2018 NDACE CONFERENCE

Setting Speed Limits

CASS COUNTY GOVERNMENT

WARD COUNTY

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Ward County Highway Department

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NDCC 39-09-02. Speed limitations (2003)

- **NDCC 39-09-02 f** - Fifty-five miles [88.51 kilometers] an hour on gravel, dirt, or loose surface highways, and on paved two-lane county and township highways if there is no speed limit posted, unless otherwise permitted, restricted…
- **NDCC 39-09-02 g** - Sixty-five miles [104.61 kilometers] an hour on paved two-lane highways if posted for that speed, unless otherwise permitted, restricted, or required by conditions.

Ward County Roads

- 310 miles of Paved County Roads
- 400 miles of Gravel County Roads
- Most Gravel Roads do not have Speed Limit signs
- There are approximately 60 miles of paved county roads which are signed at a speed less than 65
- The remaining 250 miles were signed at 65 following the change in the law in 2003

Ward County Roads Signed at 65 MPH

- Minimum of a 4:1 inslopes.
- No obstructions in the clear zone.
- Minimum of 12ft driving lanes.
- Center and Edge Stripes.
- Advisory Speed on Curves that do not meet posted speed limit.
  - No more than 20 MPH
- Chevrons and Edge markers on Curves

Requests

- Request to reduce speed limits by homes
  - Pavement and Gravel Roads
- Request to reduce speed limit on a section of road
- Request to increase speed limit on a section of road
- Request for Slow Children at Play Signs
  - We do not install Slow Children at Play Signs and will remove them if someone else install them on a county road

Slow Children at Play

Safety Talk
NORTH DAKOTA LOCAL TECHNICAL ASSISTANCE PROGRAM

Upper Great Plains Transportation Institute - NDSU

By: Steve Chase-Circuit Rider

February 2013

Is it OK to Install "Children at Play" Signs?

Traffic signs are installed on our highways for many reasons. They may inform us of the need to stop, the speed limit, street names or which direction to go. Warning signs alert us to unexpected hazards on our roads. Signs help us obey the laws, find our destination, and keep us from running off the road. They help us to be safe whether we are a motorist, bicyclist or pedestrian.

Many agencies receive requests for "Slow Children", "Children at Play", or "Slow Children at Play" signs. At first glance it seems logical to install these signs. After all, children play in or near the road and shouldn't there be some warning given to drivers? But do they really help? Are these signs ok to use?

Part 2 of the MUTCD discusses the function and purpose of acceptable signs on all types of roads. Communities are to only use standard signs that are found in the manual. "Children at Play" signs are not listed therefore are **nonstandard and inappropriate to install.**

Speed Study

- Use a double tube traffic counter to collect traffic information
  - Traffic Volume & Vehicle Classification
  - Speed of each vehicle & time
- Review roadway design
  - Inslopes, Curve Data, Roadway Condition, Clear Zone, Access
- Review Crash Data
- Input into FHWA USLIMIT2 program

Traffic Count on County Road 10

Vehicle General Flow Report - Grand Totals

Note: ADT and Average are based on total value of all lanes printed (Together Print).

Average Daily Traffic (ADT)

	Weekday		Weekend		Total ADT	
Cars :	811	(91%)	560	(97%)	**738**	(93%)
Trucks :	71	(9%)	14	(3%)	**54**	(7%)
Total :	882		574		**793**	

Speed Totals

50 % :	58.1 mph	Top Speed :	117.6 mph
85 % :	65.6 mph	Low Speed :	5.8 mph
Avg :	57.8 mph	10mph Pace Speed:	52.3 - 62.2 (54.3%)

Average Truck Speed :	54.1 mph
Average Car Speed :	58.1 mph

Traffic Count on County Road 14

Vehicle General Flow Report - Grand Totals

Note: ADT and Average are based on total value of all lanes printed (Together Print).

Average Daily Traffic (ADT)

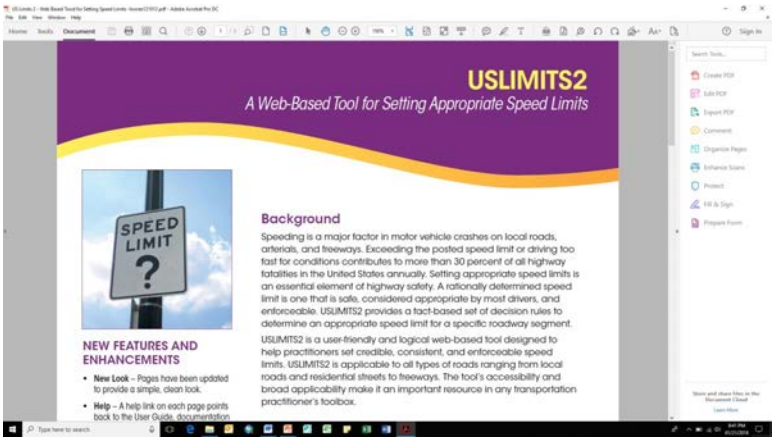
	Weekday		Weekend		Total ADT	
Cars :	1473	(76%)			**1473**	(76%)
Trucks :	443	(24%)			**443**	(24%)
Total :	1917				**1917**	

Speed Totals

50 % :	65.1 mph	Top Speed :	112.4 mph
85 % :	78.7 mph	Low Speed :	6.8 mph
Avg :	65.6 mph	10mph Pace Speed:	53.7 - 63.6 (33.3%)

Average Truck Speed :	64.2 mph
Average Car Speed :	66.0 mph

USLIMITS2



ND DOT Speed Limit Guidelines

- https://www.dot.nd.gov/divisions/programming/docs/SpeedLimitGuidelines.pdf
- In Accordance with the Federal Manual on Uniform Traffic Control Devices (MUTCD)
- Posted speeds should be established based on statutory limits unless an engineering study has been performed in accordance with established traffic engineering practices. (Manual on Uniform Traffic Control Devices, Section 2B.13)

ND DOT Speed Limit Guidelines

- Ideal Speed Limits - The primary purpose of the speed limit is to advise drivers of the maximum reasonable and safe operating speed under favorable conditions
- The use of the 85th percentile speed as the primary criterion for selecting a suitable speed limit

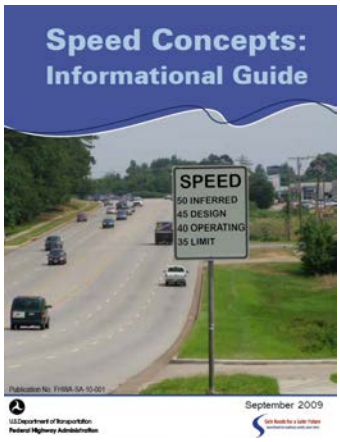
ND DOT Speed Limit Guidelines

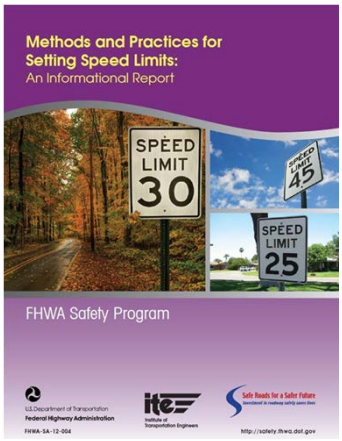
- The posted speed limit shall not exceed the statutory maximum speed limit
- The posted speed limit should be within 5mph of the 85th percentile speed of free-flowing traffic.
- If the posted speed is set lower than the 85th percentile speed, it shall not be set less than the 50th percentile speed.
- The posted speed should not be established based on an isolated restrictive feature (e.g. sharp curve) within a segment. The use of an advisory speed should be considered at these locations.4b

Why Not Set Speed Limits Lower than the 85th Percentile

- Setting speed limits lower than the 85th percentile speed can have several negative effects, including:
  - Need for increased enforcement to ensure driver compliance.
  - Potential for increased crashes due to larger variability in vehicle speeds.
  - Mistrust of highway and enforcement officials and potential disregard for other speed limits, because motorists do not readily perceive the need for lower speeds.

FHWA Documents

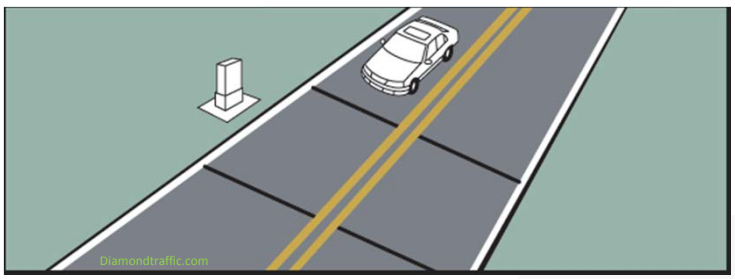




Links

- https://www.fhwa.dot.gov/publications/publicroads/13sepoct/02.cfm
- https://safety.fhwa.dot.gov/speedmgt/eng_spd_lmts/
- https://safety.fhwa.dot.gov/speedmgt/ref_mats/fhwasa12004/fhwasa12004.pdf
- https://safety.fhwa.dot.gov/speedmgt/ref_mats/fhwasa10001/fhwasa10001.pdf
- https://www.dot.nd.gov/divisions/programming/docs/SpeedLimitGuidelines.pdf

Speed Study



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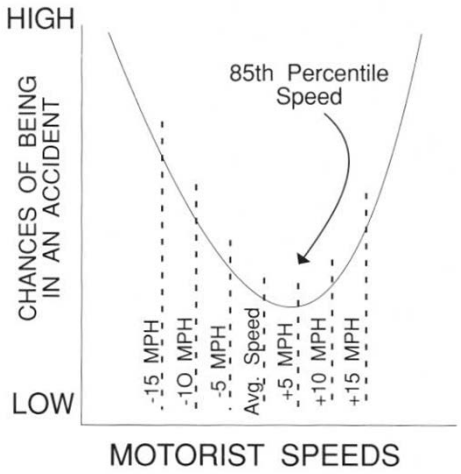
85th Percentile Speed



Source: National Motorists Association

- The 85th Percentile Speed is the speed that 85 percent of vehicles do not exceed.

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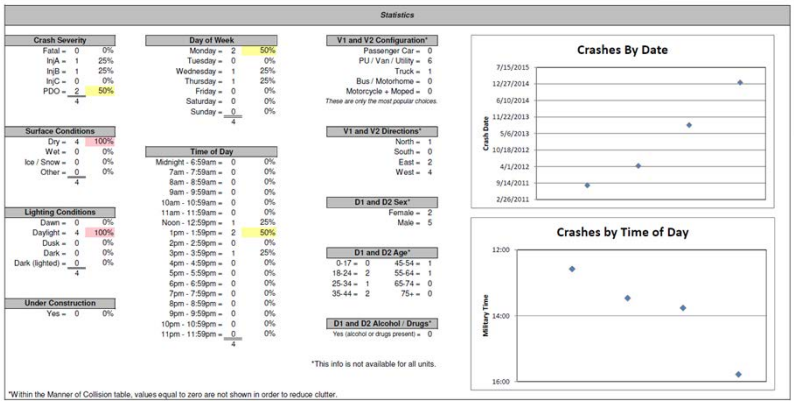
Crash History



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Access Control

III-16.01 Partially Controlled Access – Rural Areas

The planning and design of projects in rural areas on state highways should, where possible, consider partial access control to provide for the safe and efficient flow of traffic and to preserve the public investment.

Generally, the following procedures should be used in the control of access:

- See Standard Drawings D-203-6 and D-203-8 for design details for rural roadways
- Following a field inspection and reviewing with the District Engineer, NDDOT will include recommendations on access control in the project concept report.
- The basic guidelines for establishing access points are based on a maximum of five (5) per side per mile, including section lines.
- A minimum spacing of 500 feet between access points is desirable.
- Access points may or may not be installed during new construction.
- The amount paid for access control will be based on the maximum number of access points allowed.

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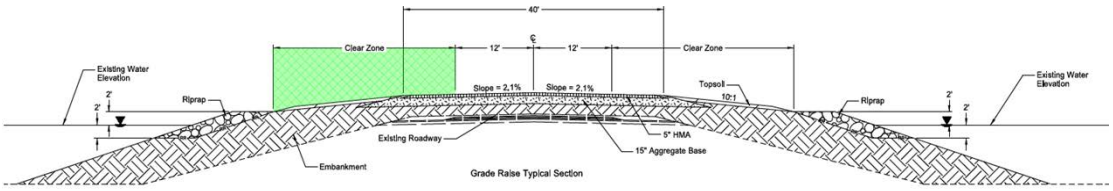
Clear Zone



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Clear Zone

Table 1 CLEAR ZONE DISTANCE (in Feet from Edge of Driving Lane)[1]

DESIGN SPEED	DESIGN ADT***	FORESLOPE					BACKSLOPE				
		FLAT	1V:6H	1V:5H	1V:4H	1V:3H	1V:3H	1V:4H	1V:5H	1V:6H	FLAT
40 mph or less	Under 750	7-10	7-10	7-10	7-10	**	7-10	7-10	7-10	7-10	7-10
	750-1500	10	12	12	14	**	12-14	12-14	12-14	12-14	12-14
	1500-6000	12	14	14	16	**	14-16	14-16	14-16	14-16	14-16
	Over 6000	14	16	16	18	**	16-18	16-18	16-18	16-18	16-18
45-50 mph	Under 750	10	12	12	14	**	8-10	8	10	10	12
	750-1500	14	16	16	20	**	10-12	12	14	14	16
	1500-6000	16	18	20	26	**	12-14	14	16	16	18
	Over 6000	20	22	24	28	**	14-16	18	20	20	22
55 mph	Under 750	12	14	14	18	**	8-10	10-12	10-12	10-12	10-12
	750-1500	16	18	20	24	**	10-12	14	16	16	18
	1500-6000	20	22	24	30	**	14-16	16	18	20	22
	Over 6000	22	24	26	32*	**	16-18	20	22	22	24
60 mph	Under 750	16	18	20	24	**	10-12	12	14	14	16
	750-1500	20	24	26	32*	**	12-14	16	18	20	22
	1500-6000	26	30	32*	40*	**	14-18	18	22	24	26
	Over 6000	30	32*	36*	44*	**	20-22	24	26	26	28
65-75 mph	Under 750	18	20	20	26	**	10-12	14-16	14-16	14-16	14-16
	750-1500	24	26	28	36*	**	12-16	18	20	20	22
	1500-6000	28	32*	34*	42*	**	16-20	22	24	26	28
	Over 6000	30	34*	38*	46*	**	22-24	26	30	28	30

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Clear Zone

Table 1 CLEAR ZONE DISTANCE (in Feet from Edge of Driving Lane)[1]

DESIGN SPEED	DESIGN ADT***	FORESLOPE					BACKSLOPE				
		FLAT	1V:6H	1V:5H	1V:4H	1V:3H	1V:3H	1V:4H	1V:5H	1V:6H	FLAT
40 mph or less	Under 750	7-10	7-10	7-10	7-10	**	7-10	7-10	7-10	7-10	7-10
	750-1500	10	12	12	14	**	12-14	12-14	12-14	12-14	12-14
	1500-6000	12	14	14	16	**	14-16	14-16	14-16	14-16	14-16
	Over 6000	14	16	16	18	**	16-18	16-18	16-18	16-18	16-18
45-50 mph	Under 750	10	12	12	14	**	8-10	8	10	10	12
	750-1500	14	16	16	20	**	10-12	12	14	14	16
	1500-6000	16	18	20	26	**	12-14	14	16	16	18
	Over 6000	20	22	24	28	**	14-16	18	20	20	22
55 mph	Under 750	12	14	14	18	**	8-10	10-12	10-12	10-12	10-12
	750-1500	16	18	20	24	**	10-12	14	16	16	18
	1500-6000	20	22	24	30	**	14-16	16	18	20	22
	Over 6000	22	24	26	32*	**	16-18	20	22	22	24
60 mph	Under 750	16	18	20	24	**	10-12	12	14	14	16
	750-1500	20	24	26	32*	**	12-14	16	18	20	22
	1500-6000	26	30	32*	40*	**	14-18	18	22	24	26
	Over 6000	30	32*	36*	44*	**	20-22	24	26	26	28
65-75 mph	Under 750	18	20	20	26	**	10-12	14-16	14-16	14-16	14-16
	750-1500	24	26	28	36*	**	12-16	18	20	20	22
	1500-6000	28	32*	34*	42*	**	16-20	22	24	26	28
	Over 6000	30	34*	38*	46*	**	22-24	26	30	28	30

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Guardrail

MDOT-Metro Detroit

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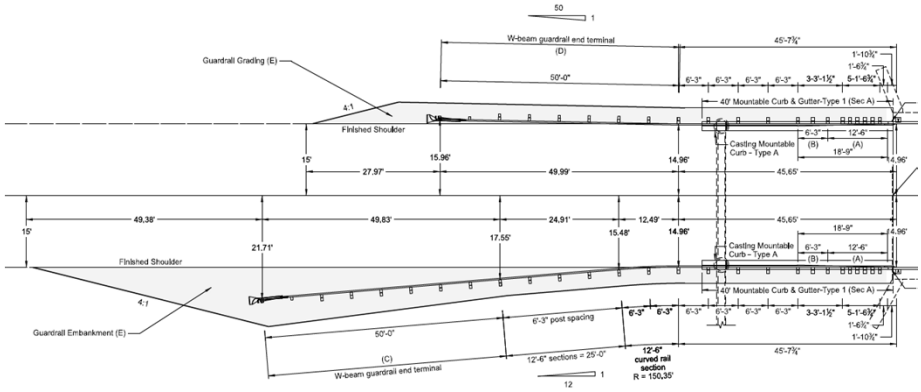
Guardrail



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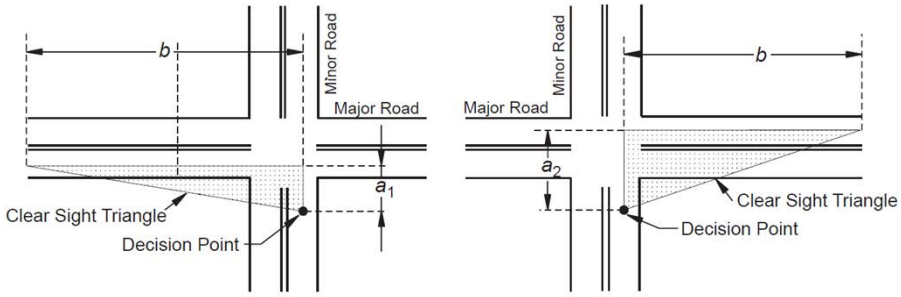
Sight Triangles



Departure Sight Triangle for Viewing Traffic Approaching the Minor Road from the Left

Departure Sight Triangle for Viewing Traffic Approaching the Minor Road from the Right

Departure Sight Triangles (Stop-Controlled)

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Sight Triangles

Table 9-6. Design Intersection Sight Distance—Case B1, Left Turn from Stop

Metric				U.S. Customary			
		Intersection Sight Distance for Passenger Cars				Intersection Sight Distance for Passenger Cars	
Design Speed (km/h)	Stopping Sight Distance (m)	Calculated (m)	Design (m)	Design Speed (mph)	Stopping Sight Distance (ft)	Calculated (ft)	Design (ft)
20	20	41.7	45	15	80	165.4	170
30	35	62.6	65	20	115	220.5	225
40	50	83.4	85	25	155	275.6	280
50	65	104.3	105	30	200	330.8	335
60	85	125.1	130	35	250	385.9	390
70	105	146.0	150	40	305	441.0	445
80	130	166.8	170	45	360	496.1	500
90	160	187.7	190	50	425	551.3	555
100	185	208.5	210	55	495	606.4	610
110	220	229.4	230	60	570	661.5	665
120	250	250.2	255	65	645	716.6	720
130	285	271.1	275	70	730	771.8	775
—	—	—	—	75	820	826.9	830
—	—	—	—	80	910	882.0	885

Note: Intersection sight distance shown is for a stopped passenger car to turn left onto a two-lane highway with no median and grades 3 percent or less. For other conditions, the time gap should be adjusted and the sight distance recalculated.

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Sight Triangles

Table 9-6. Design Intersection Sight Distance—Case B1, Left Turn from Stop

Metric				U.S. Customary			
		Intersection Sight Distance for Passenger Cars				Intersection Sight Distance for Passenger Cars	
Design Speed (km/h)	Stopping Sight Distance (m)	Calculated (m)	Design (m)	Design Speed (mph)	Stopping Sight Distance (ft)	Calculated (ft)	Design (ft)
20	20	41.7	45	15	80	165.4	170
30	35	62.6	65	20	115	220.5	225
40	50	83.4	85	25	155	275.6	280
50	65	104.3	105	30	200	330.8	335
60	85	125.1	130	35	250	385.9	390
70	105	146.0	150	40	305	441.0	445
80	130	166.8	170	45	360	496.1	500
90	160	187.7	190	50	425	551.3	555
100	185	208.5	210	55	495	606.4	610
110	220	229.4	230	60	570	661.5	665
120	250	250.2	255	65	645	716.6	720
130	285	271.1	275	70	730	771.8	775
—	—	—	—	75	820	826.9	830
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Note: Intersection sight distance shown is for a stopped passenger car to turn left onto a two-lane highway with no median and grades 3 percent or less. For other conditions, the time gap should be adjusted and the sight distance recalculated.

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No Passing Zones

Table 3B-1. Minimum Passing Sight Distances for No-Passing Zone Markings

85th-Percentile or Posted or Statutory Speed Limit	Minimum Passing Sight Distance
25 mph	450 feet
30 mph	500 feet
35 mph	550 feet
40 mph	600 feet
45 mph	700 feet
50 mph	800 feet
55 mph	900 feet
60 mph	1,000 feet
65 mph	1,100 feet
70 mph	1,200 feet

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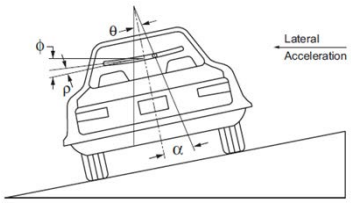
Horizontal Curves

U.S. Customary															
	V_d = 15 mph	V_d = 20 mph	V_d = 25 mph	V_d = 30 mph	V_d = 35 mph	V_d = 40 mph	V_d = 45 mph	V_d = 50 mph	V_d = 55 mph	V_d = 60 mph	V_d = 65 mph	V_d = 70 mph	V_d = 75 mph	V_d = 80 mph
e (%)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)
NC	868	1580	2290	3130	4100	5230	6480	7870	9410	11100	12600	14100	15700	17400
RC	614	1120	1630	2240	2950	3770	4680	5700	6820	8060	9130	10300	11500	12900
2.2	543	991	1450	2000	2630	3370	4190	5100	6110	7230	8200	9240	10400	11600
2.4	482	884	1300	1790	2360	3030	3770	4600	5520	6540	7430	8380	9420	10600
2.6	430	791	1170	1610	2130	2740	3420	4170	5020	5950	6770	7660	8620	9670
2.8	384	709	1050	1460	1930	2490	3110	3800	4580	5440	6200	7030	7930	8910
3.0	341	635	944	1320	1760	2270	2840	3480	4200	4990	5710	6490	7330	8260
3.2	300	566	850	1200	1600	2080	2600	3200	3860	4600	5280	6010	6810	7680
3.4	256	498	761	1080	1460	1900	2390	2940	3560	4250	4890	5580	6340	7180
3.6	209	422	673	972	1320	1740	2190	2710	3290	3940	4540	5210	5930	6720
3.8	176	358	583	864	1190	1590	2010	2490	3040	3650	4230	4860	5560	6320
4.0	151	309	511	766	1070	1440	1840	2300	2810	3390	3950	4550	5220	5950
4.2	131	270	452	684	960	1310	1680	2110	2590	3140	3680	4270	4910	5620
4.4	116	238	402	615	868	1190	1540	1940	2400	2920	3440	4010	4630	5320
4.6	102	212	360	555	788	1090	1410	1780	2210	2710	3220	3770	4380	5040
4.8	91	189	324	502	718	995	1300	1640	2050	2510	3000	3550	4140	4790
5.0	82	169	292	456	654	911	1190	1510	1890	2330	2800	3330	3910	4550
5.2	73	152	264	413	595	833	1090	1390	1750	2160	2610	3120	3690	4320
5.4	65	136	237	373	540	759	995	1280	1610	1990	2420	2910	3460	4090
5.6	58	121	212	335	487	687	903	1160	1470	1830	2230	2700	3230	3840
5.8	51	106	186	296	431	611	806	1040	1320	1650	2020	2460	2970	3560
6.0	39	81	144	231	340	485	643	833	1060	1330	1660	2040	2500	3050



α = Ball-bank indicator angle
ϕ = Body roll angle
θ = Superelevation angle
ρ = Lateral acceleration angle

Figure 3-3. Geometry for Ball-Bank Indicator

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Horizontal Curves

U.S. Customary															
	V_d = 15 mph	V_d = 20 mph	V_d = 25 mph	V_d = 30 mph	V_d = 35 mph	V_d = 40 mph	V_d = 45 mph	V_d = 50 mph	V_d = 55 mph	V_d = 60 mph	V_d = 65 mph	V_d = 70 mph	V_d = 75 mph	V_d = 80 mph
e (%)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)	R (ft)
4.0	151	309	511	766	1070	1440	1840	2300	2810	3390	3950	4550	5220	5950
4.2	131	270	452	684	960	1310	1680	2110	2590	3140	3680	4270	4910	5620
4.4	116	238	402	615	868	1190	1540	1940	2400	2920	3440	4010	4630	5320
4.6	102	212	360	555	788	1090	1410	1780	2210	2710	3220	3770	4380	5040
4.8	91	189	324	502	718	995	1300	1640	2050	2510	3000	3550	4140	4790
5.0	82	169	292	456	654	911	1190	1510	1890	2330	2800	3330	3910	4550
5.2	73	152	264	413	595	833	1090	1390	1750	2160	2610	3120	3690	4320
5.4	65	136	237	373	540	759	995	1280	1610	1990	2420	2910	3460	4090
5.6	58	121	212	335	487	687	903	1160	1470	1830	2230	2700	3230	3840
5.8	51	106	186	296	431	611	806	1040	1320	1650	2020	2460	2970	3560
6.0	39	81	144	231	340	485	643	833	1060	1330	1660	2040	2500	3050

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Horizontal Curves

- **Existing Geometry**
- V =55 MPH
- R = 2,800’
- e(%)= 4

Required Geometry

V= 65 MPH

R= 2,800’

e(%)=5

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Warning Sign Locations

Figure 2C-2. Example of Warning Signs for a Turn

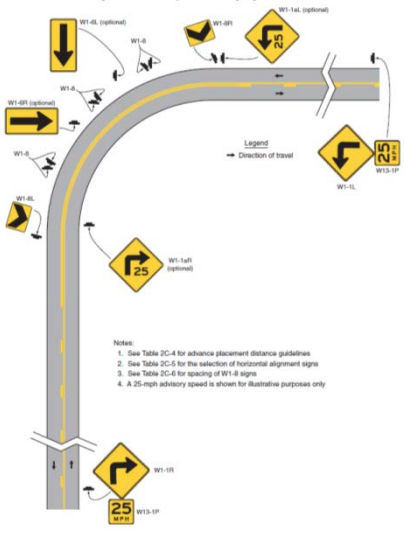

Table 2C-4. Guidelines for Advance Placement of Warning Signs

Posted or 85th-Percentile Speed	Advance Placement Distance[1]								
	Condition A: Speed reduction and lane changing in heavy traffic[2]	Condition B: Deceleration to the listed advisory speed (mph) for the condition							
		0[3]	10[4]	20[4]	30[4]	40[4]	50[4]	60[4]	70[4]
20 mph	225 ft	100 ft[6]	N/A[5]	—	—	—	—	—	—
25 mph	325 ft	100 ft[6]	N/A[5]	N/A[5]	—	—	—	—	—
30 mph	460 ft	100 ft[6]	N/A[5]	N/A[5]	—	—	—	—	—
35 mph	565 ft	100 ft[6]	N/A[5]	N/A[5]	N/A[5]	—	—	—	—
40 mph	670 ft	125 ft	100 ft[6]	100 ft[6]	N/A[5]	—	—	—	—
45 mph	775 ft	175 ft	125 ft	100 ft[6]	100 ft[6]	N/A[5]	—	—	—
50 mph	885 ft	250 ft	200 ft	175 ft	125 ft	100 ft[6]	—	—	—
55 mph	990 ft	325 ft	275 ft	225 ft	200 ft	125 ft	N/A[5]	—	—
60 mph	1,100 ft	400 ft	350 ft	325 ft	275 ft	200 ft	100 ft[6]	—	—
65 mph	1,200 ft	475 ft	450 ft	400 ft	350 ft	275 ft	200 ft	100 ft[6]	—
70 mph	1,250 ft	550 ft	525 ft	500 ft	450 ft	375 ft	275 ft	150 ft	—
75 mph	1,350 ft	650 ft	625 ft	600 ft	550 ft	475 ft	375 ft	250 ft	100 ft[6]

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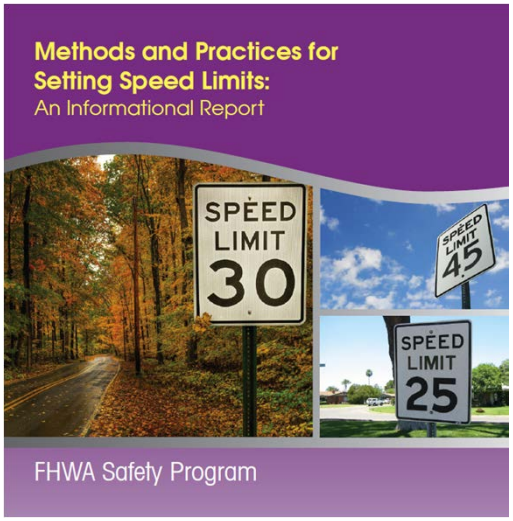
Trucks



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Resources

- Speed Limits in North Dakota https://www.dot.nd.gov/divisions/programming/traffic-operations.htm
  - NDDOT
  - North Dakota State Patrol
  - LTAP
  - UGPTI
- Methods and Practices for Setting Speed Limits
  - Federal Highway Administration
- MUTCD
- AASHTO Geometric Design of Highways and Streets
- AASHTO Roadside Design Guide
- NDDOT Traffic Operations Manual
- NDDOT Design Manual

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Speed Limits

Common Misconceptions About Speed Limits

The public generally accepts the concepts that provide the basis for speed zoning. However, according to the ITE, during moments of heightened levels of emotion, the public will in most cases reject those principles and depend instead on more popular misconceptions such as:

1. Reducing the speed limit will slow the speed of traffic;
2. Reducing speed limits will decrease the number of crashes and increase safety;
3. Raising the posted speed limit will cause an increase in the speed of traffic;
4. Any posted speed limit must be safer than an unposted speed limit; and
5. Drivers will always go 5 mph over the posted speed limit.

NDDOT North Dakota Department of Transportation

NORTH DAKOTA STATE PATROL

LTAP North Dakota Local Technical Assistance Program

UGPTI Upper Great Plains Transportation Institute North Dakota State University

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