

**Provincial Railway
Technical Standards**

Section:

STANDARDS

Subject:

PUBLIC GRADE CROSSING

GENERAL:

The standards and requirements listed in this document are intended for use on provincially regulated railway public grade crossings. These standards are considered the minimum requirements to which public grade crossings should be maintained.

The requirements and specifications noted in this document for existing public grade crossings will become mandatory on January 1, 2021. The provincial railway inspector may make orders to correct immediate safety concerns and bring specific public grade crossings into compliance with these standards at any time prior to January 1, 2021.

It is recommended that any new or relocated public grade crossing be designed and constructed in accordance with all the requirements and specifications outlined in the most recent version of Transport Canada's Grade Crossing Standards.

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SECTION 1 - DEFINITIONS

Average Annual Daily Railway Movements: means the number of movements of engines or engines coupled with railway equipment, across a grade crossing in a year, divided by the number of days in that year.

Average Annual Daily Traffic: means the number of motor vehicles that cross a grade crossing in a year, divided by the number of days in that year.

Clearance Distance (cd): the distance between the departure point of a vehicle (minimum of 5 m perpendicularly ahead of the outside rail in the direction of travel) and the clearance point (minimum of 2.4 m perpendicularly from the last rail crossed in the direction of travel). Please refer to Transport Canada's Grade Crossing Standards for further clarification.

Crossing Surface: means the part of the road that lies between the ends of a railway tie and that has the width as required in SECTION 3.

Cross-product: means the product of the average annual daily railway movements and the average annual daily traffic of vehicles on the road that pass across the grade crossing.

Existing Grade Crossing: means a grade crossing for which actual construction is started before January 1, 2016.

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Field Side Gap: means the space between the outside of the rail and the travelled surface at a grade crossing.

Grade Crossing: means an at-grade crossing and intersection of a railway and a highway, road, street, or lane.

New Grade Crossing: means a grade crossing for which actual construction is started on or after January 1, 2016.

Public Grade Crossing: means a grade crossing intended for or used by the general public for the passage of vehicles or pedestrians.

Road Approach Gradient: is the average gradient over the SSD.

Road Authority: means the public authority (municipal or provincial government, department, or agency) responsible for the direction, control and management of a road that crosses a provincial railway line.

SSD: is the minimum stopping sight distance along the road approach that a crossing user needs to react to approaching railway equipment.

Travelled Way: means that part of a road intended for vehicular use, excluding shoulders.

SECTION 2 - INFORMATION SHARING

In order to determine the appropriate standards and requirements for individual grade crossings, railways and road authorities should share information and determine the design aspects for each grade crossing. If a railway and road authority share the following information with each other, it is recommended that the information also be provided to Railway Policy and Programs so that the design information can be incorporated and used in the Ministry of Highways and Infrastructure's (MHI) grade crossing inspection program.

In the absence of any formal information sharing notification, MHI will assume and set the design criteria for each individual grade crossing. Based on this information, MHI will inspect each grade crossing and issue corrective action orders as part of MHI's ongoing public grade crossing inspection programs.

SUBSECTION 2.1 - RESPONSIBILITIES OF RAILWAYS

Railways are responsible for determining the following design aspects of each railway crossing. If requested by the road authority, the railway must provide the following information for each crossing:

- i) the precise location of the grade crossing, including railway subdivision and mileage;
- ii) the number of tracks that cross the grade crossing;

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- iii) the average annual daily railway movements;
- iv) the railway design speed;
- v) the warning system in place at the grade crossing;
- vi) an indication of whether a Stop sign is installed (or will be installed) on the same post as the Railway Crossing sign; and
- vii) an indication of whether or not whistling is required when railway equipment is approaching the grade crossing.

SUBSECTION 2.2 - RESPONSIBILITIES OF ROAD AUTHORITIES

Road authorities are responsible for determining the following design aspects of each railway crossing within their jurisdiction. If requested by the railway, the road authority must provide the following information for each crossing:

- i) the precise location of the grade crossing (road/street name, geographic coordinates or legal land description);
- ii) the number of traffic lanes that cross the crossing surface;
- iii) the average annual daily traffic;
- iv) the road crossing design speed;
- v) the road classification, which should include three descriptors (one descriptor from each column in Table 1) as defined in Transport Canada's Grade Crossing Standards;

Table 1 – Road classification descriptors

Column A	Column B	Column C
Rural (R)	Local (L)	Divided (D)
	Collector (C)	
Urban (U)	Arterial (A)	Undivided (U)
	Expressway (E)	
	Freeway (F)	

- vi) the width of each traffic lane and shoulder on the road approach;
- vii) the design vehicle;
- viii) the stopping sight distance (SSD);
- ix) the average gradient of the road approach;
- x) the crossing angle measured between the centreline of the road and the centreline of the railway;
- xi) the applicable departure time (the greater of the time required for the design vehicle to pass completely through the Clearance Distance (cd) from a stopped position or the time required for

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pedestrians, cyclists and persons using assistive devices to pass completely through the cd);

- xii) the activation time for any active advance warning sign (prepare to stop warning system) that is interconnected to a railway warning system;
- xiii) the activation time for any traffic signals that are interconnected to a railway warning system;
- xiv) an indication of whether the grade crossing includes a sidewalk, path or trail, and if so, whether the sidewalk, path or trail has been designated for persons using assistive devices.

SECTION 3 - CROSSING SURFACE

The crossing surfacing material must provide for a structurally sound surface and must be securely fastened to prevent movement or removal.

The crossing surface of a grade crossing must be smooth and continuous.

The geometric requirements provided under Subsection 3.1 apply to existing grade crossings. The geometric requirements in Subsection 3.2 apply to new, or rehabilitated grade crossing surfaces. The geometric requirements in Subsection 3.3 apply to all provincially regulated grade crossings.

SUBSECTION 3.1 - EXISTING GRADE CROSSING SURFACE WIDTH

For roadways without a shoulder, the crossing surface width must be equal to the width of the travelled way, plus 0.5 m on each side, measured at right angles to the centerline of the road as shown in Figure 1.

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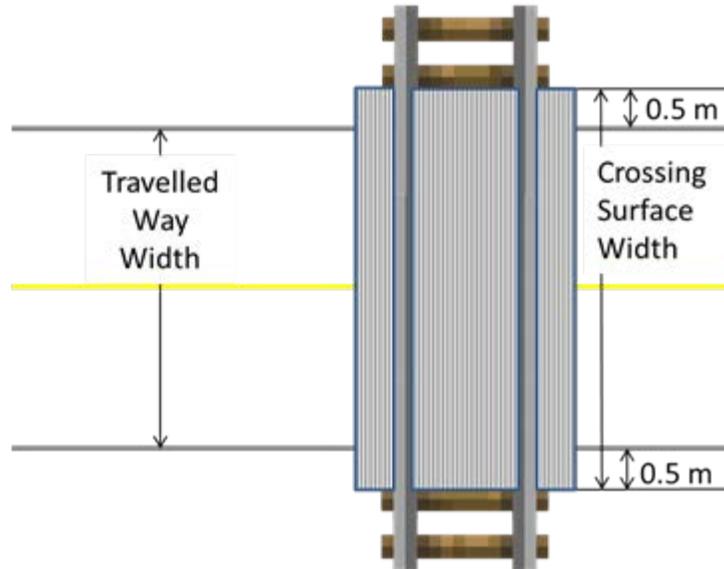


Figure 1 – Grade crossing pan view without roadway shoulders

For roadways with a shoulder the crossing surface must be of a width that is equal to the width of the travelled way and the shoulders of the road as shown in Figure 2.

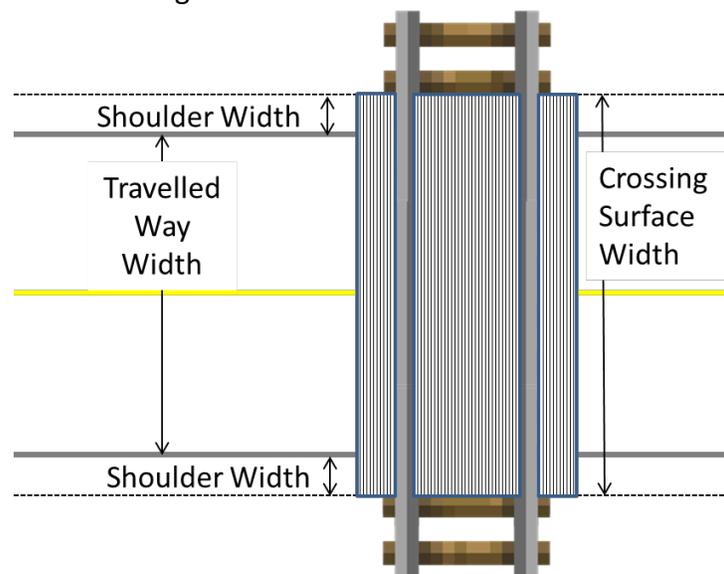


Figure 2 – Grade Crossing pan view with roadway shoulders

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SUBSECTION 3.2 - NEW GRADE CROSSING SURFACE WIDTH

The crossing surface must be of a width that is equal to the travelled way and shoulders of a road, plus 0.5 m on each side, measured at right angles to the centerline of the road as shown in Figure 1 for roadways without shoulders and in Figure 3 for roadways with shoulders.

In addition to applying this requirement to new grade crossing construction, it is also recommended that railways ensure existing crossing surfaces meet the extended crossing surface width requirement upon repair or replacement of the crossing surface.

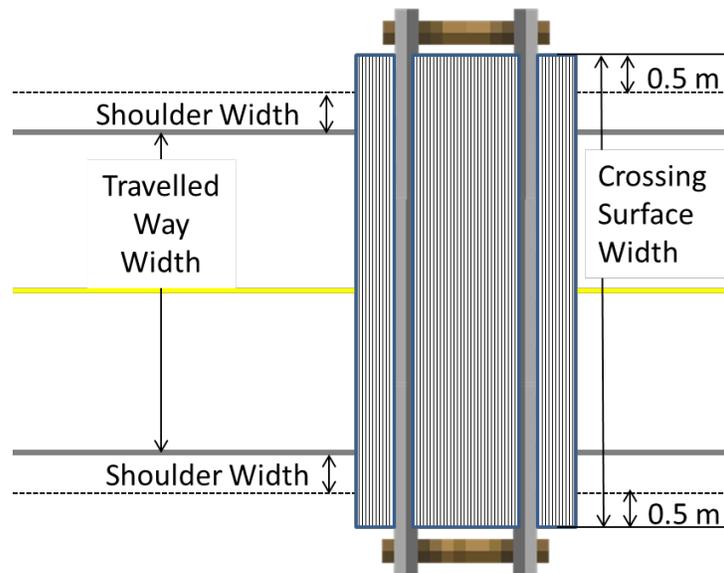


Figure 3 - Grade crossing pan view with roadway shoulders

SUBSECTION 3.3 - EXISTING AND NEW GRADE CROSSING FLANGEWAYS

A flangeway must be provided on all crossings between the gauge side of the rail and the road surface and must be between 65 mm and 120 mm wide and a minimum of 50 mm deep.

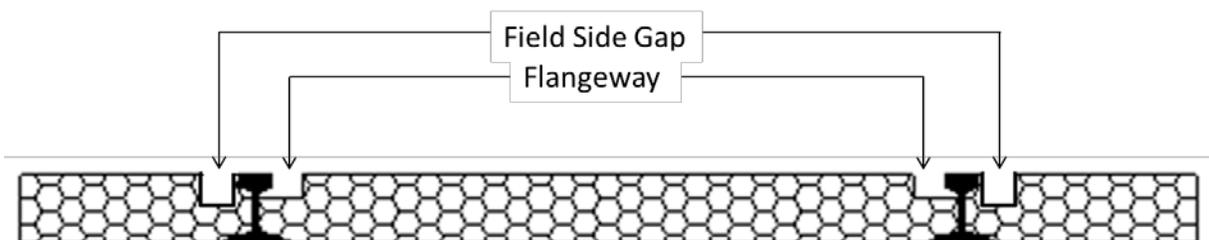


Figure 4 – Crossing surface cross-section of the roadway travelled way

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Table 2 – Flangeway and wear limit dimensions

		Distance in mm
Flangeway Width	Minimum	65
	Maximum	120
Flangeway Depth	Minimum	50
Wear Limit		25

Wear limit means the maximum distance of the top of the rail above or below the crossing surface. The top of the crossing surface must be installed as close as possible to the top of the rail. The allowable wear limit for new and existing crossings is 25 mm.

SUBSECTION 3.4 - GRADE CROSSINGS IN RURAL LOCATIONS

A field side gap of a maximum 120 mm wide is permitted only at rural locations. A field side gap is not permitted in urban locations and at grade crossings with access for persons using assistive devices.

Table 3 - Field side gap allowance

		Distance in mm
Field Side Gap	Maximum	120

SUBSECTION 3.5 - GRADE CROSSINGS WITH ACCESS FOR PERSONS USING ASSISTIVE DEVICES

The requirements in Subsection 3.3 and Subsection 3.4 do not apply to public sidewalks, paths or trails designated by the road authority for use by persons using assistive devices. It is recommended that grade crossings with public sidewalks, paths or trails designated by the road authority for use by persons using assistive devices meet the grade crossing surface requirements outlined in the most recent version of Transport Canada's Grade Crossing Standards.

SECTION 4 - RAILWAY CROSSING SIGNS AND ROADWAY CONTROL SIGNS

SUBSECTION 4.1 - REQUIREMENTS FOR ALL PUBLIC GRADE CROSSINGS

All public grade crossings must have a Railway Crossing Sign providing warning of a grade crossing as shown in Figure 5 and must have:

- i) a retroreflective coating that covers the entire front surface of the sign; and
- ii) a 50 mm border on the front of each blade, with transparent red ink silk-screen processed over silver-white sheeting material.

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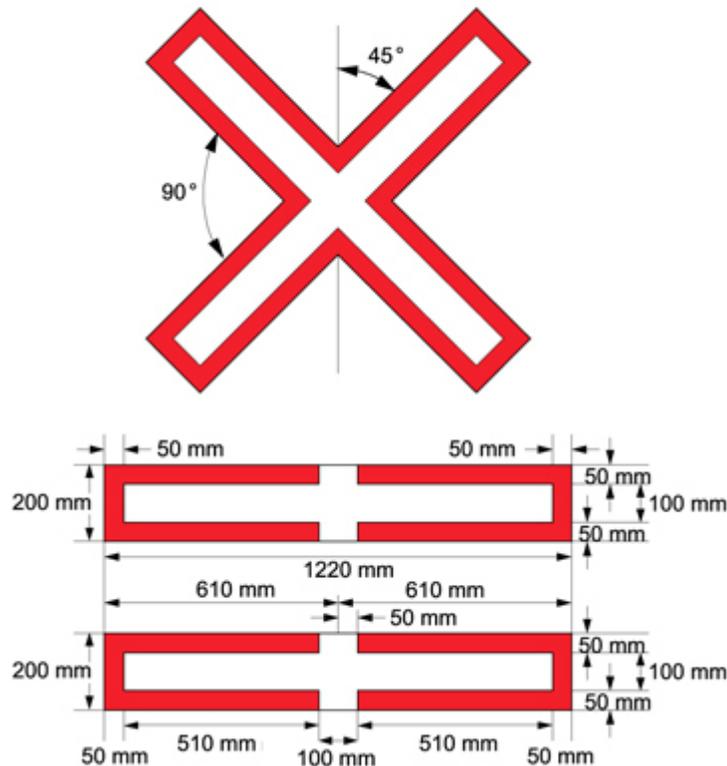


Figure 5 – Railway Crossing sign dimensions

A sign indicating the number of tracks (Number of Tracks sign) at a grade crossing where there is more than one track must be as shown in Figure 6 and must:

- i) have a retroreflective coating that covers the entire front surface of the sign;
- ii) have a digit that shows the Number of Tracks and symbol that is transparent red or black inked silk-screened processed; and,
- iii) be installed on the supporting post of each Railway Crossing Sign as shown in Figure 7.

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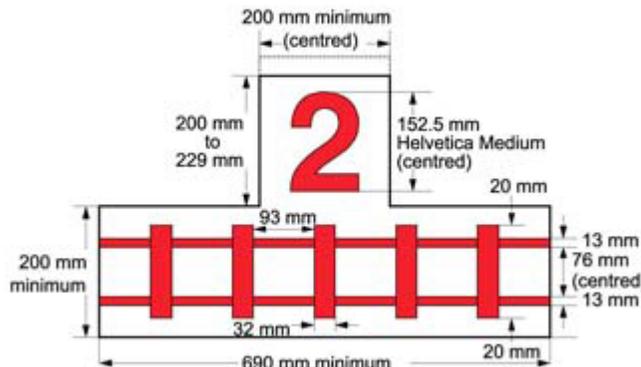


Figure 6 – Number of Tracks sign

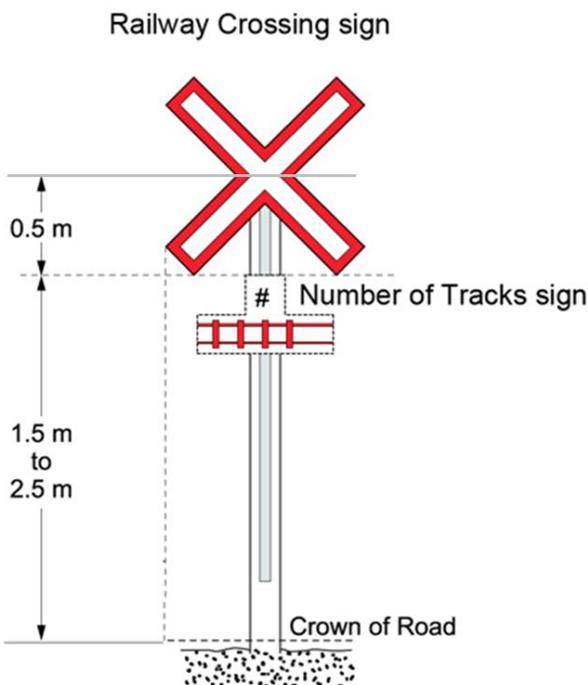


Figure 7 – Sign installation configuration

The Railway Crossing sign must be located between 0.3 m and 2.0 m from the face of the curb, or the outer edge of the road shoulder or, where there is no curb or shoulder, 2.0 m to 4.5 m from the edge of the travelled way.

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The Railway Crossing sign must not be located closer than three (3) m measured to the nearest rail, as shown in Figure 8.

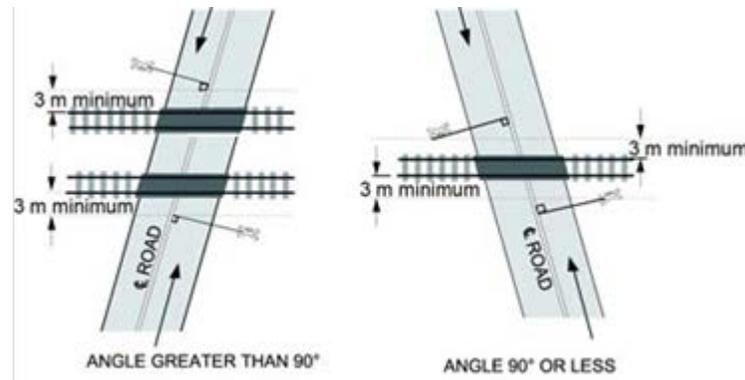


Figure 8 – Railway Crossing and Number of Tracks signs placement

The Railway Crossing sign must be installed in a location that effectively indicates to drivers the presence of the railway crossing.

SUBSECTION 4.2 - ADDITIONAL SUPPORTING POST REQUIREMENTS FOR NEW GRADE CROSSINGS WITHOUT WARNING SYSTEMS

The supporting post, on which is installed the Railway Crossing sign and the Number of Tracks sign, must be of such construction that a 820 kg vehicle striking it at speeds of 32 km/h or more, will not have a change in velocity greater than 4.57 m/s. This requirement does not apply to a Railway Crossing sign installed on the mast of a warning system.

SUBSECTION 4.3 - ADDITIONAL REFLECTIVE MATERIAL REQUIREMENTS FOR NEW GRADE CROSSINGS WITHOUT WARNING SYSTEMS

A 100 mm retroreflective strip must be applied on the back of each blade of the Railway Crossing Sign, for the full length of each blade, as shown in Figure 9.

A 50 mm strip of silver-white sheeting must be applied on the front and back of the supporting post, extending from no higher than 300 mm above the crown of the adjacent road surface to 70 mm above the centre of the Railway Crossing sign as shown in Figure 9.

Further to applying the additional reflective material requirements to new grade crossing construction, it is also recommended that railways ensure that the additional reflective strips noted above are added to back of the

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Railway Crossing sign and supporting posts upon repair or replacement of a Railway Crossing sign.

Retroreflective material referred to in this section, and for new or replacement railway crossing signs must meet the specifications for Type IV material, white sheeting, as specified in sections 4.2.4 and 6.1.4 of *ASTM D4956* when tested in accordance with the Test Methods for Type IV material specified in Sections 7 and 9 of that Standard.

The retroreflective coefficient of the retroreflective material is to be maintained above 50 percent of the value specified for Type IV material specified in article 6.1.4 of *ASTM D4956*.

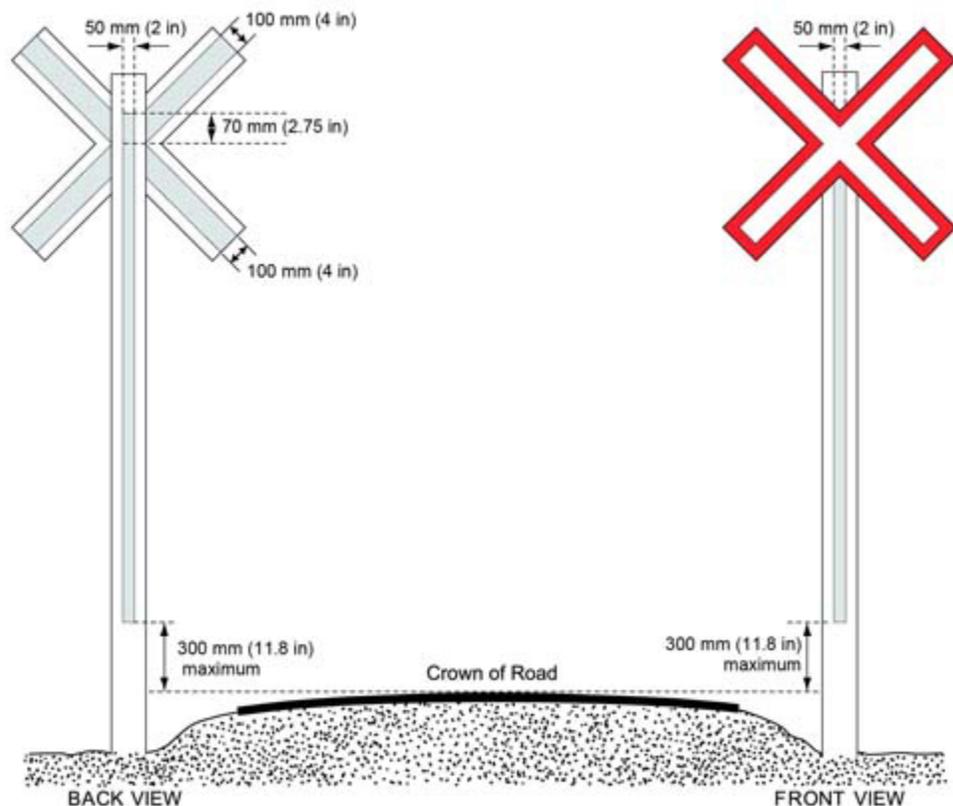


Figure 9 – Retroreflective material configuration

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SUBSECTION 4.4 - RAILWAY CROSSING AHEAD SIGN AND ADVISORY SPEED TAB SIGN

A Railway Crossing Ahead sign with an advisory speed tab sign must be installed if:

- a) The Railway Crossing sign is not clearly visible within the stopping sight distance, or
- b) The speed of the motor vehicle on the road approach needs to be reduced in order to correspond to the crossing design speed.

If required, a sign providing advanced warning of a grade crossing (Railway Crossing Ahead sign) must be as specified in Section 500 WC-04 in the *Saskatchewan Traffic Control Devices Manual* and must meet the applicable standards from that manual as well as applicable specifications from Section 2900 in the *Ministry of Highways and Infrastructure Design Manual Part 2*.

SUBSECTION 4.5 - STOP SIGN

A Stop sign must be installed at a grade crossing without a warning system if the road crossing design speed is less than 15 km/hr.

As an alternative to installing Railway Crossing Ahead signs and advisory speed tab signs, a railway and road authority may agree to install a Stop sign at any grade crossing where the road crossing design speed is less than the posted speed limit.

A railway may only place a Stop sign at a grade crossing without the approval of the road authority if ordered to do so by a provincial railway inspector or the Minister.

A Stop sign must be as shown in Section 400 RA-01 in the *Saskatchewan Traffic Control Devices Manual* and must meet the applicable standards from that manual as well as applicable specifications from Section 2900 in the *Ministry of Highways and Infrastructure Design Manual Part 2*.

When a Stop sign is installed on the same post as a Railway Crossing sign, it must be installed as shown in Figure 10.

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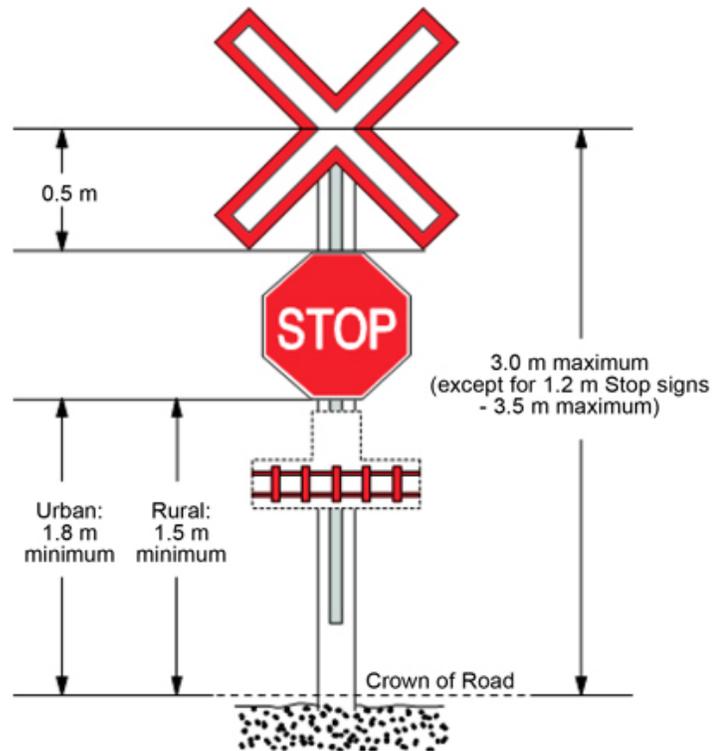


Figure 10 – Stop sign installed on the same post as the Railway Crossing sign

SUBSECTION 4.6 - STOP AHEAD SIGN

A Stop Ahead sign must be installed if the Stop sign is not clearly visible within the stopping sight distance.

A Stop Ahead sign must be as shown in Subsection 501 WB-01 in the *Saskatchewan Traffic Control Devices Manual* and must meet the applicable standards from that manual as well as applicable specifications from Section 2900 in the *Ministry of Highways and Infrastructure Design Manual Part 2*.

SUBSECTION 4.7 - LOW GROUND CLEARANCE AT RAILWAY CROSSING SIGN

A Low Ground Clearance at Railway Crossing sign may be used as needed at railway grade crossings to notify drivers that they are approaching a low clearance grade crossing to prevent vehicles with low ground clearance or long wheelbase to become high-centered or damaged at the grade crossing.

A Low Ground Clearance at Railway Crossing sign symbol must be as shown in the W10-5 image in Figure 8B-4 in Part 8 of the Federal Highway Administration's *Manual on Uniform Traffic Control Devices* and must meet

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the applicable standards and specifications from the *Saskatchewan Traffic Control Device Manual* and Section 2900 in the *Ministry of Highways and Infrastructure Design Manual Part 2*.

SUBSECTION 4.8 - EMERGENCY NOTIFICATION INFORMATION

An Emergency Notification sign that provides information on the location of the grade crossing and the railway company's emergency telephone number must be installed parallel to the road or on each side of the grade crossing, facing traffic approaching the grade crossing. The Emergency Notification sign must be clearly legible.

SUBSECTION 4.9 - DISCRETIONARY SIGNAGE

Discretionary signage may be installed as ordered and/or approved by a provincial railway inspector.

SECTION 5 - ROAD GEOMETRY

The horizontal and vertical alignment of the road approach and the crossing surface must be smooth and continuous at all grade crossings.

The absolute gradient of a road approach to an existing grade crossing shall not be increased.

If the approach gradient or road profile at a crossing is altered, the new road geometry must meet the complete road geometry requirements in Transport Canada's Grade Crossing Standards.

Any new or relocated grade crossing must be designed and constructed to meet the road geometry requirements in Transport Canada's Grade Crossing Standards.

SECTION 6 - SIGHTLINES

Sightlines must be maintained as per the requirements listed in this section.

SUBSECTION 6.1 - DETERMINATION OF SIGHTLINE REQUIREMENTS

Sightlines are measured from a point 1.05 m above the road surface to a point 1.2 m above the top of the lowest rail.

Public grade crossings without a warning system must meet the requirements for D_{SSD} and $D_{STOPPED}$ as shown in Figure 11 and Figure 12, respectively:

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where D_{SSD} is the minimum distance along the line of the railway (in both directions) that a crossing user needs to see approaching railway equipment from the SSD point. D_{SSD} is equal to the distance required for the design vehicle at its road crossing design speed to go from the stopping sight distance completely past the clearance point on the other side of the grade crossing; and,

where $D_{STOPPED}$ is the minimum distance along the line of a public grade crossing that a user needs to see approaching railway equipment, from the stopped position, and safely cross over the public grade crossing.

Public grade crossings with a stop sign must meet the requirements of $D_{STOPPED}$ as shown in Figure 11.

Public grade crossings with a warning system without gates must meet the requirements for $D_{STOPPED}$ as shown in Figure 11.

Sightline requirements in this standard do not apply to grade crossings with warning systems with a gate.

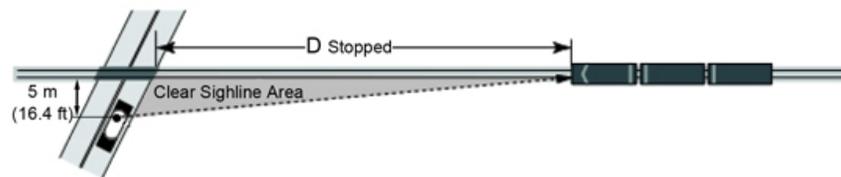


Figure 11 – Sightline for the stopped condition

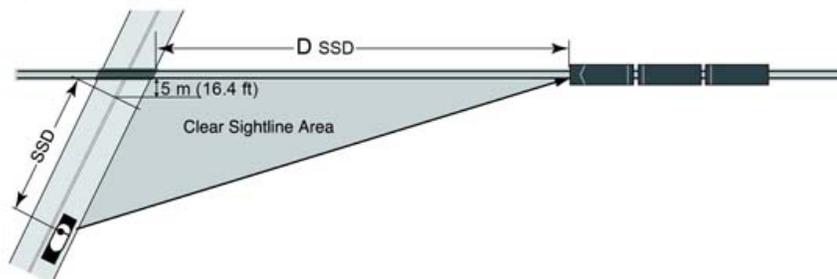


Figure 12 – Sightline for travelling vehicles

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SUBSECTION 6.2 - DETERMINING SSD

Table 4 and Table 5 may be used to determine passenger car and truck class SSD, respectively. The road authority is responsible to identify the design vehicle to be used at public grade crossings.

Table 4 – Passenger car class stopping sight distance (SSD) in meters

Road Crossing Design Speed (km/hr)	Road Approach Gradient																				
	-10%	-9%	-8%	-7%	-6%	-5%	-4%	-3%	-2%	-1%	0%	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
10	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
20	21	21	21	21	21	21	20	20	20	20	20	20	20	20	20	20	19	19	19	19	19
30	33	33	32	32	32	31	31	31	30	30	30	30	29	29	29	29	29	29	29	28	28
40	51	50	49	49	48	48	47	46	46	45	45	45	44	44	43	43	43	42	42	42	42
50	76	75	73	72	71	70	69	68	67	66	65	64	63	63	62	61	61	60	60	59	59
60	104	101	99	97	95	93	91	89	88	86	85	84	83	81	80	79	78	77	77	76	75
70	140	135	132	128	125	122	119	117	114	112	110	108	106	105	103	101	100	99	97	96	95
80	182	176	171	166	161	157	153	149	146	143	140	137	135	132	130	128	126	124	122	121	119
90	223	216	209	202	197	191	186	182	178	174	170	167	163	160	157	155	152	150	148	145	143
100	281	271	262	253	245	238	232	226	220	215	210	205	201	197	194	190	187	184	181	178	175
110	345	331	318	307	296	287	278	270	263	256	250	244	239	234	229	224	220	216	209	209	205

Table 5 – Truck class stopping sight distance (SSD) in meters

Road Crossing Design Speed (km/hr)	Road Approach Gradient																				
	-10%	-9%	-8%	-7%	-6%	-5%	-4%	-3%	-2%	-1%	0%	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
20	26	26	26	26	26	26	25	25	25	25	25	25	25	25	25	25	24	24	24	24	24
30	48	48	47	47	47	46	46	46	45	45	45	45	45	44	44	44	44	44	44	43	43
40	76	75	74	74	73	73	72	71	71	70	70	70	69	69	68	68	68	67	67	67	67
50	121	120	118	117	116	115	114	113	112	111	110	109	108	108	107	106	106	105	105	104	104
60	149	146	144	142	140	138	136	134	133	131	130	129	128	126	125	124	123	122	122	121	120
70	210	205	202	198	195	192	189	187	184	182	180	178	176	175	173	171	170	169	167	166	165
80	252	246	241	236	231	227	223	219	216	213	210	207	205	202	200	198	196	194	192	191	189
90	318	311	304	297	292	286	281	277	273	269	265	262	258	255	252	250	247	245	243	240	238
100	401	391	382	373	365	358	352	346	340	335	330	325	321	317	314	310	307	304	301	298	295
110	455	441	428	417	406	397	388	380	373	366	360	354	349	344	339	334	330	326	322	319	315

If the data provided in Table 4 and Table 5 does not suitably represent the design conditions at a public grade crossing, the following formula may be used to calculate a more representative SSD:

$$SSD = 0.278 \times 2.5 \times V + d \text{ (m)}$$

d = braking distance (m); and,
V = initial speed (km/h).

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SUBSECTION 6.3 - DETERMINING D_{SSD}

The values provided in Table 6 can be used as the D_{SSD} . T_{SSD} may be calculated using the following formulas:

$$T_{SSD} = [(SSD + cd + L) / (0.278 \times V)] (s)$$

SSD = stopping sight distance (m);

cd = clearance distance (m);

L = length of the design vehicle (m); and,

V = road crossing design speed (km/h).

Table 6 – Minimum sightlines along the rail line

Railway Design Speed (mph)	T_{SSD} (s)											If TSSD > 20 seconds, add this length for each additional second (m)
	≤10	11	12	13	14	15	16	17	18	19	20	
	D_{SSD} (m)											
STOP	30	30	30	30	30	30	30	30	30	30	30	0
1-10	45	50	55	60	65	70	72	76	80	85	90	5
11-20	90	100	110	120	125	135	145	155	165	170	180	10
21-30	135	150	165	175	190	205	215	230	245	255	270	15
31-40	180	200	220	235	250	270	285	305	325	340	360	20
41-50	225	250	270	290	315	335	360	380	405	425	450	25
51-60	270	300	325	350	380	405	430	460	485	510	540	30
61-70	315	350	380	415	445	470	505	535	565	595	630	35
71-80	360	395	435	465	505	540	580	610	650	680	720	40
81-90	405	445	490	535	570	605	650	685	730	765	810	45
91-100	450	500	540	580	630	670	715	760	805	850	895	50

If the values provided in Table 6 do not suitably represent D_{SSD} , the following formula may be used to calculate D_{SSD} :

$$D_{SSD} = 0.278 \times V_T \times T_{SSD} (m)$$

where V_T = railway design speed in km/h; and,

where T_{SSD} = time required for the vehicle to travel the SSD and to completely pass the clearance distance.

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In order to determine $D_{STOPPED}$ the following must be determined:

- i) distance to travel during acceleration over the grade crossing;
- ii) acceleration time of the design vehicle;
- iii) time required for the design vehicle, or the pedestrian/cyclist/assistive device to safely clear the crossing; and,
- iv) $D_{STOPPED}$, using the greater of the two times required to safely clear the crossing.

The time required for the pedestrian/cyclist/assistive device does not need to be considered if the crossing is not designated by the road authority for that purpose.

The distance to travel during the acceleration may be calculated using the following formula:

$$S = cd + L \text{ (m)}$$

S = distance to travel to completely pass the clearance distance during the acceleration from a stopped position (m);

cd = clearance distance (m); and

L = length of the design vehicle (m).

Using Figure 13, t , the vehicle acceleration time can be determined by using the acceleration curve values for the design vehicle.

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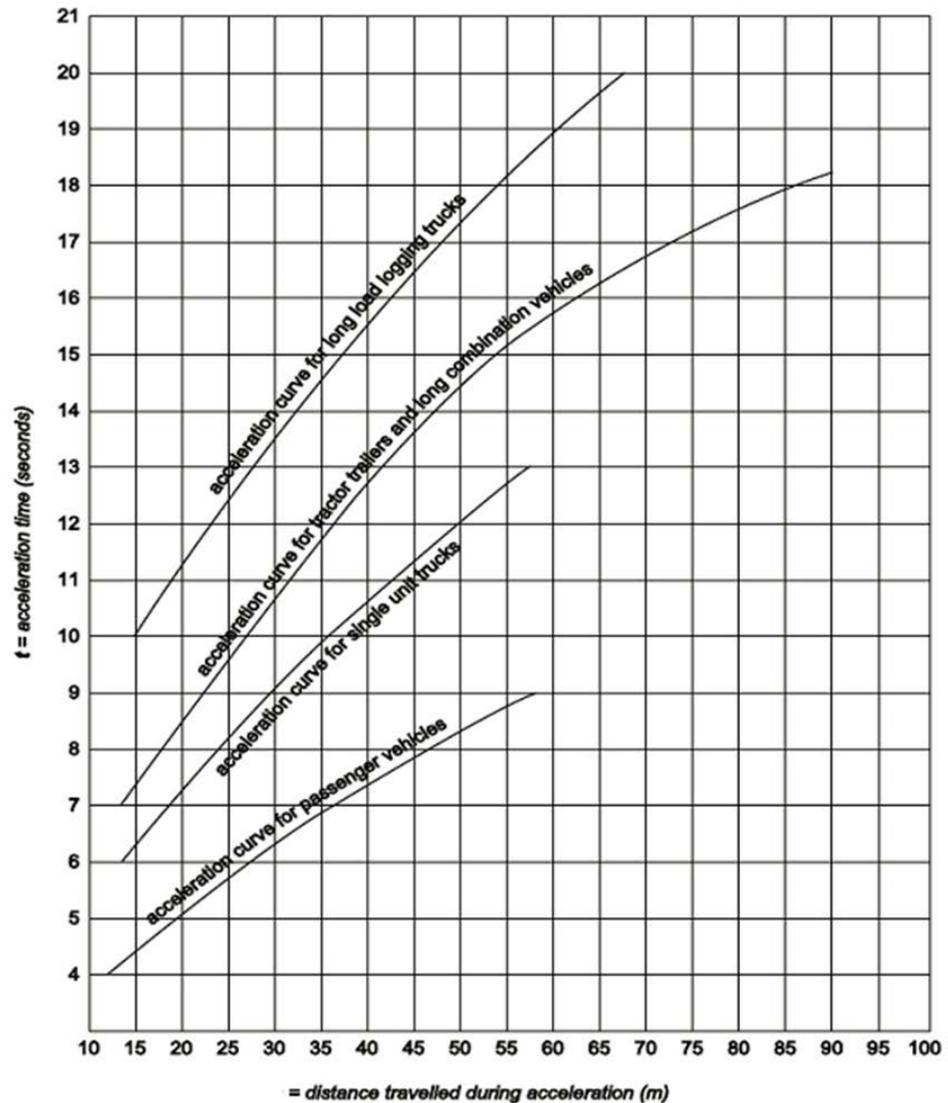


Figure 13 – Acceleration Curves

The design vehicle departure time, T_d , may be calculated using the following formula:

$$T_d = 2 + (t \times G) \quad (s)$$

t = vehicle acceleration time (s); and,
 G = ratio of acceleration times on grades found in Table 7.

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Table 7 – Ratios of acceleration times on grades

Grade Crossing Design Vehicle	Road Grade (%)				
	-4	-2	0	2	4
Passenger Car	0.7	0.9	1	1.1	1.3
Single Unit Truck & Buses	0.8	0.9	1	1.1	1.3
Tractor-Semitrailer	0.8	0.9	1	1.2	1.7

If this calculation of T_d is not suitably representative, tests or estimates for the ratio of acceleration times can be made. Additional time for T_d may be required depending on the number of tracks, surface roughness, super-elevation of the tracks, any unevenness created by the crossing angle or any restrictions on shifting gears while crossing tracks.

The time required for the pedestrian/cyclist/assistive device, T_p , may be calculated using the following formula:

$$T_p = cd / V_p \quad (s)$$

cd = clearance distance (m); and,

V_p = average travel speed in m/s for pedestrians, cyclists and persons using assistive devices to a maximum value of 1.22 m/s.

Table 8 may be used to determine $D_{STOPPED}$. The departure time, $T_{STOPPED}$, is the greater of T_d or T_p .

Table 8 – Minimum sightlines along the rail line for the stopped condition

Railway Design Speed (mph)	$T_{STOPPED}$ (s)											If $T_{STOPPED} > 20$ seconds, add this length for each additional second (m)
	≤10	11	12	13	14	15	16	17	18	19	20	
	$D_{STOPPED}$ (m)											
STOP	30	30	30	30	30	30	30	30	30	30	30	0
1-10	45	50	55	60	65	70	72	76	80	85	90	5
11-20	90	100	110	120	125	135	145	155	165	170	180	10
21-30	135	150	165	175	190	205	215	230	245	255	270	15
31-40	180	200	220	235	250	270	285	305	325	340	360	20
41-50	225	250	270	290	315	335	360	380	405	425	450	25
51-60	270	300	325	350	380	405	430	460	485	510	540	30
61-70	315	350	380	415	445	470	505	535	565	595	630	35
71-80	360	395	435	465	505	540	580	610	650	680	720	40
81-90	405	445	490	535	570	605	650	685	730	765	810	45
91-100	450	500	540	580	630	670	715	760	805	850	895	50

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If the values provided in Table 8 do not suitably represent D_{STOPPED} , the following formula may be used to calculate D_{STOPPED} :

$$D_{\text{STOPPED}} = 0.278 \times V_T \times T_{\text{STOPPED}} \text{ (m)}$$

V_T = railway design speed (km/h); and,

T_{STOPPED} = time required for the user to travel through S (s).

SECTION 7 - WARNING SYSTEMS

If a warning system is required at a grade crossing in accordance with Subsection 7.1 - to Subsection 7.2 - , the ministry recommends that the warning system meet the requirements of Transport Canada's most recent version of the Grade Crossing Standards.

SUBSECTION 7.1 - WARNING SYSTEMS FOR EXISTING GRADE CROSSINGS

Installation of a warning system at an existing crossing should be investigated and considered where the cross-product is 2000 or more.

Existing crossings with warning systems must meet the following articles of Transport Canada's most recent version of the Grade Crossing Standards:

- i) article 13;
- ii) articles 14.2 to 14.6;
- iii) articles 16.1.1 (a) to (c) and (f);
- iv) article 16.2.2;
- v) article 16.3.1;
- vi) article 16.4;
- vii) article 17;
- viii) article 18;
- ix) article 19; and,
- x) article 20.

SUBSECTION 7.2 - WARNING SYSTEM FOR NEW GRADE CROSSINGS

New or relocated crossings must meet all warning system requirements of Transport Canada's most recent version of the Grade Crossing Standards.

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SECTION 8 - TRAIN OPERATIONS AT GRADE CROSSINGS

Railway equipment must not be left unattended in a way that obstructs the sightline requirements.

Equipment must not be allowed to stand so as to cause the unnecessary operation of warning devices.

No part of a movement may be allowed to stand on any part of a public crossing at grade, for a longer period than 5 minutes, when vehicular or pedestrian traffic requires passage.

Switching at public grade crossings must not obstruct vehicular or pedestrian traffic for a longer period than five minutes at a time.

When emergency vehicles require passage, employees must cooperate to quickly clear the involved crossings.

Pursuant to Section 29 of The Railway Act, trains must not unnecessarily interfere with public traffic.