver of any vehicle shall, consistent with the requirements, drive at an appropriate reduced speed when approaching or passing an authorized emergency vehicle stopped with emergency lights flashing on any street or highway, when approaching and crossing an intersection or railway grade crossing, when approaching and going around a curve, when approaching a hill crest, when traveling upon any narrow or winding roadway, and when special hazards exist with respect to pedestrians or other traffic or by reason of weather or highway conditions.

(b) A person who fails to reduce speed appropriately when approaching or passing an authorized emergency vehicle stopped with emergency lights flashing on a street or highway shall be assessed an additional surcharge equal to the amount of the fine imposed for the speed violation, but not less than \$25.

Subd. 4. Establishment of zones by commissioner.

On determining upon the basis of an engineering and traffic investigation that any speed set forth in this section is greater or less than is reasonable or safe under the conditions found to exist on any trunk highway or upon any part thereof, the commissioner may erect appropriate signs designating a reasonable and safe speed limit thereat, which speed limit shall be effective when such signs are erected. Any speeds in excess of such limits shall be prima facie evidence that the speed is not reasonable or prudent and that it is unlawful; except that any speed limit within any municipality shall be a maximum limit and any speed in excess thereof shall be unlawful. On determining upon that basis that a part of the trunk highway system outside a municipality should be a zone of maximum speed limit, the commissioner may establish that part as such a zone by erecting appropriate signs showing the beginning and end of the zone, designating a reasonable and safe speed therefor, which may be different than the speed set forth in this section, and that it is a zone of maximum speed limit. The speed so designated by the commissioner within any such zone shall be a maximum speed limit, and speed in excess of such limit shall be unlawful. The commissioner may in the same manner from time to time alter the boundary of such a zone and the speed limit therein or eliminate such zone.

Subd. 4a.

[Repealed, 1997 c 143 s 20]

Subd. 5. Zoning within local area.

When local authorities believe that the existing speed limit upon any street or highway, or part thereof, within their respective jurisdictions and not a part of the trunk highway system is greater or less than is reasonable or safe under existing conditions, they may request the commissioner to authorize, upon the basis of an engineering and traffic investigation, the erection of appropriate signs designating what speed is reasonable and safe, and the commissioner may authorize the erection of appropriate signs designating a reasonable and safe speed limit thereat, which speed limit shall be effective when such signs are erected. Any speeds in excess of these speed limits shall be prima facie evidence that the speed is not reasonable or prudent and that it is unlawful; except that any speed limit within any municipality shall be a maximum limit and any speed in excess thereof shall be unlawful. Alteration of speed limits on streets and highways shall be made only upon authority of the commissioner except as provided by law.

Subd. 5a. Speed zoning in school zone; surcharge.

(a) Local authorities may establish a school speed limit within a school zone of a public or nonpublic school upon the basis of an engineering and traffic investigation as prescribed by the commissioner of transportation. The establishment of a school speed limit on any trunk highway shall be with the consent of the commissioner of transportation. Such school speed limits shall be in effect when children are present, going to or leaving school during opening or closing hours or during school recess periods. The school speed limit shall not be lower than 15 miles per hour and shall not be more than 30 miles per hour below the established speed limit on an affected street or highway.

(b) The school speed limit shall be effective upon the erection of appropriate signs designating the speed and indicating the beginning and end of the reduced speed zone. Any speed in excess of such posted school speed limit is unlawful. All such signs shall be erected by the local authorities on those streets and highways under their respective jurisdictions and by the commissioner of transportation on trunk highways.

(c) For the purpose of this subdivision, "school zone" means that section of a street or highway which abuts the grounds of a school where children have access to the street or highway from the school property or where an established

school crossing is located provided the school advance sign prescribed by the Manual on Uniform Traffic Control Devices adopted by the commissioner of transportation pursuant to section 169.06 is in place. All signs erected by local authorities to designate speed limits in school zones shall conform to the Manual on Uniform Traffic Control Devices.

(d) Notwithstanding section 609.0331 or 609.101 or other law to the contrary, a person who violates a speed limit established under this subdivision is assessed an additional surcharge equal to the amount of the fine imposed for the violation, but not less than \$25.

Subd. 5b.Segment in urban district.

When any segment of at least a quarter-mile in distance of any city street, municipal state-aid street, or town road on which a speed limit in excess of 30 miles per hour has been established pursuant to an engineering and traffic investigation by the commissioner meets the definition of "urban district" as defined in section 169.011, subdivision 90, the governing body of the city or town may by resolution declare the segment to be an urban district and may establish on the segment the speed limit for urban districts prescribed in subdivision 2. The speed limit so established shall be effective upon the erection of appropriate signs designating the speed and indicating the beginning and end of the segment on which the speed limit is established, and any speed in excess of such posted limits shall be unlawful. A copy of the resolution shall be transmitted to the commissioner at least 10 days prior to the erection of the signs.

Subd. 5c.Speed zoning in alleyway.

Local authorities may regulate speed limits for alleyways as defined in section 169.011 based on their own engineering and traffic investigations. Alleyway speed limits established at other than 10 miles per hour shall be effective when proper signs are posted.

Subd. 5d.Speed limit in work zone when workers present.

(a) Notwithstanding subdivision 2 and subject to subdivision 3, the speed limit on a road having an established speed limit of 50 miles per hour or greater is adjusted to 45 miles per hour in a work zone when (1) at least one lane or portion of a lane of traffic is closed in either direction, and (2) workers are present. A speed in excess of the adjusted speed limit is unlawful.

(b) Paragraph (a) does not apply to a segment of road in which:

(1) positive barriers are placed between workers and the traveled portion of the highway;

(2) the work zone is in place for less than 24 hours;

(3) a different speed limit for the work zone is determined by the road authority following an engineering and traffic investigation and based on accepted engineering practice; or

(4) a different speed limit for the work zone is established by the road authority under paragraph (c).

(c) The commissioner, on trunk highways and temporary trunk highways, and local authorities, on streets and highways under their jurisdiction, may authorize the use of reduced maximum speed limits in work zones when workers are present, without an engineering and traffic investigation required. The work zone speed limit must not reduce the speed limit on the affected street or highway by more than:

(1) 20 miles per hour on a street or highway having an established speed limit of 55 miles per hour or greater; and

(2) 15 miles per hour on a street or highway having an established speed limit of 50 miles per hour or less.

(d) A work zone speed limit under paragraph (c) is effective on erection of appropriate regulatory speed limit signs. The signs must be removed or covered when they are not required. A speed in excess of the posted work zone speed limit is unlawful.

(e) For any speed limit under this subdivision, a road authority shall erect signs identifying the speed limit and indicating the beginning and end of the speed limit zone.

Subd. 5e.Speed limit on park road.

The political subdivision with authority over a park may establish a speed limit on a road located within the park. A speed limit established under this subdivision on a trunk highway is effective only with the commissioner's approval. A speed limit established under this subdivision must be based on an engineering and traffic investigation prescribed by

the commissioner of transportation and must not be lower than 20 miles per hour, and no speed limit established under this subdivision may reduce existing speed limits by more than 15 miles per hour. A speed limit established under this subdivision is effective on the erection of appropriate signs designating the speed limit and indicating the beginning and end of the reduced speed zone. Any speed in excess of the posted speed is unlawful.

Subd. 5f.Speed limits on certain rural residential districts.

(a) A rural residential district existing and lawfully signed before August 1, 2009, continues to qualify as a rural residential district.

(b) A rural residential district existing and lawfully signed before August 1, 2009, is subject to the speed limit signed before August 1, 2009.

[See Note.]

Subd. 5g.St. Louis County Road 128.

Notwithstanding any provision to the contrary in this section, the speed limit on St. Louis County Road 128 in Eagles Nest Township between marked Trunk Highway 169 and County Road 989 is 40 miles per hour. The county engineer must erect appropriate signs displaying the 40 miles per hour speed limit.

Subd. 5h.Speed limits on city streets

A city may establish speed limits for city streets under the city's jurisdiction other than the limits provided in subdivision 2 without conducting an engineering and traffic investigation. This subdivision does not apply to town roads, county highways, or trunk highways in the city. A city that establishes speed limits pursuant to this section must implement speed limit changes in a consistent and understandable manner. The city must erect appropriate signs to display the speed limit. A city that uses the authority under this subdivision must develop procedures to set speed limits based on the city's safety, engineering, and traffic analysis. At a minimum, the safety, engineering, and traffic analysis must consider national urban speed limit guidance and studies, local traffic crashes, and methods to effectively communicate the change to the public.

Subd. 6.

[Repealed, Ex1971 c 27 s 49]

Subd. 6a.Work zone speed limit violations.

A person convicted of operating a motor vehicle in violation of a speed limit in a work zone, or any other provision of this section while in a work zone, shall be required to pay a fine of \$300. This fine is in addition to the surcharge under section 357.021, subdivision 6.

Subd. 7.Burden of proof.

The provisions of this chapter declaring speed limitation shall not be construed to relieve the plaintiff in any civil action from the burden of proving negligence on the part of the defendant as the proximate cause of an accident.

Subd. 8.Minimum speeds.

On determining upon the basis of an engineering and traffic investigation that a speed at least as great as, or in excess of, a specified and determined minimum is necessary to the reasonable and safe use of any trunk highway or portion thereof, the commissioner may erect appropriate signs specifying the minimum speed on such highway or portion thereof. The minimum speed shall be effective when such signs are erected. Any speeds less than the posted minimum speeds shall be prima facie evidence that the speed is not reasonable or prudent and that it is unlawful.

Subd. 9.Standards of evidence.

In any prosecution in which the rate of speed of a motor vehicle is relevant, evidence of the speed of a motor vehicle as indicated on the speedometer thereof shall be admissible on a showing that a vehicle is regularly used in traffic law enforcement and that the speedometer thereon is regularly and routinely tested for accuracy and a record of the

results of said tests kept on file by the agency having control of said vehicle. Evidence as to the speed indicated on said speedometer shall be prima facie evidence that the said vehicle was, at the time said reading was observed, traveling at the rate of speed so indicated; subject to correction by the amount of error, if any, shown to exist by the test made closest in time to the time of said reading.

Records of speedometer tests kept in the regular course of operations of any law enforcement agency shall be admissible without further foundation, as to the results of said tests. Such records shall be available to the defendant upon demand. Nothing herein shall be construed to preclude or interfere with the cross examination or impeachment of evidence of rate of speed as indicated by speedometer readings, pursuant to the Rules of Evidence.

Subd. 10. Radar; speed-measuring device; standards of evidence.

(a) In any prosecution in which the rate of speed of a motor vehicle is relevant, evidence of the speed as indicated on radar or other speed-measuring device is admissible in evidence, subject to the following conditions:

- (1) the officer operating the device has sufficient training to properly operate the equipment;
- (2) the officer testifies as to the manner in which the device was set up and operated;
- (3) the device was operated with minimal distortion or interference from outside sources; and
- (4) the device was tested by an accurate and reliable external mechanism, method, or system at the time it was set up.

(b) Records of tests made of such devices and kept in the regular course of operations of any law enforcement agency are admissible in evidence without further foundation as to the results of the tests. The records shall be available to a defendant upon demand. Nothing in this subdivision shall be construed to preclude or interfere with cross examination or impeachment of evidence of the rate of speed as indicated on the radar or speed-measuring device.

Subd. 11. Handheld traffic radar.

(a) Law enforcement agencies that use handheld radar units shall establish operating procedures to reduce the operator's exposure to microwave radiation.

(b) The procedures, at a minimum, must require:

- (1) that the operator turn the unit off when it is not in use;
- (2) if the unit has a standby mode, that the operator use this mode except when measuring a vehicle's speed;
- (3) that the operator not allow the antenna to rest against the operator's body while it is in operation; and
- (4) that the operator always point the antenna unit away from the operator and any other person in very close proximity to the unit.

Subd. 12. Radar jammer.

For purposes of this section, "radar jammer" means any instrument, device, or equipment designed or intended for use with a vehicle or otherwise to jam or interfere in any manner with a speed-measuring device operated by a peace officer. No person shall sell, offer for sale, use, or possess any radar jammer in this state.

History:

(2720-178) 1937 c 464 s 28; 1939 c 430 s 6; 1947 c 428 s 12,13; 1955 c 802 s 1,2; 1957 c 580 s 1; 1963 c 843 s 1-4; 1969 c 623 s 1; 1975 c 53 s 1; 1975 c 363 s 1,2; 1976 c 166 s 7; 1979 c 60 s 1; 1980 c 498 s 4; 1984 c 417 s 24,25; 1986 c 444; 1987 c 319 s 1; 1991 c 298 art 4 s 9; 1993 c 26 s 1; 1993 c 61 s 1; 1994 c 635 art 1 s 12; 1994 c 640 s 1; 1994 c 645 s 1; 1995 c 118 s 1; 1995 c 265 art 2 s 18; 1996 c 455 art 1 s 5,6; 1997 c 143 s 9-11; 1997 c 159 art 2 s 20,21; 1999 c 44 s 1; 2001 c 213 s 9; 1Sp2003 c 19 art 2 s 27; 1Sp2005 c 6 art 3 s 41,42; 2008 c 287 art 1 s 45; 2009 c 56 s 4,5; 2009 c 165 s 1; 2010 c 356 s 1; 2014 c 312 art 11 s 7,8; 1Sp2017 c 3 art 3 s 48; 1Sp2019 c 3 art 3 s 34,35

NOTE: Subdivision 5f, paragraph (b), as added by Laws 2009, chapter 56, section 5, expires when the speed limit signs erected before August 1, 2009, are replaced. Laws 2009, chapter 56, section 5, the effective date.

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APPENDIX B: Case Studies - Category Speed Limit

City of Minneapolis:

The City of Minneapolis utilized the category speed limit approach: 20 mph for minor roads and 25 mph for major roads under their jurisdiction. After the new Minnesota State Statute was passed, the City of Minneapolis passed an ordinance giving the city engineer the authority to set the speed limits. Minneapolis decided to change their speeds limits based on a technical analysis of existing data and other national and local reports. The city had a goal to make itself a safer place for the walking and biking community. Along with these goals, Minneapolis used the collected 50th percentile speeds as well. Once they decided on a speed limit of 20 mph on minor roadways and 25 mph on major roadways, the education process began. The city created an campaign to educate the community. They also teamed up with the City of St. Paul to do joint events in the community to educate the public on the new speed limit change. The city also changed the signs in Minneapolis and added gateway signs that the city worked with MnDOT to create. There is still some education left to be done, and after a few years of these speed changes they hope to reevaluate to see how the speed limit change has impacted crash and speed data.

City of St. Paul

They City of St Paul conducted a technical evaluation to determine speed limits on city streets (see St. Paul Speed Limit Evaluation, March 12, 2020). The effort included collaboration with the city of Minneapolis as well as other internal and external partners including the City Attorney's office, St. Paul Police, City Planning and Economic Development, MnDOT, Ramsey County, Metro Transit, and various other Public Works Divisions. Based on their efforts, the city established that principal and minor arterial streets are major streets and speed limits will generally be set at 25 mph. However, they were also evaluated to determine if a higher limit is appropriate based on the "context and design." Collector streets were also identified as major streets and would generally be 25 mph. However, collector streets were also evaluated to determine if a lower limit was appropriate, again based on "context and design." Local streets were considered to be minor streets and speed limits were set at 20 mph, however they were also evaluated to determine if a higher speed limit was appropriate.

City of St. Louis Park:

The City of St. Louis Park also took the approach of implementing the category speed approach limits. When the Minnesota State Statute was changed the public and city council pressured the engineering staff to make a change. One thing that St. Louis Park did that other cities did not, is when they went to pass the ordinance, they had their research and recommendation already done. Once the city passed the ordinance, the council recommended that the engineering staff evaluate in more detail some specific locations. They took an extremely data heavy approach for evaluation. The city evaluated their speed data and their crash data. The traffic study that they conducted evaluated the medium, average, and 85th percentile of all their streets and then they broke it down by low, medium and high traffic roads. They also looked at what they had set forth in their 2040 comprehensive plan national standards and the speed limit goal they have for the city. After evaluating all these criteria, they recommended speeds of 20 mph on local neighborhood streets, 25 mph on connecting streets, and 30 mph on select streets/segments. After speed change is fully implemented, a traffic speed study will be conducted to evaluate the effects of the new speed change.

City of St. Anthony Village

St. Anthony Village adopted a city-wide speed limit of 25 mph on local streets. Because St. Anthony borders Minneapolis, city officials faced pressure from the public and elected officials to review their speed limits. It was decided that 20 mph (adopted by Minneapolis) was too slow so the city adopted a citywide 25 mph limit. The city changed and updated speed limit signs and added gateway signs to notify drivers as they enter the city limit.

City of Falcon Heights

The City of Falcon Heights also adopted a city-wide speed limit. After analyzing past speed studies, the city concluded that they didn't have a speed issue. However, pressure from the council resulted in a speed limit change anyway. The engineering staff employed state statute Section 169.14, Subd. 2.7b., which allowed them to change their local streets to 25 mph without conducting an engineering study or establishing a process. The city installed regulatory speed limit signs at gateways and key entry points into the city. This approach was appealing to the city because it was an easy and inexpensive option.

City of Shoreview

The City of Shoreview has taken the approach of leaving their speed limits the same. Unlike St. Paul and Minneapolis, speed limits in Shoreview were developed much more recently so they have implemented design and layouts that are reflected in the speed limit that is posted. The staff collected traffic speeds around the city and found that the 85th percentile was in the 22-28 mph range. On top of the design factors, the City of Shoreview has a good deal of speed and crash data that reinforces the decision to keep their local speed limit 30 mph. The council also looked at the two other options of setting city-wide speed limits or a category approach. On the advice of the engineering staff the council decided not to change any of the local speed limits.

City of Edina

Edina adopted a city-wide speed limit of 25 mph on local streets. This initiative is part of a comprehensive strategy to address speeding and pedestrian safety. It will complement other efforts including minimizing roadway widths, constructing new multi-modal infrastructure and improving pedestrian crossings where warranted.

Seattle Department of Transportation: Speed Limit Case Studies

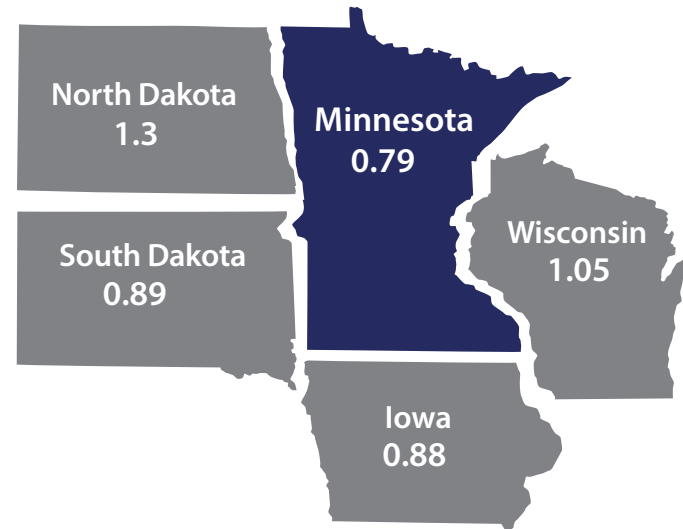
Article Summary: The Seattle Department of Transportation evaluated how placing speed limit signs closer together and changing the speed limit effected speeds. The SDOT evaluated five locations throughout Seattle. Before the change the speed limit was set to 30 mph and signs were spaced out 1 to 1.5 miles apart. At the new locations the speed was changed to 20 mph spaced at ¼ mile intervals. The SDOT estimate that cost of the sign installation is about \$4,000 to \$5,000 per mile; this cost includes design, materials and labor. The results from the study showed that there was a significant reduction in 40+ mph speeds. The next steps were to continue to implement the speed limit reduction and have new speed limits done by May 2021.

APPENDIX C: RESEARCH FACT SHEETS

Fatal Ped-Bike Crash Rates Surrounding States 2021-2018

Highlights

- During the period 2010 through 2018, Minnesota averaged **45** fatal Ped + Bike crashes per year.
- Normalized for population, this results in Minnesota having a fatal Ped + Bike crash rate of **0.79** fatal Ped + Bike crashes per 100,000 population.
- The states that border Minnesota – North Dakota, South Dakota, Iowa and Wisconsin have fatal Ped + Bike crash rates that range from **0.88 to 1.3/100,000** population.
- The fatal Ped + Bike crash rates in the surrounding states are **11- 64%** higher than the rate in Minnesota.
- It's also important to note that every one of these surrounding states has a statutory urban speed limit (**25 mph**) that is lower than Minnesota's (**30 mph**).
- The fact that all the surrounding states have lower urban speed limits and higher Ped + Bike fatality rates suggests that it is **NOT** reasonable to expect that lowering urban speed limits in Minnesota will be effective in reducing our Ped + Bike fatality rate.



Year	MN	Iowa	N. D.	S. D.	Wis.
2010	44	26	23	13	64
2011	44	30	11	8	67
2012	47	24	6	2	60
2013	39	24	1	7	48
2014	21	23	15	11	48
2015	52	32	8	7	73
2016	66	34	12	8	63
2017	44	30	6	10	68
2018	51	29	8	10	60
Total	408	252	90	76	551
Average	45	28	10	8	61
Population	5.7 M	3.2M	0.8M	0.9M	5.9M
Rate	0.79	0.88	1.3	0.89	1.05

1. Fatal Ped+Bike Crashes/100,000 Population

Serious Ped & Bike Crashes (2016-2020) in Minnesota – A Perspective

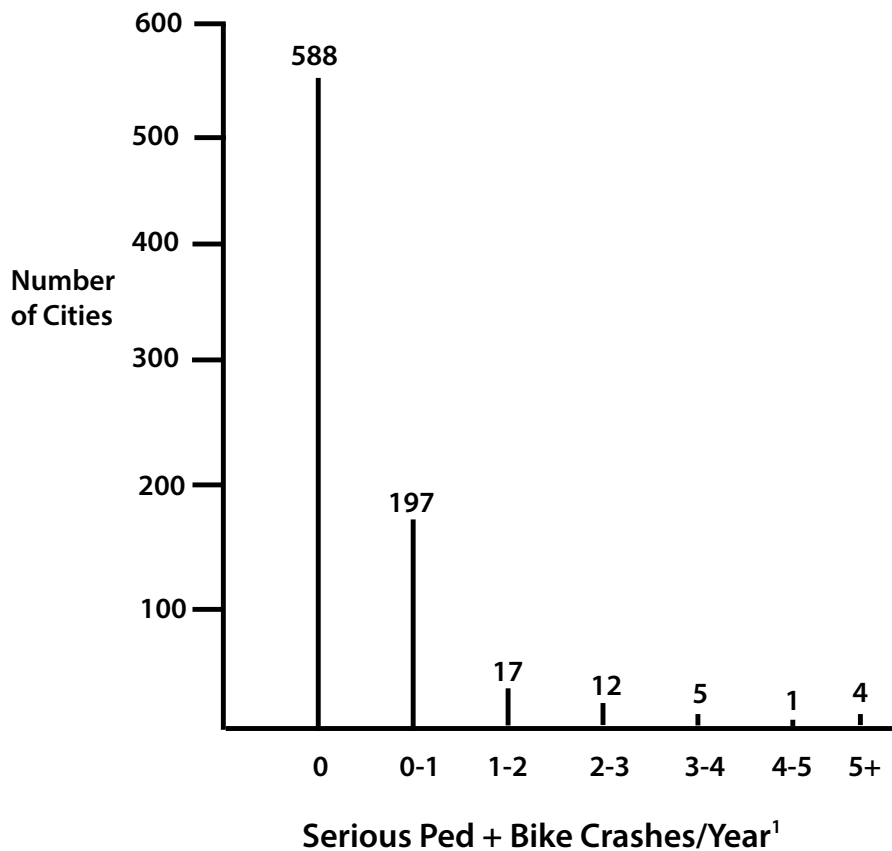
System	Fatal Crashes	Serious Crashes	Serious Speed Related	Serious Ped & Bike	Serious Speed Related Ped & Bike	Miles
State	816	2,641	647	255	17	
5 year Total	163	528	129	51	3	11,846
Annual Density	0.01	0.04	0.01	0.004	0.0003	
County	616	3,406	695	390	19	
5 year Total	123	681	139	78	4	44,958
Annual Density	0.003	0.02	0.003	0.002	0.00008	
City	228	2,298	482	765	30	
5 year Total	46	460	96	153	6	22,373
Annual Density	0.002	0.02	0.004	0.007	0.0003	
Total	1,763	8,966	2,014	1,466	70	
5 year Total	353	1,793	403	293	14	142,976
Annual Density	0.002	0.01	0.003	0.002	0.0001	

Highlights

- Minnesota's Strategic Highway Safety Plan (SHSP) has adopted serious crashes (Fatal + A Injury) as the State's Safety Performance measure.
- The SHSP documents the results of a data driven analysis of crashes and identifies crashes involving Pedestrians and Bicyclists in a comprehensive list of Safety Focus Areas since these crashes account for approximately **16%** of all serious crashes.
- More than **50%** of serious Ped + Bike crashes occur on city streets. However, it should be noted that these crashes are rare – the crash density is **0.007** Serious Ped + Bike crashes/miles/year.
- Speed related Ped + Bike crashes are even rarer – law enforcement cited speed as a contributing factor in only **4%** of Serious Ped + Bike crashes.
- Cities with a population over **5,000** typically have about **200** miles of city streets. With the crash densities noted in the table, typical cities can expect **1.4** serious Ped + Bike crashes per year and one serious speed related Ped + Bike crashes every **16** years.

Note: Crash numbers in the columns do not add up to the values shown in the bottom row – the few crashes along almost 64,000 miles of township roads were omitted in order to simplify the table.

Distribution of Serious (K+A) 2011-2020 Ped + Bike Crashes



Highlights

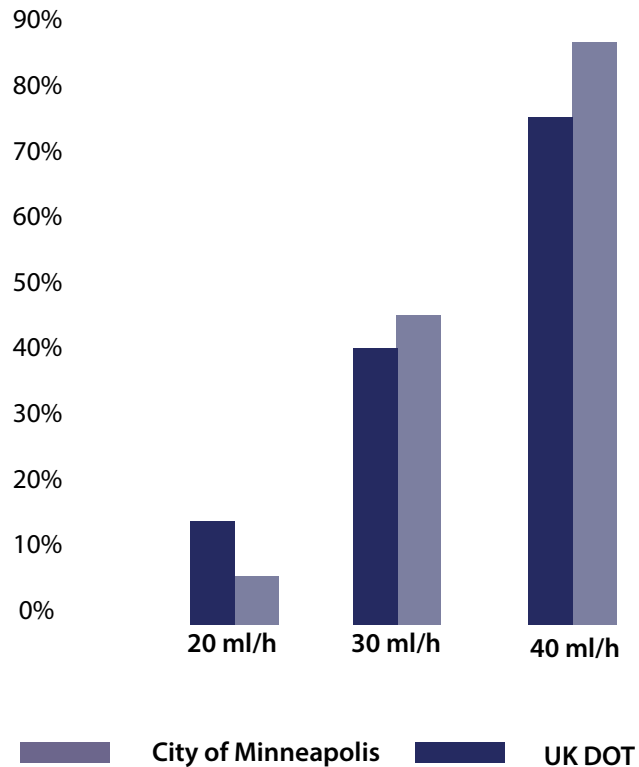
- During the 10-year period 2011 thru 2020 there were a total of 2,282 serious (fatal + serious injuries) crashes involving pedestrians and bikes.
- The 2,282 serious Ped + Bike crashes account for approximately 15% of all serious crashes during that 10-year period.
- The majority of all serious crashes occur on rural roads in greater Minnesota. However, practically all (99%) of serious Ped + Bike crashes occur in cities.
- Serious Ped + Bike crashes are not evenly distributed among Minnesota's 856 cities.
 - 588 cities (69%) had no serious Ped + Bike crashes.
 - 197 cities (23%) had an annual average between zero and one serious Ped + Bike crashes.
 - 67% of serious Ped + Bike crashes occurred in the Minneapolis – St. Paul Metro area.
 - Four cities – Duluth, Rochester, St. Paul, and Minneapolis accounted for 40% of all serious Ped + Bike Crashes.
 - Two cities - St. Paul (250) and Minneapolis (580) accounted for 36% of all serious Ped + Bike Crashes.

1. See Appendix. ____ for the city by city listing of serious Ped + Bike crashes.

Speed & Speed Limit Facts/Myths – Highlights

Fatalities Based on Speed of Vehicle

A pedestrian's chance of death if hit by a motor vehicle



MnDOT Speed Zoning Studies

Study Location	Before	After	Change +/- MPH	85% Before After	Change MPH
TH 65	Speed Limit 40	Speed Limit 30	-10	34 34	0
TH 65	Speed Limit 50	Speed Limit 40	-10	44 45	+1
Anoka CSAH 1	Speed Limit 45	Speed Limit 40	-5	48 50	+2
Anoka CSAH 24	Speed Limit 30	Speed Limit 45	+15	49 50	+1
Anoka CSAH 51	Speed Limit 40	Speed Limit 45	+5	45 46	+1
Hennepin CSAH 4	Speed Limit 50	Speed Limit 40	-10	52 51	-1
Noble Ave	Speed Limit 30	Speed Limit 35	+5	37 40	+3
62nd Ave N	Speed Limit 35	Speed Limit 30	-5	37 37	0
Miss. St.	Speed Limit 30	Speed Limit 35	+5	39 40	+1

- It appears that supporters of lowering urban speed limits in Minnesota justify their actions based on one fact and one myth.
- Research supports the notion that collisions with Peds and Bikes are usually less severe at lower impact speeds (see nearby bar chart).
- The key point is the speeds indicated in the chart **are** impact speeds (as determined by crash reconstruction) and **not** speed limits.
- The myth is that simply changing the numbers on a regulatory sign or adopting lower urban speed limits has ever resulted in a significant number of drivers reducing their operating speed.
- In fact, the research is absolutely consistent- not a single case is documented where lowering posted speed limits has successfully changed driver behavior.

Speed & Speed Limit Facts/Myths – Highlights

Insurance Institute for Highway Safety Speed Study - Boston, MA

Speed	Before 30 MPH Limit	After 25 MPH Limit	Change
50 th percentile	24.8	24.8	0
85 th percentile	31.0	31.0	0
+25 MPH	47.9%	46.9%	-2%
+30 MPH	18.2%	18.1%	-0.5%

The FHWA conducted a national study with over 100 sites in 22 states where speed limits were changed by 5 to 20 mph. The report concluded that differences in actual speeds were less than 2 mph and were NOT related to the amount the posted speed limit was changed.

Over the years, MnDOT has conducted a number of experiments in the Minneapolis-St. Paul Metro area. In each case, local governments requested changing the speed limit and, in each case, MnDOT agreed to a temporary change, to conduct periodic speed surveys and offered local agencies the opportunity to apply as much enforcement as they saw fit.

The results of the speed surveys (see table) show that 85% speeds were virtually unchanged, and it was concluded that merely changing the number on the regulatory signs did **NOT** change driver behavior.

Speed Profile on Local Streets Wisconsin Vs. Minnesota

Roadway Width	Average 85% percentile Speed (MPH)	
	River Falls, WI	Woodbury, MN
Feet		
30	32	32
32	33	32
36	31	34
40	34	34
42	34	36

Two studies were found that document the effect of lower city wide urban speed limits.

- The Insurance Institute for Highway Safety documented the effect of Boston, MA lowering their urban speed limit from 30 mph to 25 mph. The study (see nearby table) found that changing the speed limit had **NO** effect on driver behavior - the average speed (25 mph) and 85th percentile speed (31mph) did **NOT** change.
- A speed study was conducted on local streets in Woodbury, MN (statutory 30 mph limit) and River Falls, WI (statutory 25 mph limit). (See nearby table) The results indicate that average 85th percentile speeds are similar despite the different statutory speed limit.

Speed & Speed Limit Facts/Myths – Highlights

Characteristics of Serious (Fatal + Serious Injury) Ped+Bike Crashes

Serious Ped+Bike Crashes

	Total	TH.	Co.	MSA	Municipal
Total	2,389	419 18%	694 28%	613 26%	441 18%
At Intersection	1,235 52%	177 42%	358 52%	380 62%	230 52%
At Signal	591 47%	108 61%	209 58%	185 49%	39 17%
At Stopsign	300 24%	23 13%	69 19%	89 23%	101 44%
Fail to Yield	242 11%	24 6%	69 11%	77 14%	46 12%
Distracted	168 8%	37 9%	56 9%	39 7%	29 7%
Careless/ Reckless	120 5%	18 4%	33 5%	18 3%	32 8%
Fail to Obey Signal/Sign	10 1%	1 0.2%	1 0.2%	3 0.6%	4 1%
Speeding	29 1%	10 2%	4 0.6%	7 1%	4 1%
Mileage	141,957	11,678 8%	44,589 31%	3,734 3%	19,222 14%
Serious Crash Density	0.0018	0.0037	0.0016	0.017	0.002

In Minnesota, all crashes involving fatalities and injuries are investigated by law enforcement officers and injury results are documented in crash reports that are submitted to the Department of Public Safety.

Information documented in crash reports includes: location, date/time, level of injury for those involved, physical condition for those involved, roadway condition and characteristics, actions of drivers/peds/bikes and presence of traffic control devices.

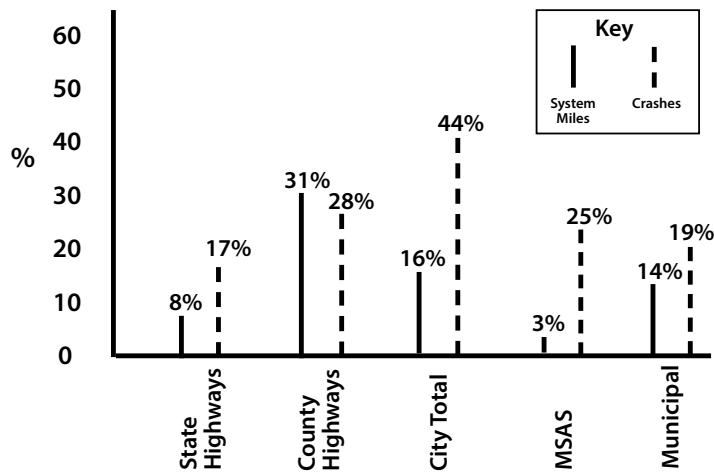
During the 10-year period 2011 through 2020 there was a total of 2,491 serious (Fatal & Serious Injuries) Ped & Bike crashes of which 2,389 occurred on public streets/roads/highways. (The remaining crashes occurred off system - primarily in private parking lots).

A review of Minnesota's crash records system revealed the following facts about characteristics and factors associated with serious Ped+Bike crashes.

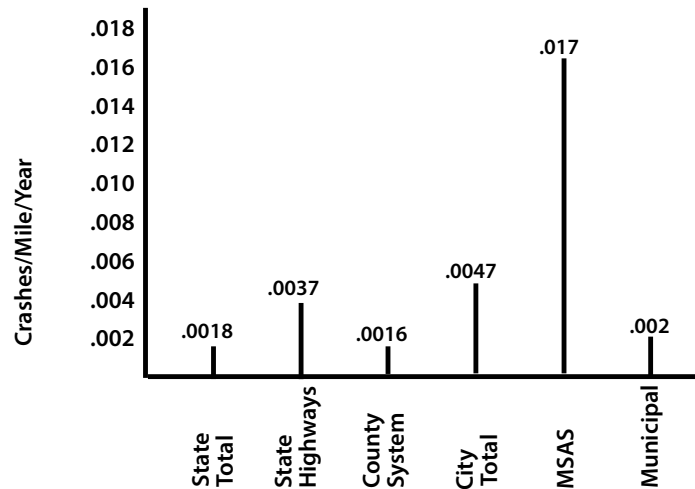
- A plurality of serious Ped+Bike crashes occur on city streets (44%) and a majority of these occur on the Municipal State Aid (MSA) system.
- One-half of serious Ped+Bike crashes occur at intersections and the range is 42% along highways to 62% along the MSA system.
- Of the intersection related crashes, 47% are controlled by traffic signals (61% for highways and 17% for municipal streets) and 24% by STOP signs (13% for highways and 44% for municipal streets).

Characteristics of Serious (Fatal + Serious Injury) Ped + Bike Crashes

Distribution of Serious Ped+Bike Crashes by System



Serious Ped+Bike Crash Density



HIGHLIGHTS

The investigations of the serious Ped+Bike crashes reported that in more than one half of these crashes no particular action by the drivers involved could be identified that clearly contributed to the crash. For the remaining crashes, the most common actions by drivers that did contribute to serious Ped+Bike crashes includes:

- Failure to yield** - 11% (6% on highways to 14% on MSAS)
- Distracted** - 8% (7% on city streets to 9% on county roads)
- Careless/reckless** - 5% (3% on MSAS to *% on muni-streets)
- Failure to obey signal/sign** - 1% (0.2% on highways to 1% on muni-streets)
- Speeding** - 1% (0.6% on county roads to 2% on highway)

Contributing factors were reviewed for serious Ped+Bike crashes in Minneapolis and St. Paul because these two cities account for 36% of all Ped+Bike crashes and they are leading the initiative to lower urban speed limits. The results in Minneapolis and St. Paul closely match the statewide distribution - fail to yield and distracted were the two most common driver behaviors. However, speeding was twice the statewide average - 2% in each city.

Serious Ped+Bike crashes are not evenly distributed across Minnesota’s system of highways and streets. A plurality of serious Ped+Bike crashes occur along city streets (44%) and more than one-half of these crashes occur along the MSA system.

To account for differences in mileage among the different roadway jurisdictions, crash density was computed (serious Ped+Bike crashes/mile/year). City streets have a higher crash density (0.0047) than state highways or county roads, and the fraction of city streets on the MSAS have the highest crash density (0.017), which is more than nine times the statewide total.