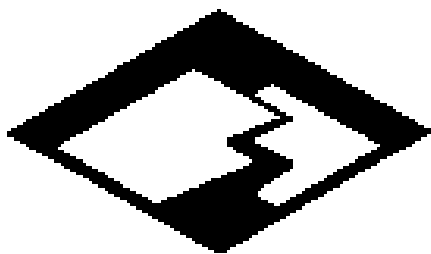


2012

Setting Speed Limits- A Guide for Vermont Towns



Vermont Local Roads
Saint Michael's College
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Special thanks to the following people who made substantial contributions to the production of this handbook and to the 1994 videotape "Setting Speed Limit".

Sally Collopy, (Retired), Vermont Local Roads Program

Hank Lambert, (Retired), Vermont Local Roads Program

Douglas F. Brink, (Retired), Traffic and Safety Division, Vermont Agency of Transportation

Loren B. Fraser, (Retired), Traffic and Safety Division, Vermont Agency of Transportation

Robert "Dick" Keene, (Retired), Traffic and Safety Division, Vermont Agency of Transportation

Nancy Avery, Roadway, Traffic and Safety Division, Vermont Agency of Transportation

David F. Antone
Director
Vermont Local Roads Program
St. Michael's College, Box 260
One Winooski Park
Colchester, VT 05439

We work to foster a safe, efficient, and environmentally sound surface transportation system by improving the skills and knowledge of the municipal transportation workforce and leaders.

- Vermont Local Roads Mission Statement

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Introduction

State law and the Manual on Uniform Traffic Control Devices (MUTCD) regulate the procedures for establishing effective and enforceable speed limits. Title 23 V.S.A. Section 1007 authorizes the local governing body to establish effective and enforceable speed limits on town highways at not more than 50 MPH or less than 25 MPH and to do so on the basis of a traffic engineering investigation or study. This provision mandates that any speed limit must be justified and reasonable, based on the conditions that prevail on the particular road or street being considered. Refer to page 29 of this handbook for the text of 23 V.S.A. Section 1007.

This handbook is a guide to be used by Vermont municipal officials in setting reasonable and safe speed limits on town roads and streets. Together with the ten-minute videotape entitled "Setting Speed Limits", this handbook provides the basic information necessary to set speed limits on municipal roads and streets.

Assistance Available

Vermont Local Roads
Saint Michael's College
1 Winooski Park, Box 260
Colchester, VT 05439
1-800-462-6555

Vermont Agency of Transportation
Roadway, Traffic and Safety
One National Life Drive
Montpelier, VT 05633-5001
1-802-828-2664

(The Traffic and Safety Division may be able to print out spot speed study information for towns who send in their raw data. Call the Traffic and Safety Division for information first.)

Check with the staff of your regional planning commission who may be able to assist.

Principles for Setting Speed Limits

There are basically two principles for setting speed limits to achieve reasonable and safe speeds.

The first is to protect the public and curb unreasonable behavior. Motorists should have some assurance that the risk of having an accident is low on that particular road or street if they obey the speed limit.

Of course, operators have responsibilities. They should drive at speeds that are reasonable and proper for the prevailing conditions such as snow and ice, fog, darkness, heavy traffic, and so on. Speed limits tell the motorist what the maximum speed is. Drivers should use common sense and drive according to the prevailing conditions and surroundings. They also must heed other traffic control devices such as black/yellow warning signs, pavement markings, flashing beacons, and so on.

Second, to effectively enforce a law, the public must believe that the law is reasonable. Local officials should not set a uniform speed limit for all roads and streets, nor should they succumb to pressure by residents to lower speed limits. The random installation of signs and speed limits can be detrimental to safety by breeding disrespect for all speed limits. The majority of motorists will drive at a speed that they perceive to be safe. In the absence of a study identifying that speed limit, setting a speed limit too low merely punishes motorists who otherwise obey the law. Studies indicate that the measured average speed that most drivers perceive safe is at or very close to the speed limit established by a traffic engineering study.

Gravel roads are particularly difficult to assess. They typically do not exhibit the same characteristics as paved roads. Most are more narrow, have more horizontal and vertical curves and are not as heavily traveled as paved roads. One school of thought is not to set a speed limit at all due to the difficulty in assigning a uniform speed limit. Residents often oppose this concept. Each situation should be thoroughly investigated and scrutinized before assigning a speed limit.

Conducting a traffic engineering study provides information for basing judgments on facts and not on guesses or political pressure.

Recommended Practice

A traffic engineering study allows you to carefully consider the characteristics of each road, its surrounding features, and other factors. You then have the information you need to make a reasonable judgment in assigning a speed limit that is "reasonable and safe."

Conducting a traffic engineering study does not mean you have to be an engineer. But you do have to investigate the conditions. The following criteria comprise the minimum requirements for a traffic engineering study.

Only three forms are necessary. All can be copied. Use the "Traffic Engineering Report" on page 22 for items one through six. Use the "Spot Speed Study Field Data Sheet" on page 24 and the "Spot Speed Study Summary" on page 26 for item 2, monitoring vehicle speeds.

1. Consider the road itself, such as the characteristics of the travel surface, the condition of the shoulder, the road's alignment and sight distance, the width of the road and shoulders and the number of lanes.

Determine the presence of passing zones.

Determine the maximum grade and the degree of critical curves. Steep roads and sharp curves usually require slower speeds.

Consider what motorists might do if you lowered the speed limit because of the presence of a hazard. Would this create a situation where motorists would risk passing slow moving vehicles, for example, thus creating greater danger?

As you travel the road, look for these and other characteristics and record the information on the "Traffic Engineering Report" form.

2. Monitor the speed at which vehicles are traveling. Do this by performing a spot speed study and recording the speeds on the "Spot Speed Study Field Data Sheet." This consists of monitoring a minimum of 100 vehicles and identifying that speed under which most (85%) vehicles are traveling. (Surveying exactly 100 vehicles makes it easier to calculate percentages.) Experience has shown that a posted speed limit near this value is safe and reasonable.

On low volume roads, instead of gathering a sample of 100 vehicles, you might use several time runs and estimate the speed. In fact, the Vermont Agency of Transportation suggests that obtaining the 85th percentile speed on low volume roads may not be practical. It may require too much time to obtain a significant sample.

Another method is to determine the pace speed to obtain the 85th percentile speed. It is the ten mile-per-hour band of travel speeds containing the largest number of observed vehicles. See the explanation on page 25.

3. Look for roadside development and culture. Is it a densely residential area? A commercial area with many driveways entering the highway? A school zone? A trailer park? Or is it rural farmland? Considering the type and the density of development along the road will help you to decide what is a reasonable and safe speed for those conditions. Record the information on the form.
4. Determine the safe speed for curves or other hazardous locations within the zone, such as intersections.

You can determine the advisory speed for a curve by driving the section in a conventional automobile. Make several passes along the centerline of the travel lane at constant speeds, increasing the speed by 5 mph on each pass. Select the speed that allows you to negotiate the curve safely and comfortably, without excessive braking or feeling a concern for safety. If you find you are leaning in the seat while negotiating a curve, it is an indication you are going too fast.

The Vermont Agency of Transportation sometimes uses a ball bank indicator, also known as a slope meter, to determine the advisory speed of a curve. They cost about \$200.

Use the following chart to determine the maximum safe speed for approaching an intersection based on stopping sight distance.

HIGHWAY CONDITIONS (THREE OR MORE MUST BE SATISFIED)				
Design speed (mph)	Minimum Length of Zone Equals or Exceeds (miles)	Average Distance Between Intersections Equals or Exceeds (feet)	Number of Roadside Businesses does not Exceed (per mile)	PRELIMINARY
				ESTIMATE OF MAXIMUM SPEED (mph)
20	0.2	no min	no max	20
30	0.2	no min	no max	30
40	0.3	125	8	40
50	0.5	250	6	50
60	0.5	500	4	60
70	0.5	1000	1	70

Use a black on yellow advisory speed plate placed below the warning sign to indicate the safe speed. The advisory speed plate cannot be the same or higher than the posted speed limit.

5. Record the parking practices and pedestrian activity in the area. Record whether parking is on the roadway or off street. Is parking controlled by signs or markings or meters?

Make a note about pedestrian activities. Higher pedestrian activity may require a lower speed.

6. Record the reported accident experience for a recent twelve month period. High accident experience may indicate a need to moderate the speed limit. Consider, however, that accidents are caused by other contributing factors such as turning movements, intersections, DWI, ice and snow, and the like.

On the "Traffic Engineering Report" form, note any other features that may influence traffic movement.

Determining the Speed

With the data you have collected, you can determine a proper speed for the road under consideration. A reasonable and safe speed will give a driver time to react and stop or slow down sufficiently to avoid potential conflicts while driving at a comfortable speed. You can test for the proper speed by driving the road section at constant speeds, increasing the speed by 5 mph on each pass. This is similar to testing for safe speeds on low volume roads.

Towns sometimes tend to set speed limits too low. This merely creates more speeders, since the majority of motorists drive at speeds they perceive to be safe. Speeds set too low can also create more, and sometimes dangerous, passing. Many people will strictly obey the speed limit regardless of whether it is too slow for the majority of drivers.

Generally speaking, the Vermont Agency of Transportation's Traffic and Safety Division does not recommend setting speed limits on Class 3 gravel roads. Most people tend to drive on gravel roads at speeds slower than what towns might set them.

The traffic engineering survey is a reasonable method for helping you make an informed decision about the proper speed for a particular road. No one of the criteria by itself determines "reasonable and safe". To make an informed decision, consider all the criteria.

Adopting a Traffic Ordinance

Once you have decided the speed limits for your streets and highways, the next step is to adopt an ordinance, making speed limits official municipal policy.

A traffic ordinance establishes speed limits and other traffic regulations (STOP, YIELD, parking, etc.) as municipal policy. (Refer to 23 V.S.A. Sections 1007 and 1008, and 24 V.S.A. Section 2291(4).) The ordinance makes the speed limits and other traffic regulations a matter of local law and therefore enforceable. A traffic ordinance can be passed by the local governing body unless petitioned by at least 5% of the people, in which case a vote of the townspeople is also required.

Provisions for passing an ordinance are in Title 24 V.S.A., Section 1972. Follow them carefully. People who challenge speed limits in court often question the procedures the town followed, especially whether the town conducted a traffic engineering study and whether the town followed all the steps in adopting the ordinance.

The traffic ordinance should describe the speed zone accurately. This can be done by referring to a town map, stating a distance from the beginning point to an identifiable point such as an intersection or town line, as well as the direction and distance to the end of the zone. Several speed zones of the same or of different limits may be included in one ordinance. Amendments to the ordinance can be made as the needs arise. Make sure to record the completed traffic study forms and the ordinance in the permanent town records. However, the lack of evidence of a traffic engineering study will not invalidate a local speed limit ordinance as adopted or amended under V.S.A. Title 23 Motor Vehicles 1007 Local Speed Limits, after 5 years following the day on which the speed limit ordinance took effect.

The following model suggests what might be contained in a municipal traffic ordinance. A town should produce an ordinance that reflects its own unique conditions.

A Model Traffic Ordinance

TRAFFIC ORDINANCE

Town of _____, Vermont

Pursuant to the provisions of Title 23, Vermont Statutes Annotated, Section 1007 and 1008, and Title 24, Vermont Statutes Annotated Sections 1971 and 2291(1)(4) and (5), and such other general enactments as may be material hereto, it is hereby ordained by the Board of Selectmen of the Town of _____ that the following Traffic Ordinance is adopted for the Town of _____, Vermont.

ARTICLE I DEFINITIONS

The definitions of Title 23, Vermont Statutes Annotated, Section 4 are incorporated by reference.

ARTICLE II SCOPE

The ordinance establishes special traffic regulations on public highways within the Town of _____, Vermont.

ARTICLE III TRAFFIC CONTROL DEVICES

- Section 1.** It shall be unlawful for any person to disobey the direction of a traffic control device except in response to the direction of a law enforcement officer.
- Section 2.** It shall be unlawful for any person to intentionally remove, injure, obstruct, deface, alter or tamper with any traffic control device.
- Section 3.** It shall be unlawful for any person to install any sign or device which may resemble or be mistaken for an official traffic control device, without prior approval of the Town of _____, Board of Selectmen.

**ARTICLE IV
SPEED REGULATIONS**

On the basis of engineering and traffic studies, the following speed limits are hereby established.

- T.H. #1 - A maximum speed of 25 m.p.h. from the intersection of VT. Route _____ easterly to the intersection of T.H. #2, then a maximum speed of 40 m.p.h. from the intersection of T.H. #3 easterly and southerly to the _____Town Line.
- T.H.#2 - A maximum speed of 35 m.p.h. from the intersection of VT. Route _____ to the _____Town Line.
- T.H.#3 - A maximum speed of 35 m.p.h. from the intersection of T.H.#1 to the _____Town Line.
- T.H.#4 - A maximum speed of 35 m.p.h. for the entire length.
- T.H.#6 - A maximum speed of 35 m.p.h. from the intersection of VT. Route _____ to the _____Town Line.
- T.H.#7 - A maximum speed of 30 m.p.h. from the intersection of VT. Route _____ to the _____Town Line.
- T.H.#8 - A maximum speed of 30 m.p.h. for the entire length.
- T.H.#16 - A maximum speed of 35 m.p.h. from the intersection of T.H.#20.
- T.H.#26 - A maximum speed of 30 m.p.h. for its entire length.
- T.H.#31 - A maximum speed of 25 m.p.h. from the intersection of Vt. Route _____, extending easterly a distance of 0.83 miles east of Vt. Route _____, to intersection of T.H. #1

The above speed limits shall be posted in accordance with the standards set forth in the Manual of Uniform Traffic Control Devices and shall be in effect when so posted.

**ARTICLE V
STOP AND YIELD INTERSECTIONS**

- Section 1.** The following intersections shall be designated is stop intersections and shall be so signed:
 - T.H. #4 entering T.H. #3
 - T.H. #16 entering T.H. #3
 - T.H. #18 entering T.H. #3
 - T.H. #24 entering T.H. #3

- Section 2.** The following intersections shall be designated as "YIELD" intersections and shall be so signed:
 - T.H. #3 entering T.H. #1
 - T.H. #4 entering T.H. #1
 - T.H. #28 entering T.H. #4

**ARTICLE VI
PARKING REGULATIONS**

- Section 1.** It shall be unlawful to park at any time on either side of T.H. #1 from the intersection of Vt. Route _____ easterly for a distance of forty-five (45) feet.
- Section 2.** It shall be unlawful to park on the south side of T.H. #1 from a point two hundred fifteen (215) feet east of Vt. Route _____ easterly to the covered bridge.
- Section 3.** It shall be unlawful to park at any time on T.H. #24 between the intersection of Vt. Route _____ and the _____ town line.
- Section 4.** It shall be unlawful to park on T.H. #1 between the intersections of Vt. Route _____ and the covered bridge, and within any municipal parking lot between the hours of 12:00 P.M. and 7:00 A.M. from November 15th to April 30th.
- Section 5.** Any vehicle parked in violation of the provisions of this Article may be summarily removed at the owner's expense, by order of any law enforcement officer, road commissioner, or selectman.
- Section 6.** If the owner of a vehicle summarily removed under section 5 hereof does not claim such vehicle and pay all towing and storage expenses within thirty (30) days of the date of such removal, the title to such vehicle shall escheat to the Town and the vehicle may be sold or otherwise disposed of in accordance with Title 27, Vermont Statutes Annotated, Section 11.
- Section 7.** Nothing in this Article shall be construed to make unlawful vehicular stops in obedience to the direction of a law enforcement officer or for causes beyond the control of the operator.

**ARTICLE VII
DESIGNATED ONE-WAY STREETS**

The following street or portion of said street is hereby designated as a one-way street and the direction of travel shall be as follows.

_____ Street: Legal direction of travel, from intersection of _____ Street and Vermont State Highway Route No. _____ shall be south to the intersection of _____ Street and _____ Street.

_____ Road: Legal direction of travel, from intersection of _____ Road with _____ Road, shall be west to the intersection of _____ Road with _____ Road.

**ARTICLE VIII
LOADED VEHICLES**

No vehicle shall be driven or moved on any street unless such vehicle is so constructed or loaded so as to prevent its contents from dropping, sitting, leaking or otherwise escaping there from.

**ARTICLE IX
GENERAL PROVISIONS**

Section 1. Separate Offenses:

Each violation of a provision of this ordinance shall be deemed a separate offense.

Section 2. Penalties:

The provisions of this ordinance shall be cumulative to the fullest extent permitted by law with respect to all other statutes or ordinances now or hereafter adopted regardless of their order of passage or enactment.

Section 3. Severability:

The provisions of this ordinance are declared to be severable and if any provisions hereof be adjudged invalid such judgment shall not affect the validity of any other provisions.

Section 4. Designation:

This ordinance may be referred to as the _____ Traffic Ordinance and in a prosecution hereunder a copy of such ordinance, certified by the Town Clerk shall be prima facie evidence thereof. An allegation that the act constituting the offense charged is contrary to a specified provision of this ordinance shall be a sufficient reference hereto.

Section 5. Repeal of Prior Ordinances:

Any other ordinance or traffic regulation heretofore adopted by the Town of _____ is hereby repealed.

Section 6. Publication and Posting:

This ordinance shall be published in the _____ on _____, 20____ and shall be filed with the _____ Town Clerk on _____, 20____.

Adopted by the Board of Selectmen, Town of _____ at its meeting held on the _____ day of _____, 20____.

QUESTIONS OFTEN ASKED ABOUT LOCAL SPEED LIMITS

Q. Should the local ordinance be approved by the State Traffic Committee?

A. No. Title 23 V.S.A., Section 1007, provides an avenue of appeal if there is dissension over the adoption process.

Q. Can a single speed limit, for example 35 MPH, be established for all the roads in town and posted at each highway entering the town?

A. It is doubtful that an engineering and traffic study would indicate that any one speed limit would be proper for all highways in a town. Signing only at the town line does not fulfill the mandate of the law for posting speed limits.

Q. What is wrong with installing a few signs where they are needed for whatever good they can do without enforcement?

A. This does not conform to the law and it will breed disrespect for all speed limits. An enforcement officer who cites someone on the assumption that a speed zone is valid will be embarrassed when trying to prove the case in court. The officer will be reluctant to enforce local regulations further.

Q. When is a traffic engineering study required?

A. To lower or raise existing speed limits. A study is not required to initially establish a 50-mph zone.

Q. Do we have to hire a professional engineer to do the study?

A. No. Anyone can gather the information needed.

Q. What if the selectmen receive a petition from a significant number of residents demanding a speed limit in a certain area?

A. The law states that the speed limit must be based on an engineering and traffic study. A petition may result in a survey, but the decision to establish a speed limit must be based on the results of the study, not the opinion of the petitioners.

Q. Should the speed limit be set 5 or 10 mph below what the investigation indicates to make up for the tolerance allowed by enforcement officers?

A. No. The statutes do not provide for a tolerance. A speed limit set too low is not realistic and will not command the respect of motorists.

Q. Should towns install speed limit signs on all of their town highways?

A. Probably not since the minimum/maximum speed limits are 25 mph and 50 mph respectively. A speed limit of 25 mph might be too high for most class 4 town highways and some class 3 town highways. By the same token, 50 mph signs on gravel town highways would suggest it is safe to drive at that speed when, in fact, it might not be.

Q. Are advance signs such as “Reduced Speed Limit Ahead” signs required on the approach to the speed limit zone?

A. No. Such signs are not required, but they are recommended where the speed limit is being reduced by more than 10 mph, or where engineering judgment indicates the need for advance notice to comply with the posted speed limit.

Q. Should a speed limit be set at the safe speed for the worst spot in the proposed zone?

A. No. A spot hazard such as a sharp curve or intersection should be treated with the appropriate warning sign for the particular hazard. The warning sign may or may not include an advisory speed plate. An established speed limit is not a guarantee that the speed can be maintained throughout the zone. It is a speed that will allow the driver time to react to a variety of situations which may occur within the zone.

Q. How does a town go about making a change in speed limits on state highways?

A. The governing body of the community (Town Administrator, Town Manager, Selectboard, etc.) should write a letter to the Traffic Committee Coordinator, State of Vermont, Roadway, Traffic & Safety, One National Life Drive, Montpelier, VT 05633-5001 requesting a speed limit change indicating the route, the exact location, and citing their reasons for the change. A copy of the letter should be sent to the District Transportation Administrator. Staff of the State’s Traffic Committee will conduct a traffic and engineering study of the location and present their findings to the Traffic Committee at an open meeting, in which the Town will be notified and invited, to present their testimony before a ruling is determined.

SIGNS

1. Postings Signs

Title 23 V.S.A. Section 1025 adopts the MUTCD as the standard for all traffic control signs, signals, and markings on town highways in Vermont. The MUTCD lists basic requirements for signs, signals and markings to be effective. They must

- fulfill a need
- command attention
- convey a clear, simple meaning
- allow adequate time for a proper response

Basic suggestions for the selection and use of signs are:

- Use approved signs (size, shape, colors, text)
- Try to achieve uniformity among signs (size, message)
- Keep messages simple.
- Place signs in locations where they will be easily seen; avoid locations just over the brow of a hill or just around a curve
- Use signs only when necessary

2. Categories of Signs

Regulatory signs inform drivers that specific regulations apply at specific places and times. Speed limit and stop signs are regulatory signs.

Warning signs advise drivers of potentially hazardous locations, maneuvers or activities.

Guide signs give information about routes, directions, destinations, points of interest and services.

3. Size and Spacing of Signs

The MUTCD has guidelines for the size, shape, color, height, distances, and retro-reflectivity of signs. The standard size and color for a regulatory speed limit sign is 24" wide x 30" high with a black border and legend on a white background. The 24"x 30" size sign shall be used for all conventional highways. On a low-volume road the minimum size 18" wide x 24" high size sign can be used.

Note that a low-volume road shall be defined as follows:

A. A low-volume road shall be a facility lying outside of built-up areas of cities, towns, and communities, and it shall have a traffic volume of less than 400 AADT.

B. A low-volume road shall not be a freeway, an expressway, an interchange ramp, a freeway service road, a road on a designated State highway system, or a residential street in a neighborhood. In terms of highway classification, it shall be a variation of a conventional road or a special purpose road as defined in Section 1A.13 of the 2009 MUTCD.

C. A low-volume road shall be classified as either paved or unpaved.

Basically, the above states that low-volume roads typically include agriculture, recreational, resource management and development, such as, mining and logging and grazing and local rural roads.

The "Reduced Speed Ahead" regulatory sign (R2-5A) have been replaced in the 2009 MUTCD with the "Reduced Speed Limit Ahead" warning sign (W3-5 or W3-5a). If used, the "Reduced Speed Limit Ahead" sign shall be followed by a "Speed Limit" sign (R2-1) installed at the beginning of the zone where the speed limit applies. The speed limit on the "Reduced Speed Limit Ahead" sign shall be identical to the "Speed Limit" sign displayed on the subsequent "Speed Limit" sign. Also a "Speed Limit" sign should be installed following each major intersection in both directions of travel. Intermediate signs should be posted as needed to remind motorist what the speed is in that zone. See page 18 for sign spacing.

There is no set minimum distance between signs within a speed limit zone. Since intermediate signs remind drivers of the speed limit, the distance between them should be determined based on time and roadside distractions. Based on a 1-minute time span, for example, a 25 or 30 mph limit could be signed about every 1/2 mile and a 40 or 45 mph limit could be signed about every 3/4 mile. This assumes that there are no unusual distractions to occupy a driver's attention such as recreation activities, shop windows, other types of signs, panoramic views and the like.

Another rule of thumb could be 0.3 to 0.4 miles for 25 to 30 mph speed zones and 0.5 to 0.8 miles for 35 to 45 mph zones. Signs within a 50 mph zone can be a mile or two apart since State law indicates the speed limit is 50 mph unless otherwise posted.

Do not use speed zones to warn motorists of hazardous conditions. On rural roads, for example, avoid posting speed limits, say from 40 to 30 to 35 to 45 back to 30 and so on. Rather, try to establish one speed limit and use advisory speed plates as needed for curves, hills and other hazardous conditions.

4. Inspecting and Maintaining Signs

Signs must be maintained if they are to be effective and enforceable. Survey road signs for damaged or come up missing at least twice a year, under daytime, nighttime (for reflectivity), and inclement weather conditions. Clean all signs to improve reflectivity. Clear away brush, limbs or grass which may obstruct signs. Straighten leaning posts. Missing STOP signs should be considered an emergency and replaced immediately.

Keep a detailed inventory for every traffic sign. This information may be necessary for legal purposes and for planning replacement of signs. A good record system will list the sign type, date of installation, type of support, and maintenance or replacement activities. It is a good practice to mark the date on the back of each sign panel when it is put in place.

If you prefer a hand written method, this one comes from Thomas Szebenyi at the Cornell Local Roads Program.

Create a file of 4 X 6 cards and lay each card out as follows:

Date: (Today)
Road: (Name)
Direction of Travel:
Starting point: (In miles or kilometers)
Location: (from reference starting point)
MUTCD sign code: (This is essential when ordering signs.)
Text on sign:
Size: (width x height, and cost)
Placement: (left, right, center, overhead)
Pointing which direction: (forward, reverse)
Support type and cost: (steel channel, pipe, etc.)
Date installed:

On the back of each card, you can then record:

Inspection date:
Condition of sign:
Defects:
Date of work order:
Work order purpose:
Date work completed:

Enforcement

A speed limit will only be as effective as the enforcement it receives. To be enforceable, a speed limit must conform to both the state statutes and the MUTCD. Enforcement officers need the backing of a traffic ordinance based on an engineering and traffic study.

Enforcement of speed limits is sometimes necessary for maintaining conformance by motorists. Irrational drivers cannot be controlled except by enforcement. Never establish speed limits artificially low to slow irrational drivers. It doesn't work. If speed limits are set too low for a particular road or street, even responsible drivers will usually exceed the limit. Enforcement then becomes unnecessarily time consuming and a drain on resources.

Also consider that local drivers tend to be the frequent violators because they claim to know the road "by heart". This should not give them license to exceed the speed limits.

Forms

The form on the facing page, "Traffic Engineering Report for a Spot Speed Limit Study" was developed for use by the Vermont Agency of Transportation. It encourages a thorough investigation of a road or street for purposes of setting a speed limit.

Gather as much information as you can.

M.P. = mile post

TH = Town Highway

Make copies of this form. One copy is needed for each road section you survey.

State of Vermont, Agency of Transportation

TRAFFIC ENGINEERING REPORT FOR A SPEED LIMIT STUDY ON A State Hwy. _____ Town Hwy. _____ Other: _____ (In accordance to Title 23 VSA, Section 1003)			Date
CHARACTERISTICS	Left Side	Right Side	Town
No. of Roadway Lanes			
Roadway, Width (feet)			County
" , Surface Type			
" , Condition			Route No.
Shoulder, Width (feet)			
" , Surface Type			Village
" , Condition			
Sidewalk, Width (feet)			From M.P.
" , Surface Type			
" , Condition			Thru M.P.
Curbing, Type of			
" , Condition			Length (miles)

TOPO	No. of Drives	No. of Houses/Farms	List Small Businesses	State/TH Junctions
Left				
Right				

ALIGNMENT	No. 1	No. 2	No. 3
Curves, From/Thru M.P.			
" , Degree of			
" , Ballbank Reading			
" , Current Adv. MPH			
" , Proposed Adv. MPH			
Grades, From/Thru M.P.			
" , Percent of			
Passing Zone M.P. (NB/EB)			
" " (SB/ WB)			
Crosswalk Milepoints			
Bridge, Milepoints			
" , Widths c/c (ft.)			

PARKING INFO: From/Thru M.P. _____ Meet Needs? _____

Controlled by: Signs _____ Markings _____ Meters _____

Hinders: Thru Traffic? _____ THS? _____ Drive? _____

PARKING ZONES: From/Thru M.P. _____

ACCIDENTS: From 19__ Thru 19__ Actual/Critical Accident Rate _____

Total No. ____ Injured ____ Fatalities ____ Drives ____

Types of (1) _____ (2) _____

RECOMMENDATIONS (by _____): _____

Report done by: _____

Spot Speed Survey Field Data Sheet

1. Fill out the information required at the top of the form. (M.P. stands for mile post.)
2. Circle appropriate direction of travel for vehicles being monitored, either northbound/southbound (NB/SB) or eastbound/westbound (EB/WB).
3. Aim the radar gun in the appropriate direction and wait for a car to drive by. When the car passes through the radar field a number will flash in the target window of the unit. Go down the appropriate column for cars or for trucks and buses, and then the column for direction. Find the speed along the left of the column which coincides with the speed of the vehicle and put down a tic mark. Preceding or following the placement of the tic mark make another tic mark on some scrap paper to represent the vehicle. Continue in this manner until your scrap paper has 100 tic marks, representing 100 vehicles. Count the tics to be sure you have enough information.

Make copies of this form. One copy is needed for each road section you survey.

Vermont Agency of Transportation Spot Speed Survey Field Data Sheet

Study No.	Setup M.P.
Date	Day
Town	
Route No.	
Posted Speed Limit	

From M.P.	To M.P.
Weather	
Survey Hours	
Observers	
Passing Zones (Begin/End)	

Describe Setup Locations

MPH	CARS				MPH	TRUCKS AND BUSES			
	NB EB		SB WB			NB EB		SB WB	
70&OVER					70&OVER				
69					69				
68					68				
67					67				
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28					28				
27					27				
26					26				
25					25				
24					24				
23					23				
22					22				
21&Under					21&Under				
Totals									

Summary of a Spot Speed Survey

Modal Speed The modal speed is the speed at which the highest number of vehicles are travelling. Place a check mark next to the modal speed.

Average (Median) Speed The average (median) speed is the speed at which at least 50% of the vehicles are travelling.

85th Percentile The 85th percentile is the speed at or below which 85% of the sample of vehicles surveyed are travelling. So, of 100 vehicles surveyed, $100 \times .85$ represents 85 vehicles from the bottom of the column. The 85th percentile for sixty-two vehicles, for example, would be $62 \times .85 = 52.7$. Round up the number to 53.

Ten Mile Pace The ten mile pace is the block of ten miles per hour which contains the most vehicles. Look for an area that appears to have the most vehicles in it and add them up. Put a line above the ten miles per hour block and another one below it. Now check to see if you can move the lines up or down simultaneously, to increase the total number of cars. If not, then this is the ten mile pace.

Speed Limit Range The speed limit range has two numbers. It has a high number and a low number. The high number of the speed limit range is the lowest of two numbers minus three. The two numbers are 1) the 85th percentile, and 2) the high number of the ten mile pace. Choose the lowest of those two numbers and subtract three from it. That is the high number of the percent in pace. Now, the low number of the speed limit range is the low number of the ten mile pace.

Percent in Ten mile Pace This is the percent of vehicles travelling within the ten mile pace. Sum the vehicles in the ten-mile pace and divide them by the total number of vehicles (which should be 100). So, for example, if you have a total of 100 vehicles, 62 of which are in the ten-mile pace, you would have 62 percent in pace.

Make copies of this form. One copy is needed for each road section you survey.

State of Vermont, Agency of Transportation

SUMMARY OF A SPOT SPEED SURVEY
(Use one sheet for Each Spot Speed Survey)

Date _____ Page _____

Setup No. _____ Setup M.P. _____ Setup Area: From _____ Thru _____

Town _____ County _____ Route No. _____

Present Speed Limit _____ ADT _____ Year ADT _____ DHV _____

General Remarks on Traffic (Only for the Area Covered by this Spot Speed Survey)

	Cars, Vans and Light Trucks	Large Trucks and Buses	All Vehicles
Median Speed			
85th Percentile Speed			
Modal Speed			
10- Mile Pace			
Percent in 10-Mile Pace			
Speed Limit Range (Use all vehicles column)			

MPH	Cars, Vans and Light Trucks	Accum. Pct.	Large Trucks and Buses	Accum Pct.	All Vehicles	Accum Pct.
Over 60						
56-60						
51-55						
46-50						
41-45						
36-40						
31-35						
26-30						
Under 26						
Totals						

Summary done by _____

Definitions

85th percentile speed - the speed at or below which 85 percent of the sample of free flowing vehicles are travelling. This speed should be determined by conduction a spot speed study.

Advisory speed - the speed at which a specific feature along the street or highway can be safely traversed.

Basic Speed Law - no person shall operate a motor vehicle at a speed greater than is reasonable and proper for the prevailing conditions.

Manual on Uniform Traffic Control Devices (MUTCD) - the national standard adopted by state law as the standard to be followed by state and municipal authorities in Vermont.

Pace - the 10 miles per hour band of travel speeds containing the largest number of observed vehicles.

Speed Limit - the maximum (or minimum) speed permitted on a section of street or highway.

Tolerance - the numerical difference between the speed limit and the minimum speed at which enforcement action is taken.

References

Chittenden County Regional Planning Commission Speed Limit Handbook, CCRPC, Essex Junction, VT, 1989.

Manual of Traffic engineering Studies, fourth Edition, Institute of Transportation Engineers, Washington, D.C., 1976.

Manual on Uniform Traffic control Devices, U.S. Government Printing Office, Washington, D.C., 2009 edition.

Speed Zone Guidelines: A Proposed Recommended Practice, Institute of Transportation Engineers, 525 School Street., S.W., Suite 410, Washington, D.C. 20024-2797, 1993, 5 pages.

Setting Speed Limits: A Guide for Vermont Towns, Vermont Local Roads Program, Saint Michael's College, Colchester, VT, 1986.

Sign Inventory Program Using 4 X 6 Index Cards, From "Nuggets and Nibbles", Winter, 1994, Cornell Local Roads Program newsletter.

Vermont State Statutes of Note

This reference list is not intended to be an all-inclusive listing of what may be helpful information in state statute. Vermont State Statutes can be viewed online at: <http://www.leg.state.vt.us/statutesmain.cfm>

Title 23: Motor Vehicles. Chapter 13- Operation of Vehicles

- § 1007. Local speed limits
- § 1007a. Neighborhood electric vehicles; speed limit
- § 1008. Regulations in municipalities
- § 1008a. Regulation of motor vehicles at state airports
- § 1025. Standards
- § 1081. Basic rule and maximum limits
- § 1082. Slow-moving vehicles
- § 1083. Special speed limitations
- § 1431. Height and width limits
- § 1432. Length of vehicles; authorized highways

Title 24: Municipal and County Government. Chapter 61- Regulatory Provisions; Police Power of Municipality

- § 2291. Enumeration of powers

Title 24: Municipal and County Government. Chapter 59: Adoption and Enforcement Of Ordinances And Rules

- § 1972. Procedure

Title 13: Crimes and Criminal Procedure. Chapter 223- Fines, Costs, & Penalties

- § 7251. Municipalities; payment to and liability of

Title 20: Internal Security and Public Safety. Chapter 151- Vermont Criminal Justice Training Council

- § 2358. Minimum training standards

Sections of note from the 2009 Manual on Uniform Traffic Control Devices (MUTCD)

This reference list is not intended to be an all-inclusive listing of what may be helpful information from the 2009 MUTCD.

For a free PDF version of the manual visit <http://mutcd.fhwa.dot.gov/>

Section 2B.13 Speed Limit Sign ffi2-D

Section 2B.14 Truck Speed Limit Sign (R2-2)

Section 2B.15 Night Speed Limit Plaque (R 2-JP)

Section 2B.17 Higher Fines Signs and plaque (R2-6P, R2-JO, and R2-JJ)

Section 2C.05 Placement of Warning Signs

Section 2C.38 Reduced Speed Limit Ahead Signs (W3-5, W3-5a)