Quick Reference

Minimum suggested channelizing device and sign spacing in work zones

Traffic Speed (mph)	Taper Length Eacn 12 Ft Lane[1]	Device Spacing		Sign Spacing Advance of Taper & Between Signs
		Taper	Tangent	
25	125	25	50	100
30	180	30	60	150
35	245	35	70	250
40	320	40	80	350
45	540	45	90	400
50	600	50	100	450
55 (non-freeway)	660	55	110	500

[1]Does not apply to flagger tapers.

A guide for advance warning sign placement distances

Posted Speed (MPH)	Condition A (High Judgement Needed)	General Warning Signs					
		Condition B (Stop)	Condition C (Deceleration to Advisory Speed)				
		0	10	20	30	40	50
20	175	-	-	-	-	-	-
25	250	-	100	-	-	-	-
30	325	100	150	100	-	-	-
35	400	150	200	175	-	-	-
40	475	225	275	250	175	-	-
45	550	300	350	300	250	-	-
50	625	375	425	400	325	225	-
55	700	450	500	475	400	300	-
60	775	550	575	550	500	400	300
65	850	650	650	625	575	500	375

Please refer to Section 2C.05 of the *MUTCD* and “Warning Sign Placement” (C18) in this manual for more information.

Speed conversions between mph[1] and kph[2]

mph to kph											
mph	20	25	30	35	40	45	50	55	60	65	70
kph	32	40	48	56	64	72	80	89	97	105	113
kph to mph											
kph	30	35	40	50	60	70	80	90	100	110	120
mph	19	22	25	31	37	44	50	56	62	68	75

[1]mph = miles per hour.

[2]kph = kilometers per hour.

1 mph = 1.466 fps (feet per second); 1 fps = 0.6818 mph.

1 mph = 0.6215 kph; 1 kph = 1.609 mph.

Sign sheeting material

Engineering Grade	Minimal retroreflectivity and life
High Intensity	Medium retroreflectivity and life
Diamond Grade	Maximum retroreflectivity and life; also available in fluorescent colors

Phone numbers and websites

American Traffic Safety Services Association (ATSSA)	*www.atssa.com*
CTRE	1-515-294-8103 www.ctre.iastate.edu
FHWA	www.fhwa.dot.gov
Iowa DOT	www.dot.state.ia.us
Iowa DOT Weather	www.weatherview.dot.state.ia.us
International Municipal Signal Association (IMSA)	www.imsasafety.org
Iowa One Call	1-800-292-8989
Iowa State Patrol	1-800-525-5555
Institute of Transportation Engineers (ITE)	www.ite.org
MUTCD	mutcd.fhwa.dot.gov
State Traffic Engineer	1-515-239-1513

Background sign color code

Black	Regulatory
White	Regulatory
Yellow	General warning
Red	Stop or prohibition
Blue	Motorist services, guidance, and evacuation route
Green	Movements permitted, direction guidance
Brown	Recreational and cultural interest guidance
Orange	Temporary traffic control
Fluorescent Yellow-Green	Schools, pedestrians, and bicycles

Uniform utility color code

Red	Electric power lines, cables, or conduits
Yellow	Gas or gaseous materials; oil or petroleum materials; steam
Orange	Alarm lines, cables or conduits; communication lines, cables, or conduits
Blue	Irrigation lines; slurry lines; water lines
Green	Drain lines; sewers

Standard colors for pavement markings

Yellow	Separates opposing traffic in an adjacent lane or to mark a left-hand edge line on multilane roadways
White	Used to separate traffic on multilane roadways moving in the same direction, for turning lanes, right-hand edge markings, and most symbols
Blue	Disabled parking areas
Red	Restricted use

Miscellaneous measure

Engineer's Chain	100 ft.
Surveyor's Chain	66 ft.
Rod	16.5 ft.
Link	7.92 in.

Length unit conversions[1]

	Inches	Feet	Yard	Rod	Mile	Millimeter	Centimeter	Meter	Kilometer
Inches	-	0.0833	0.0277	0.00505	$1.578x10^{-5}$	25.4	2.54	0.0254	2.54×10^{-5}
Feet	12	-	0.3333	0.0606	$1.893x10^{-4}$	304.8	30.48	0.3048	3.048×10^{-4}
Yard	36	3	-	0.1818	$5.682x10^{-4}$	914.44	91.44	0.9144	9.144×10^{-4}
Rod	198	16.5	5.5	-	0.00312	5029.2	502.92	5.0292	0.00502
Mile	63,360	5,280	1760	320	-	$1.609x10^{6}$	$1.609x10^{5}$	1609.34	1.60934
Millimeter	0.03937	0.00328	0.00109	$1.987x10^{-4}$	$6.214x10^{-7}$	-	0.1	0.001	$1.0x10^{-6}$
Centimeter	0.3937	0.0328	0.01093	0.00198	$6.214x10^{-6}$	10	-	0.01	$1.0x10^{-5}$
Meter	39.37	3.28	1.0936	0.19883	$6.214x10^{-4}$	1,000	100	-	0.001
Kilometer	$3.937x10^{4}$	3,280.84	1,093.61	198.84	0.62137	$1.0X10^{6}$	$1.0X10^{5}$	1,000	-

[1]For conversions from the vertical dimensions, multiply. From the horizontal dimensions, divide.

Important publications

Manual on Uniform Traffic Control Devices.
FHWA standard publication on signing, pavement markings, traffic signals, roadway construction zones, rail crossings, etc.

A Policy on Geometric Design of Highways.
American Association of State Highway and Transportation Officials (AASHTO) publication on roadway design; commonly known as the “green book”

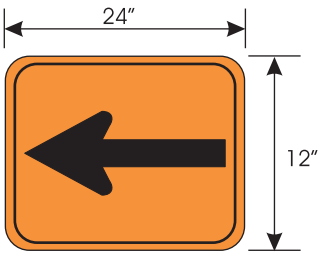
Roadside Design Guide.
AASHTO manual of roadside design; design slopes, clear zones, barriers and sign support standards

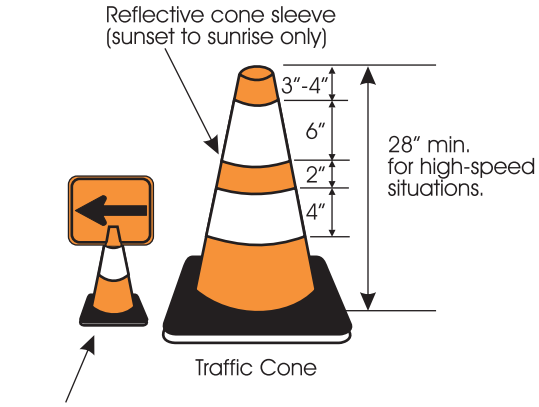
Traffic Engineering Handbook.
ITE handbook on traffic engineering; information on traffic studies, traffic signals, roadway lighting, signing, pavement markings, roadway geometrics, etc.

Manual of Transportation Engineering Studies.
ITE in-depth manual on traffic studies, analyzing accidents, street parking, traffic flow, etc.

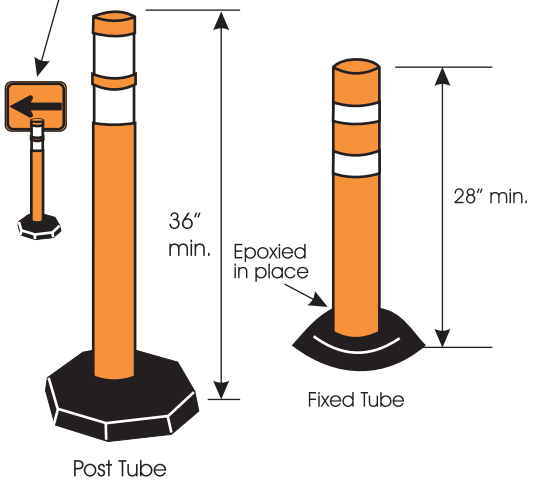
Cones

Cones are available in many sizes from 12 to 36 inches in height. Roadways with speeds greater than 40 mph should only use cones 28 inches or taller. Cones are sold in different weights and should be heavy enough to withstand local winds and the drafts created by semi-trucks. Cones should also include reflectorized bands for night visibility. Refer to Section 6F.55 of the *MUTCD* for more information.





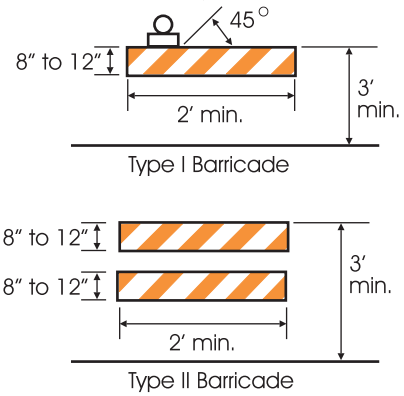
Supplemental directional or warning signs may be mounted on cones and other devices subject to agency approval.*



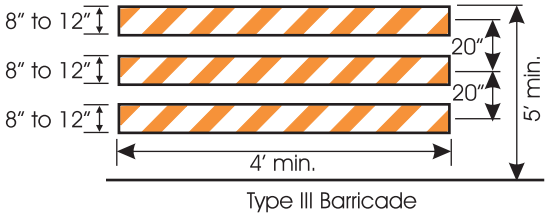
* These supplemental signs have not been given a Uniform Sign Code number.

Channelizing devices (temporary use)

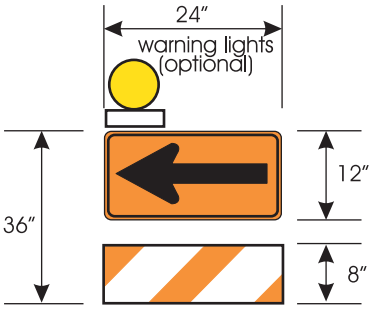
Warning Light
(Optional on all barricade types)



Note: Barricades shall have a miminum of 270 square inches of retroreflective area facing traffic when used on freeways, expressways, and other high-speed highways.



Typical barricades (temporary use)



Direction indicator barricade

Barricade characteristics

Type	I	II	III
Width of Rail	8" min. 12" max.	8" min. 12" max.	8" min. 12" max.
Length of Rail	2' min	2' min.	4' max.
Width of Stripes[1]	6"	6"	6"
Number of Reflectorized Rail Faces	2	4	3

[1] For rails less than 3 feet long, 4-inch wide stripes may be used.