CN GENERAL ENGINEERING INSTRUCTIONS

CANADIAN LINES

The instructions contained within this document are issued for the information and guidance of all employees and contractors engaged in the inspection, maintenance, and construction of track, roadway, signals, bridges, buildings and other structures and must be adhered to.

They apply to the operation of CN Canadian Lines and supersede CN General Engineering Instructions dated October 2006.

Except as provided herein, all Canadian Railway Operating Rules (CROR) and Special Instructions remain in force

Office of the
Vice President System Engineering

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Vice President System Engineering

CN GENERAL ENGINEERING INSTRUCTIONS

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1.0 General

1.1 Every employee and/or contractor engaged in the inspection, maintenance, and construction of track, roadway, signals, bridges, buildings and other structures shall be subject to and conversant with these instructions. Except where specifically noted, the rules and regulations herein apply equally to employees and contractors.

1.2 When local conditions necessitate, instructions in addition to those contained herein, may be issued providing further specific guidelines.

1.3 All Engineering employees required to occupy or foul any track, shall be governed by these instructions. They are also responsible to make themselves familiar with all conditions and special instructions applicable to the territory in which they are working.

1.4 Employees governed by these instructions must have a copy accessible while on duty.

1.5 An employee is foul of the tracks when the individual or equipment is within 4 feet (1.2 meters) of the nearest rail.

1.6 Highway/Roadway Grade Crossing means a location where a public highway, road, street, or unrestricted private roadway and associated sidewalks and any pedestrian or bicycle pathway cross one or more railway tracks at grade.

1.7 Track unit means any on track equipment (e.g. hi-rails, welding trucks, Brandt trucks, frog trucks, boom truck, etc.).

2.0 Job Briefing

2.1 Prior to commencing any work, the employee in charge of a work group will hold a job briefing session for all persons engaged in the activity.

A supplemental job briefing is required when:

- Method of protection is changed, or
- Method of protection is extended or about to be released.
- Job task is changed.

2.2 The job briefing session shall cover all relevant issues with respect to the task being performed and necessary safety precautions that must be taken, including, but not limited to the following:

- Designation of the employee in charge

- Method of on-track protection being used and the limits of authority
- Track(s) that may be fouled
- Operational control of movements on adjacent tracks, if any
- Procedure to arrange for protection on adjacent tracks, if necessary
- Maximum zone speed and minimum sight line requirements when using safety watch protection, or if working adjacent to live tracks
- Means of providing a warning when Safety Watch is used
- Designated place of safety where workers will clear for trains or track units
- Designated work zones around track units
- Safe working and travelling distances between track units
- A field level risk assessment specific to the task to be performed

2.3 At the conclusion of the job briefing, all employees shall confirm understanding. Job briefing information shall be kept in writing, in prescribed job briefing books, for ready reference by each employee.

3.0 Personal Protective Equipment (PPE) and Clothing

3.1 Employees are required to wear PPE appropriate to the work location and the job being done. The following PPE applies to all employees as a minimum requirement:

- Hard hats
- Protective eyewear (including side shields)
- Protective footwear (minimum 6 inches **(152 mm)** high, laced top, defined heel)
- Reflective apparel

Exceptions to these requirements are as follows:

- When working inside designated office/buildings
- When inside an enclosed vehicle or equipment (car, truck, van, etc.)

3.2 Employees are required to wear hearing protection where posted or within 100 feet **(31 meters)** of operating machinery. Hearing protection must be worn within 500 feet **(152 meters)** of a snow jet.

Personal Protective Equipment Charts

3.3 Table 1 contains craft-specific PPE charts for employees that outline requirements for protective equipment. The PPE chart is designed to work in conjunction with the requirements of Section 3.0.

NOTES: Face shields are more restrictive than goggles and can be substituted for goggles. Shin guards are more restrictive than leggings and can be substituted for leggings.

TABLE 1: ENGINEERING GENERAL PPE REQUIREMENTS

	Hearing Protection	Gloves	Rubber Gloves	Goggles	Face shield	Shin Guards	Respiratory Protection Contact Safety Department	Disposable Overalls	Rubberized Apron	Welder's Jacket or Sleeves	Welder's Leathers	Spats/Leggings	Welding Glasses (Shade #)*	Welding Helmet	Remarks/Special Requirements
Abrasive grinding (frog grinding portable)	R	R			R	R	X								
Abrasive grinding or cutting (stationary: bench grinder, chop saw, ect.)	R	X			R		X								
Adzing machine	R	R			R	R	X								Steel instep protection
Banding materials		R			✓										
Batteries: handling or servicing		R	X	R					X						Remove watch if not covered by gloves
Blowing/cleaning with compressed air, steam or water	R	R	X	R	X		X		X						
Boring, reaming, or drilling	R	X			X										
Boutet or thermite welding	R	R			R	R	X						6-8		
Breaking frozen material (ice, ground, gravel, cinders, ballast, etc.) with hand tools		R			R										
Breaking or cutting concrete, stone, or asphalt	R	R			R		X								
Buffing/polishing with wire wheel	R	X			R										
Cadwell bonding	R	R			R							R			
Carbon-arc cutting and gouging	R	R												R	
Chain saw, brush saw, and weed trimmers	R	R			R							R			Chain Saw & Brush Saw; legging/spats
Chemicals, refrigerants or fuels: handling		R	X				X	X	X						
Chipping or cutting	R	R		R											
Chop saw	R	R			R										
Cleaning agents: spraying/general use		X	X	X	X		X		X						
Climbing equipment		R													
Climbing poles and rail/work equipment		R													
Cut-off disks, saws, or other tools with carbide bits	R	R			R							X			

R= Required equipment

X= May be required based on task and materials

✓= Recommended additional equipment

* Welding Shade Chart is found in CN track welding manual appendix A

TABLE 1: ENGINEERING GENERAL PPE REQUIREMENTS

	Hearing Protection	Gloves	Rubber Gloves	Goggles	Face shield	Shin Guards	Respiratory Protection Contact Safety Department	Disposable Overalls	Rubberized Apron	Welder's Jacket or Sleeves	Welder's Leathers	Spats/Leggings	Welding Glasses (Shade #)*	Welding Helmet	Remarks/Special Requirements
Cutting rivets, bolts, or cotter keys; spitting nuts; etc. (mechanically)	R	R			R										
Cutting rivets, bolts, or cotter keys; spitting nuts; etc. (mechanically with torch)	R	R		R									6-8		
Dusty conditions							X	X							
Electrical hazard		X													
Electrical welding	R	R					X			✓	✓			R	
Gas welding, cutting, or heating	X	R					X			✓	✓		6-8		
Hammer-punch	R	R													
Hand tools	X	X													
Intermodal facility: outside of offices	R	X													
Lifting and carrying		X													
Machining steel, iron, or other metals	R	X			X										
MIG/TIG welding	R	R					X			✓	✓			R	
Mule: operation of car mover	R	R													
Painting/spray painting	X	X					X	X							
Pneumatic tools	R	R													
Powder-actuated tools	R	R		R											
Rail drill	R	R													
Rail grinder	R	R			R	R									
Rail saw	R	R			R							R			
Sand blasting (abrasive blasting)	R	R					R	X							Sand blast hood
Scaling, scraping, or removing welding flux	X	R			X		X								
Steam cleaning	R	R	R		R		X		X						
Striking or striking with hardened tools/fastenings	X	R													
Washing locomotives, machinery, or vehicles	R	R	X						X						
Woodworking machines	R	R			X										

R= Required equipment

X= May be required based on task and materials

✓= Recommended additional equipment

* Welding Shade Chart is found in CN track welding manual appendix A

Forms of Protection

3.4 All engineering employees required to foul* or occupy tracks must be protected by one of the following means:

- Positive protection as per the CROR
- Safety Watch protection
- Lone worker protection

*Excludes when not performing work and solely crossing tracks. Tracks may be crossed without protection only when sightlines permit and there are no Class 5 restrictions in place.

Application of Portable Derails

3.5 In conjunction with CROR rule 840.1, portable derails will be used where a special lock cannot be applied to a switch to prevent movement from operating over the portion of the track where work is being performed.

3.6 Portable derails are to be installed 100 yards (91 meters) (if possible) on each side of the work location within the limits of the red flag. Portable derails are only to be used on tracks where speeds do not exceed 20 mph (32 km/hr).

3.7 Consider the following in selecting the orientation of the derail:

- Materials and Equipment – select the derail orientation (left hand or right hand) and place the derail such that a derailed car moves away from any stored material or equipment.
- Adjacent Live Track – select the derail orientation (left hand or right hand) and place the derail such that a derailed car moves away from the adjacent live track.
- Surrounding Terrain – select the derail orientation (left hand or right hand) and place the derail such that a derailed car moves away from any waterways, highways, roadways, non-CN lands and/or sensitive/restricted areas.

4.0 Lone Worker Protection

NOTE: Lone Worker protection is not applicable in multi-track Class 5 territory (i.e. multi-track territory where freight train speeds exceed 60 mph and passenger trains exceed 80 mph).

4.1 Employees using lone worker protection must participate in a job briefing with his or her supervisor or other designated employee.

The job briefing must include the lone worker's planned itinerary and the procedures that will be applied to establish protection.

4.2 Employees performing the tasks shown in Table 2 using lone worker protection will comply with the following:

- The work must not affect the movement of trains;
- The lone worker must be able to visually detect the approach of a train at maximum timetable speed and be in a place of safety 15 seconds before the arrival of the train;
- Power operated tools and track units are not in use within hearing distance;
- The ability to hear and see approaching trains and track units is not impaired by background noise, lights, precipitation, fog, passing trains or physical conditions;
- The employee has identified a place of safety prior to occupying or fouling the track.

4.3 An employee who uses lone worker protection must first complete the Statement of On Track Safety. The statement must designate the date and time for which it is valid. The statement must also indicate the maximum authorized speed of trains within the limits and the sight distance that provides the required warning of approaching trains. The lone worker using lone worker protection to establish protection shall produce the Statement of On Track Safety when requested by a company officer.

4.4 A lone worker must use another form of protection if:

- The requirements of 4.2 cannot be met, or
- The task to be undertaken is not listed in Table 2.

Determination of Adequate Clear Sightline Distance

4.5 There are a number of ways in which clear sightline distances can be determined. Employees should select the method that best suits their situation.

1. Track features such as crossings, bridges, overpasses, turnouts, way side buildings, etc., whose mileage is known can be used as reference points to determine the sight distance from the work location.

2. Mileage boards can be used as a reference point to determine the sight distance from the work location.
3. If railway pole lines are present, these can be counted in either direction to obtain sightline distances.
4. If work location is one that is frequented often (such as a turnout, road crossing, railway crossing at grade, etc.), a tape measure, measuring wheel or a track unit with a distance counter can be used to measure sight distances for all future visits to that location.
5. The use of portable hand held optical distance measuring devices may be used to determine clear sightline distances.

NOTE: Employees may be required to demonstrate how the sightline distance was obtained. This information must be recorded in the job briefing book.

Clear Sightline Distance

4.6 Lone Worker Protection will NOT be considered as adequate protection where sightlines, train speeds, weather conditions, restricted clearing ability, etc., do not allow sufficient time for the employee being protected to move to and occupy a previously arranged place of safety *not less than 15 seconds before a train moving at a maximum speed for that track, reaches that point.* Should more time be required to clear the track, it must be added to the 15 seconds.

Example: An employee is working under Lone Worker protection on a track where the maximum train speed is 35 mph (56 km/hr). It is determined that it will take the employee 5 seconds to clear himself and his tools from the track and be in a place of safety after being warned of an approaching train. This 5 seconds must be added to the 15 seconds indicated above. Therefore, from the table below, the clear sight lines required are found under the 20 second column for a train speed of 35 mph (56 km/hr), or 1030 feet (314 meters). of clear distance in either direction.

4.7 Table 3 indicates the required distance by which time employees and their tools must be completely in the clear and in a safe location for trains traveling at various speeds.

TABLE 2: WORK PERMITTED UNDER LONE WORKER OR SAFETY WATCH PROTECTION

	Description of Work	Permitted Under Lone Worker	Permitted Under Safety Watch
1	Anchoring	yes	yes
2	Bolt tightening or individual replacement	yes	yes
3	Bonding – **without drilling**	no	yes
4	Bonding – temporary or replacing plug bond	yes	yes
5	Brush cutting – Foul of track **hand tools only**	yes	yes
6	Brush cutting – Underneath bridge	yes	yes
7	Cotter key replacement	yes	yes
8	Crossing testing	yes	yes
9	Culvert inspections	yes	yes
10	Derail adjustment	yes	yes
11	Digging/shoveling ballast by hand	yes	yes
12	Drifting joints	no	yes
13	Gauge rod removal/installation	no	yes
14	Grinding	no	yes
15	Hand measuring of clearances	yes	yes
16	Inspection of bridges from underneath or beside bridge	yes	yes
17	Inspection of signal apparatus and appliances	yes	yes
18	Inspection of track - **on foot**	yes	yes
19	Lagging screws - **off track tools only**	no	yes
20	Lubricating	yes	yes
21	Painting comp joints, switch handles, derails, safety appliances, etc.	yes	yes
22	Pole line work	yes	yes
23	Rail wear/ Track geometry measurements	yes	yes
24	Snow clearing device (SCD) installation, removal and maintenance.	no	yes
25	Shoulder trimming with **hand tools**	yes	yes
26	Shunting- must have permission from RTC	yes	yes
27	Sign repair and installation-	yes	yes
28	Signal alignment	yes	yes
29	Signal and utility locates	yes	yes
30	Slotting joints	no	yes
31	Snow removal – **hand tools only**	yes	yes
32	Snow removal – with compressors and backpack blowers** (Not applicable on main track or where speeds are greater than 15 mph)	no	yes
33	Spiking/clip installation	yes	yes
34	Semi automatic spring switch testing (Only applicable on yard tracks where track speed is 15 mph or less)	no	yes
35	Surveying/layout/staking/alignment measurements	yes	yes
36	Switch target replacement/maintenance	yes	yes
37	Tamping by hand (**without track jacks**)	yes	yes
38	Tie plate replacement (**single tie plate without jacks**)	yes	yes
39	Tie marking/painting defective ties	yes	yes
40	Welding, points, frogs, and joints	no	yes

1) **When hand tools specified no power tools are permitted.**

2) ****In the application of Item 32 the following conditions apply**
a. applicable where track speed is 15 mph or less
b. when back pack blower is used, must utilize tag line to provide physical warning to clear the tracks.
c. when compressor is used physical warning may be provided by use of tag line, tugging on the air supply hose or shutting off the air supply.
d. Not applicable on main tracks.

TABLE 3: MINIMUM REQUIRED SIGHTLINE DISTANCES

Train Speed (mph)	Required Sight lines (in ft.)			
	15 seconds	20 seconds	25 seconds	30 seconds
10	220	295	370	440
15	330	440	550	660
20	440	590	735	880
25	550	735	920	1100
30	660	880	1100	1320
35	770	1030	1290	1540
40	880	1175	1470	1760
45	990	1320	1655	1980
50	1100	1470	1840	2200
55	1210	1615	2020	2420
60	1320	1760	2205	2640
65	1430	1910	2390	2860
70	1540	2055	2570	3080
75	1650	2200	2755	3300
80	1760	2350	2940	3520
85	1870	2495	3125	3740
90	1980	2640	3310	3960
95	2090	2790	3490	4180
100	2200	2935	3675	4400

5.0 Safety Watch

5.1 Work that is performed on or about the track that does not require positive protection as provided by the Canadian Rail Operating Rules (CROR) may be performed using Safety Watch protection.

Exception: In the case of multi-track Class 5 territory, Safety Watch protection may only be used for the sole purpose of undertaking a visual walking inspection. In no case may hand inspection tools such as tape measures, rail wear gauges, track gauges, level boards, etc. be used in such inspections. In addition, all the other provisions of Safety Watch must be adhered to.

A list of work that can be undertaken under Safety Watch is provided in Table 2.

Duties of Safety Watch

5.2 The sole duty of the Safety Watch is to protect working personnel by continuously monitoring all approaches to the work site for train and track unit movements or other hazards. The Safety Watch must dedicate their entire attention to this task and never engage in distracting activities, such as talking on a cell phone, text messaging, browsing, etc. In addition, they are never to engage in any other distracting activities, including the work being undertaken.

Safety Watch Job Briefing

5.3 Prior to implementing Safety Watch protection, the employee in charge, the Safety Watch and the employee(s) being protected must conduct a thorough job briefing to ensure that at a minimum the following items are covered and there is a clear understanding of:

- Identification of track or tracks to be fouled;
- The date work is performed;
- Who is the designated Safety Watch;
- Where the Safety Watch will be positioned;
- What work is to be performed;
- If additional clearing time is required;
- The maximum speed of trains on that track and required sightline distance;
- The sightline distance at the work site;

- Where the workers will clear on the approach of rail traffic;
- How the warning is to be given;
- Where any tools are to be placed when clearing;
- Who will clear the tools;
- Other risks at the work site.

This information must be documented (in writing) in the job briefing notes.

Determination of Adequate Clear Sightline Distance

5.4 There are a number of ways in which clear sightline distances can be determined. Employees should select the method that best suits their situation.

1. Track features such as crossings, bridges, overpasses, turnouts, way side buildings, etc., whose mileage is known can be used as reference points to determine the sight distance from the work location.
2. Mileage boards can be used as a reference point to determine the sight distance from the work location.
3. If railway pole lines are present, these can be counted in either direction to obtain sightline distances.
4. If work location is one that is frequented often (such as a turnout, road crossing, railway crossing at grade, etc.), a tape measure, measuring wheel or a track unit with a distance counter can be used to measure sight distances for all future visits to that location.
5. The use of portable hand held optical distance measuring devices may be used to determine clear sight line distances.

NOTE: Employees may be required to demonstrate how the sightline distance was obtained. This information must recorded in the job briefing book.

Clear Sightline Distance

5.5 Safety Watch protection will NOT be considered as adequate protection where sightlines, train speeds, weather conditions, restricted clearing ability, etc., do not allow sufficient time for each worker being protected to move to and occupy a previously arranged place of safety *not less than 15 seconds before a train moving at maximum speed for that track, reaches that point.* Should more time be required to clear the track, it must be added to the 15 seconds.

Example: Employees working under Safety Watch protection on a track where the maximum train speed is 35 mph (56 km/hr). It is determined that it will take the employees 5 seconds to clear themselves and their tools from the track and be in a place of safety after being warned of an approaching train. This 5 seconds must be added to the 15 seconds indicated above. Therefore, from the table below, the clear sight lines required are found under the 20 second column for a train speed of 35 mph (56 km/hr), or 1030 feet (314 meters). of clear distance in either direction.

5.6 Table 3 indicates the required distance by which time employees and their tools must be completely in the clear and in a safe location for trains traveling various speeds.

6.0 Crossing Bridges Using Lone Worker or Safety Watch

6.1 Employees who need to cross bridges in the performance of their duties using either Lone Worker or Safety Watch protection may do so provided that they adhere to the following criteria:

- The maximum length of track carrying bridge that can be crossed in Class 1 and 2 Track is 300 feet (91 meters).
- The maximum length of track carrying bridge that can be crossed in Class 3 and 4 Track is 200 feet (61 meters).

Bridges in the following category require positive protection in order to cross;

a) longer than the lengths indicated above, or
b) have insufficient sight lines, or
c) are located in Class 5 track

6.2 When crossing a bridge and you observe or are made aware of the approach of a movement, clear the bridge in the following manner:

- If you are not yet at the half way point of the bridge, turn around and clear the bridge in the direction from which you came.
- If you are at the half way point of the bridge or beyond, continue and clear the bridge in the direction in which you are proceeding.

Always clear the bridge in the direction of shortest distance.

6.3 Table 4 should be used as a guide in determining the minimum clear sight line distance required to cross a bridge. These minimum distances are based on timed field measurements for 1 or more people to cross and are based on good weather conditions, good footing conditions and a medium walking pace. **The minimum clear sight line distance to cross a bridge includes the 15 seconds required to be in a place of safety prior to the arrival of a movement. The maximum speed for that track shall be used to determine the minimum sightline distance.**

TABLE 4: MINIMUM SIGHT LINE DISTANCE REQUIRED TO CLEAR BRIDGE

Minimum Sight Line Distance Required to Clear a Bridge (feet)						
Length of Bridge (feet)	50	100	150	200	250	300
Maximum Distance to Clear (feet)	25	50	75	100	125	150
Class 1 Track Freight only	352	469	587	719	836	953
Class 1 Track with Passenger	528	704	880	1078	1254	1430
Class 2 Track Freight only	880	1173	1467	1797	2090	2383
Class 2 Track with Passenger	1056	1408	1760	2156	2508	2860
Class 3 Track Freight only	1408	1877	2347	2875		
Class 3 Track with Passenger	2112	2816	3520	4312		
Class 4 Track Freight only	2112	2816	3520	4312		
Class 4 Track with Passenger	2816	3755	4693	5749		

Note: The above minimum sight line distances are based on the place of safety being at the abutments of the bridge. Should the place of safety be further from the bridge than the abutment location, then additional time and sight line distance will be required and therefore must be assessed at the time the bridge is to be crossed.

If the length of bridge to be crossed is not indicated in the table above, then use the next longest bridge length that is indicated.

Example: You wish to cross a 190 feet (58 meters) long bridge in Class 3 track on which passenger service is run, using Lone Worker Protection. You note that there is a place of safety on either end of the bridge, just off the

abutment. What is the minimum required sightline distance in order to cross this bridge?

Solution: From the table above, select the next longest length bridge. In this case, a 200 feet (61 meters) long bridge with a maximum clearing distance of 100 feet (31 meters). The minimum sight line distance for Class 3 track with passenger is 4312 feet (1314 m).

Separated Work Group

6.4 When the nature of the work or size of the work crew is such that the Foreman named in the track authority protection (Protecting Foreman) cannot personally observe, and supervise all persons engaged in the work, he/she shall assign an employee(s) in charge of the separated work groups as per CROR Rule 857 special instructions.

7.0 Clearing Trains

7.1 Where track protection authority permits, a train may be authorized by the Protecting Foreman to enter the protection limits and proceed to a location within the limits short of the working point. This location must be a clearly identifiable point such as a mile board, point of switch, public crossing, bridge, etc. and must be identified by mileage. The Protecting Foreman must not permit the train to proceed further until he/she has confirmed that all of the procedures with respect to authorizing trains through protection limits have been met.

NOTE: Not applicable to separated work groups.

7.2 Except in the case of emergency, a train or engine authorized into the protection limits may only be stopped once for the purpose of clearing employees.

7.3 Workers required to clear for a train must position themselves in a safe location and clear a minimum of 19 feet (6 meters) from the nearest rail on which the train has been cleared. If it is not possible to clear a minimum of 19 feet (6 meters), the train speed must be reduced when passing the workers and not exceed 30 mph (48 km/hr). Under no circumstances may employees stand on live and unprotected track while observing passing trains on adjacent tracks. Where the work area includes difficult terrain or special features such as bridges or tunnels, a safe clearing area must be identified prior to occupying or fouling the track.

7.4 In single track territory when track units are removed from the track or cleared in a nearby spur, siding or back track, booms, wings, etc. must be retracted and secured clear of the affected track. Small tools and other material must also be cleared and secured to avoid being struck by a passing train.

8.0 Adjacent Track Instruction

8.1 In the application of this instruction, adjacent tracks that are governed by CROR Rule 105 and that are fouled will require protection.

8.2 In multi-track territory, positive track protection must include the track or tracks immediately adjacent to the track on which the work is being performed. Tracks shall be considered adjacent when the measured distance between track centers is less than 25 feet (7.6 meters).

8.3 Exception: In multi-track territory, where the Protecting Foreman is in immediate contact by radio or in-person with all track units and workers, and the track units being protected and the activity being performed will not foul an adjacent track as per GEI rule 1.5, track protection need not be applied on adjacent tracks. When clearing trains in multi-track territory, workers must avoid crossing over live unprotected track. Only those employees instructed by the Protecting Foreman may cross a live track for the purposes of providing a train inspection. When working on an inside track that is bound by live tracks, workers must position themselves between the rails of the protected track on which they are working when clearing a train.

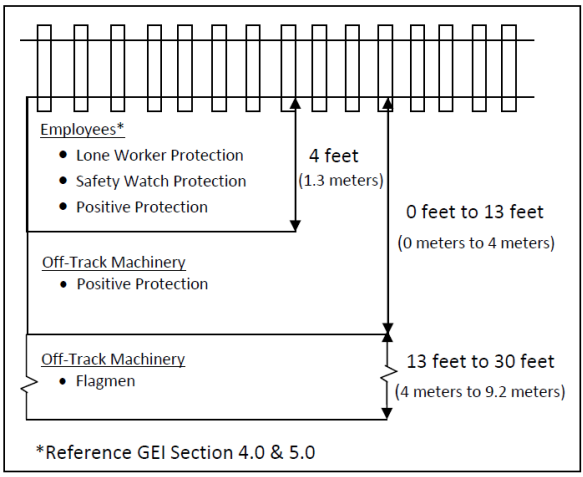
9.0 Off Track Machinery

9.1 Off track machinery such as bulldozers, frontend loaders, excavators, etc. which are working within 13 feet (4 meters) of the nearest rail or such that boom swing or bucket extension will extend within 13 feet (4 meters) of the nearest rail, must be provided with positive protection in accordance with applicable operating rules.

9.2 Off track machinery working within 30 feet (10 meters) of the nearest rail, regardless of protection, must stop working on the approach of a train and remain stopped until the train has passed.

9.3 Off track machinery working between 13 feet and 30 feet of the nearest rail requires protection by a flagperson.

FIGURE 1: TYPE OF PROTECTION NEEDED



10.0 Track Unit Procedures

10.1 Operators of track units, while on rail, must be qualified in the CN General Engineering Instructions (GEI) and Canadian Rail Operating Rules (CROR), must be knowledgeable of the physical characteristics of the unit in which they are operating and must become familiar with and be governed by the operating and maintenance instructions or manuals supplied by the Railway and/or Manufacturer. Operators of high rail vehicles must have a valid motor vehicle license.

10.2 Pre-trip inspection of track units is required at the start of every shift.

10.3 The operator of a track unit is responsible for completing the required logbook(s), and to inspect and to maintain the track unit at the prescribed frequency.

10.4 Unauthorized persons are not permitted to ride on track units. With the exception of Federal, Provincial or Municipal police and Federal Regulatory Officers (with valid identification and in the course of duty), all authorized, non-Company personnel are required to sign a “Release of Liability” form when riding on track units.

10.5 Unless specified, track units must not be relied upon to shunt track circuits

Track units with damaged or defective insulation must be repaired immediately.

10.6 When a track unit operator or pilot is copying a track authority, writing other information, or using ETOP, the track unit must be stopped.

10.7 When a train is operating on an adjacent track, track units must be brought to a stop. If it can be done safely, the passing train should be inspected on both sides.

10.8 In the application of CROR 857 special instruction, the following will apply:

- Prior to entering the limits of the confliction(s) as indicated on the foreman's TOP or OCS clearance, the foreman named in the authority must contact all other conflicting foreman. If unable to contact the conflicting foreman named in the authority, the foreman named in the authority may enter the said limit but only to the point to cancel the preceding TOP, OCS clearance, or clear the main track. The foreman may only clear the track after trying to communicate with the conflicting foreman by all means and through the RTC. When clearing, the foreman must:
  1. Be able to visually see the next crossing or siding switch, and
  2. Not exceed 10 mph (16 km/hr).

10.9 All occupants riding in a track unit are responsible for its safe operation.

10.10 Verifying Limits

a) Operators of track units being protected must have in their possession, written or electronic confirmation of their authority to occupy the track and the working limits. When working in a group consist (two or more track units), only the lead track unit and the rear track unit are required to have in their possession a written or electronic copy of the protection or authority.

b) When working or traveling, the lead track unit must comply with the following requirements:

Prior to passing a controlled signal or identifiable location, the occupants of the track unit must:

- Review the permit or authority to verify the controlled signal (signalled territory)

or identifiable location (non-signalled territory) being approached is included in the current protection, and

- Record the time and the signal number/name (signalled territory) or identifiable location (non-signalled territory) being passed when the permit/authority is verified.
- For the purpose of this instruction identifiable locations are station name signs, siding switches, and/or mileage posts), The identifiable locations that must be verified and recorded are station name signs and siding switches only. However, when the work limits include a mileage, a stop must be made one (1) mile before and at the mileage stated in the authority.

A lone track unit operator must bring the track unit to a complete stop before recording the location being passed as per item 10.6.

c) When travelling within the same controlled signals or identifiable location multiple times (working), the occupants are required to verify they are authorized to enter the limits upon the initial entry only. They may work within the location moving in both directions an unlimited number of times; however the permit/authority need only be verified once.

d) The rear track unit need not stop at control points or identifiable locations unless it reverses direction and becomes the lead unit.

e) The operator of the track unit or another designated occupant in the track unit must make the following broadcast upon departing each signal or identifiable location. The radio broadcast must include the;

- Identity of the track unit or the identity of the operator, and
- Present location and direction of travel.

When in a terminal area, no radio broadcast is required.

f) The instructions of this section (Section 10.10) do not apply to test cars within the working limits when testing.

10.11 The operator must ensure that the track unit is equipped with a proper flagging kit, first aid kit, charged fire extinguisher and a train radio.

10.12 All tools and materials must be properly secured against movement when the track unit is operating.

10.13 Track units may be coupled only by using an approved coupling device.

10.14 Lights to the front and rear and strobe lights, (when available), must be displayed when the track unit is operating on rail. (Note: Strobe lights must not be operated when traveling on the highway.)

10.15 When it is necessary for individual employees to travel under difficult conditions such as extreme heat or cold, heavy snow or rain, or in remote areas, etc. additional safety precautions such as establishing specific call-back times with another competent employee, shall be taken.

10.16 Unless protected by CROR Rule 105c, when not in immediate use or left unattended, track units must be protected against trains or engines and secured against unauthorized or unintentional movement. Track units may be protected by CROR 840.1 or other methods, ie removing the track from service. Additional clearance must be maintained where the possibility of snow removal machinery or wide load operations exist.

10.17 Track units must not be brought to a stop on the switch points of dual control switch or the point of a moveable point frog.

10.18 Spring switches and semi-automatic switches must be lined by hand for trailing point movements by track units.

10.19 Track units must operate over self-restoring dual control switches and power operated self-restoring derails in accordance with instructions, if issued, for those devices otherwise they must be placed in hand position when being traversed by a track unit.

10.20 Except during the actual working operation, extendible working components of a track unit must be retracted to the travel position and all locking devices put in place before the track unit is moved.

10.21 Operating track units in the vicinity of passenger trains entraining and detraining should be avoided. A track unit must move with extreme care when moving alongside a train carrying passengers which is discharging or receiving traffic. They must not pass between such train and the station

or platform, unless movement is properly protected.

10.22 Track inspections and track work should be planned such that track units operate or work in the forward direction whenever possible. When necessary to change direction of travel, if possible and practicable, track units should be turned and operated in the forward direction.

10.23 The following safety precautions must be taken when operating track units in reverse:

- Lights on the leading end of the track unit must be illuminated.
- A back up audible alarm must be operating. If not so equipped or operable, the operator must sound the horn on a regular basis. Three short sounds of the horn will be used before commencing a reverse movement.
- When visibility in the reverse direction is obscured, another employee must be positioned so as to warn the operator of any obstructions.
- Employees operating track units designed to work in both directions and working within a gang consist must conduct a job briefing session ensuring that procedures involving the track unit(s) movements and the operation of the gang are covered.

Working on or Around Track Units

10.24 The following precautions must be taken when working on or about track units:

- All persons operating or riding in track units must understand the duties that each person will perform.
- Use handrail if so equipped, when getting on, getting off or riding a track unit.
- A track unit must be stopped before getting on or off. Exception: Authorized personnel may entrain or detrain a tamper in work mode.
- Use the 3-point contact method when getting on or off a track unit.
- When working near or observing track units, communicate with the operator and ensure that the following is understood:
  - Operating procedure,
  - Location of employees working around and observing the tack unit,
  - Operators blind spot,

- Signal warnings that track unit will move,
- Where duties require employees to be near working track unit, employees must stay outside the 15 feet (4.5m) safe area,
- Where duties require the employees to be within the 15feet (4.5m) safe area, the operator and employee must jointly establish a safe location for the employee to occupy.

11.0 Track Unit Operation

11.1 Track units will operate under full control prepared to stop at all times. Operators must be increasingly vigilant as they approach any level crossing (public, private, farm or pedestrian), interlockings, animals or people near the track and when passing over bridges.

11.2 Initial brake test – Immediately after setting the unit in motion the brakes must be tested to ensure they are operating properly. In all cases, occupants, if any, are to be warned of brake tests by the operator.

11.3 Distance to stop test – The operator must conduct a "distance to stop" test when the track unit reaches the operating speed. This will be done by applying full controlled braking without producing a wheel skid situation while bringing the vehicle to a complete stop. Further "distance to stop" tests must be conducted when there are changes in conditions that affect the track unit's ability to stop, in advance of areas with poor sight lines, road crossings or other work groups.

11.4 Immediately after performing a "distance to stop test" and while still stopped, the following information must be recorded:

- Time the test was performed,
- Location where the test was performed,
- Operating speed at the start of the test,
- Braking distance.

The recorded information must be retained and available for inspection for the duration of the shift.

11.5 Track units must maintain a spacing of at least 300 feet (91 meters) between track units, when traveling. Track units must maintain a spacing of at least 500 feet (152m) from a standing train or engine on the same track, or when following a moving

train or engine. These distances may be decreased if there is a clear understanding with the train or engine that it is safe to do so. An increase in spacing is required if stopping distances are increased.

11.6 When track units are traveling together, track unit operators must advise each other when planning to stop. If communication with the other track unit operator(s) is not acknowledged, the operator must stop the track unit, exit and use all possible means to flag the following track unit operators to stop.

11.7 While working, track units must maintain a minimum 40 feet (13m) spacing between units. If work requires a closer spacing, a clear understanding between all operators and employees must be established.

Track Unit Operating Speed

11.8 Track units will operate at a speed not exceeding "Track Unit Speed", unless otherwise directed by Operating Rule or Special Instruction.

11.9 Work track units unless specified by special instruction for a particular unit or type of unit must not exceed a maximum of 25 mph (40 km/hr). Work track units are any track unit not included in 11.10.

11.10 Light duty hi-rail vehicles assigned for the purpose of conducting inspections must not exceed a maximum of 45 mph (75 km/hr) on tangent track and 30 mph (50 km/hr) on curves. Vehicles operating in this category must have authorization by the Regional Chief Engineer.

11.11 Track units must not exceed 5 mph (8 km/hr.) over any switch that has power operation capability, or moveable point frogs.

11.12 Track units will operate with extreme caution while traveling through the closed point of a spring frog, self-guarded manganese frogs and all other special track work, ensuring that all wheels are properly on the rails at all times.

11.13 Unless otherwise specified by special instruction, the maximum speed, when reversing, will be Track Unit Speed not exceeding 15 mph (25 km/hr).

12.0 Contractor Employee Qualifications

Contractors working for CN must comply with the requirements below. Exemptions may only be granted by the Regional Chief Engineer or his/her representative in the case of emergencies.

Contractor Requirements

12.1 The contractor must identify a Safety Officer who will be a point of contact for CN on:

- Safety related matters such as action plans
- Employee qualifications
- Employee training
- Exchanging documentation on policy and procedure changes, etc.

12.2 Provide CN with a list of the employees working on or expecting to work on CN property and their qualifications. This includes the employee's full name, date of birth as well as:

- Training completion dates
- Refresher and recertification due dates
- Proof of training provider (i.e. CN, other railroads, outside college, etc.)
    - CN will only accept CROR qualifications that are provided by a CN Operating Practices approved training supplier.

12.3 Employees must carry documented proof of training in their possession while on CN property. Employees who are not in the list per rule 12.2 and who's proof of qualifications are not provided will not be allowed on CN property.

12.4 Contractors must ensure that their employees are briefed and are provided current copies of CN's standards and policies including most recent updates.

12.5 In order to allow new employees access to a CN work site, the following process must be followed:

- Contractors must provide their names and qualifications to the office of the Regional Chief Engineer and Supply Management prior to these employees gaining access to CN property.
- Contractor must receive CN's acceptance of the qualifications prior to new employees entering CN property.

12.6 Provide a safety plan to the Regional Chief Engineer including the following but not limited to:

- An injury prevention program
- Safe track unit operation
- Staying within their track authority limits
- Specify method of ensuring compliance and an auditing process
- Field level risk assessment

CN Requirements

12.7 CN will provide the track protection for contractors, except in specific cases as authorized by the Vice President of Engineering.

12.8 CN will specify the level of training required in the following tables.

JOB SPECIFC TRAINING REQUIREMENTS

NOTE: The job specific training requirements of Table 5, 6, and 7 do not preclude other training requirements specific to the position: such as crane, welder, machine operation or other trade skills as the job may require.

TABLE 5: TRACK TRAINING REQUIREMENTS

Job Title / Role	Contractor Orientation Training (eRailsafe)	CROR	GEIs	Track Inspection Guidelines	Track Unit Operations
Foreman / Asst Foreman	Yes	Yes	Yes	Yes	Yes
Machine Operator – On Track	Yes	Yes	Yes	n/a	Yes
Machine Operator – Tamper	Yes	Yes	Yes	Yes	Yes
Machine Operator – Off Track	Yes	n/a	n/a	n/a	n/a
Flagman	Yes	Yes	Yes	Yes	Yes
Flagman – other*	Yes	Yes	Yes	n/a	n/a
Trackman / Welder / Labourer	Yes	n/a	Yes	n/a	n/a

* Note: This has limited application. It includes protecting utility companies and work not impacting track infrastructure.

TABLE 6: BRIDGE TRAINING REQUIREMENTS

Job Title / Role	Contractor Orientation Training (eRailsafe)	CROR	GEIs	Track Inspection Guidelines	Track Unit Operations	Fall Protection	Fall Rescue	Confined Space
Bridgetenders	Yes	Yes	Yes	n/a	n/a	n/a	n/a	n/a
Machine Operator On Track	Yes	Yes	Yes	n/a	Yes	As required	As required	n/a
Machine Operator Off Track	Yes	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Workers On Bridges	Yes	n/a	n/a	n/a	n/a	Yes	Yes	n/a
Workers Off Bridges	Yes	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Flagman	Yes	Yes	Yes	Yes	Yes	n/a	n/a	n/a
Culvert Work/Inspection	Yes	n/a	n/a	n/a	n/a	n/a	n/a	As required

TABLE 7: S&C TRAINING REQUIREMENTS

Job Title/Role	Contractor Orientation Training (eRailsafe)	CROR	GEIs	Boom Truck Qualifications	Track Unit Operations	Fall Protection	Signal Apprenticeship Qualifications
Foremen / Coordinator Ground Work only	Yes	Yes – Note 1	Yes	n/a	Yes – Note 1	Yes	n/a
Foremen /Coordinator Ground work, Wiring and Hookup	Yes	Yes – Note 1	Yes	n/a	Yes – Note 1	Yes	Yes
Machine Operator – on Track	Yes	Yes	Yes	n/a	Yes	Yes – Note 3	n/a
Machine Operator – off Track	Yes	n/a	Yes	n/a	N/A	Yes – Note 3	n/a
Flagman	Yes	Yes	Yes	n/a	Yes	n/a	n/a
Boom Truck Operator- on Track	Yes	Yes	Yes	Yes	Yes	Yes – Note 3	n/a
Boom Truck Operator- off Track	Yes	N/A	Yes	Yes	N/A	Yes – Note 3	n/a
Mechanic/ Maintainer	Yes	Yes – Note 2	Yes	n/a	Yes – Note 2	Yes	Yes
Laborer	Yes	Yes – Note 2	Yes	n/a	Yes – Note 2	Yes	n/a

Note 1 – If job has on track equipment then these qualifications are required.
Note 2 – If these employees operate the vehicles and or equipment on track.
Note 3 – If these employees are used to be climbing signal and communication structures.

13.0 Handling Switches

13.1 In addition to CROR rule 104 (q), employees must record the following information on the back of their TOP or OCS clearance when handling a main track switch:

- Time of day the switch was handled.
- Location of the switch.
- Initials of employees' that handled the switch and initial of the employee that confirmed the position. When the employee confirming the position of the switch is not present (i.e. confirmed via telephone or radio), the full name of the person or RTC initials must be recorded.
- Position the switch was left.

14.0 Highway/Roadway Grade Crossings and Traversing a Highway/Roadway Grade Crossing

14.1 Hi-Rail Vehicles at Highway/Roadway Grade Crossings

When hi-rail vehicles are being removed from or placed on the track, at/or near a grade crossing, employees must warn the traveling public by:

a) Displaying 360 degree flashing light and four way emergency flasher, (if equipped).
b) Employees must watch for highway vehicles and provide flagging if conditions require such an action.
c) When road traffic volume warrants, road traffic must be stopped before attempting to mount or dismount the track with the hi-rail vehicle. This can be accomplished by:
    i. Stopping traffic in each direction and requesting the motorist to hold his position until the hi-rail is clear of the crossing, or
    ii. Where equipped, activating the automatic warning system.

14.2 Any track unit or hi-rail must be operated with caution when approaching highway/roadway grade crossings. This includes giving roadway traffic preference and:

a. Approaching grade crossing under complete control, being prepared to stop if necessary.
b. A track unit must not obstruct a highway/roadway grade crossing until the way is seen to be clear by the operator of the track unit.
c. A track unit must be brought to a full stop before proceeding over a highway/roadway grade crossing when the view of the approach is obstructed or when traffic is heavy.
d. If required due to traffic volumes, sightlines, or other special conditions. the operator of the track unit must only proceed over the highway/roadway grade crossing after stopping under the protection of a flag-person, except a track unit being operated by one person alone may after stopping, proceed with extreme caution.

14.3 At all road crossings, the operator of a track unit must be prepared to stop clear of the

crossing. When a conflict with approaching highway traffic exists the track unit must be brought to a stop and may only proceed when traffic has cleared or stopped and it is safe to do so.

14.4 Where the view is obstructed, or road traffic is heavy or travels at high speeds, a track unit must be brought to a full stop, clear of the crossing. Once it is safe, the track unit may then proceed.

14.5 Highway traffic must be given the right-of-way unless protection is provided by one of the methods in 14.6, 14.7 or 14.8.

14.6 At crossings where a protective device exists that can be operated by a switch or remote control device, the protection may be activated to protect movements through the crossing. The crossing may be occupied once roadway traffic has come to a stop. Once the track unit has cleared the crossing, the protective device must be returned to normal.

14.7 At crossings protected by a flag person, the track unit may proceed when given the appropriate signal by the flag person.

14.8 When necessary, the occupants of a track unit will protect against roadway traffic. Procedures specified in Section 15 through 20, "Manual Protection at Highway/Roadway Grade Crossings" shall apply.

Manual Protection at Highway/Roadway Grade Crossings

15.0 Scope

15.1 These practices are intended to ensure that there are acceptable procedures and instructions in place to permit railway employees to safely perform manual protection at highway/railway grade crossings when:

a. The uncontrolled movement of traffic could be hazardous to workers;
b. Work is being performed at or near a railway/road grade crossings;
c. Automatic warning devices are not working as intended; or
d. Signal light, gates, and other protective devices are broken or damaged.

15.2 Except as otherwise noted, this circular is intended to apply to manual protection performed by engineering employees, contractors working on behalf of the railways or other authorized and qualified persons. Train and Engine Crews required to manually protect crossings will continue to be governed in accordance with the provisions of the Canadian Railway Operating Rules (CROR) and individual operating instructions.

16.0 General Principles

16.1 Manual protection of highway/railway grade crossings should be carried out in a manner that provides roadway users with a message consistent to that which they encounter for other roadway flagging situations.

16.2 Clear instructions must be in place between railway and highway flag-persons when both are involved in a manual protection plan.

16.3 Vehicles should not be left in a location that could interfere with the view of grade crossing warning systems or flag-persons.

16.4 Unnecessary prolonged activation of railway crossing warning systems should be avoided.

17.0 Definitions

17.1 **Flag-person** means a responsible employee or contractor qualified by the railway company or the road authority to stop or otherwise direct and control highway traffic through a highway/roadway grade crossing through instruction and a demonstrated knowledge of this circular and all other applicable rules, procedures and instructions.

17.2 **Foreman** means the designated employee in charge of work at the grade crossing.

17.3 **Highway/Roadway Grade Crossing** means a location where a public highway, road, street, or unrestricted private roadway and associated sidewalks and any pedestrian or bicycle pathway cross one or more railway tracks at grade.

17.4 **Qualified person** means a person, who, because their knowledge, training and experience is qualified to perform that duty safely and properly.

17.5 **Railway Company** means a railway company that owns or operates over the line of railway at the grade crossing.

17.6 **Road Authority** means the public agency that has legal authority to open and maintain a road that passes across the line of railway at the grade crossing.

17.7 **Traffic** means all road users including drivers cyclists and pedestrians that may use a grade crossing.

17.8 **Traffic control** means a method used for warning traffic and protecting track work at or near grade crossings.

17.9 **Traffic control plan** means the plans or written procedures detailing the traffic accommodation activities for a grade crossing project. Traffic control plans must be approved by the proper road authority.

18.0 Protection Required

18.1 Malfunction of Automatic Warning Systems

a. When a railway company is aware that an automatic grade crossing warning system malfunction has taken place, a qualified person shall arrange for appropriate means of warning highway traffic and railway employees. This may include but is not limited to:

i. Train and engine crews providing manual protection until the train or engine movement fully occupies the crossing;

ii. A qualified flag-person providing manual protection in accordance with Section 19, until the on-track equipment has cleared the crossing;

iii. A uniformed police officer providing manual protection in accordance with practices

acceptable to their organization until the on-track equipment has cleared the crossing; and

iv. In the case of workers at or near the crossing, a lookout to warn workers of approaching traffic.

b. A malfunction of a warning system at or near a grade crossing includes:

i. An activation failure, a partial activation or a false activation of an automatic warning system or any of its components;

ii. When traffic signal pre-emption systems, designed to operate in conjunction with the automatic warning system at or near a grade crossing, will not operate or will not operate properly. In this case, the road authority must be notified immediately.

c. Movement of trains where there is known to be a malfunction of an automatic warning system shall be governed in accordance with current company operating instructions and Canadian Rail Operating Rules.

18.2 Traffic Control for Very Short Duration Work

In instances where maintenance work at a grade crossing may be of very short duration and will have a minimal impact on traffic, a qualified person at the location must review the activity and assess the need for traffic control measures. Depending on the work to be performed, control measures could include items such as a lockout to warn workers of approaching traffic, flag persons and/or advance warning signage.

a. Examples of such activities would include but not be limited to:

i. Removal of snow and ice build-up in flange ways;

ii. Repair of high spikes;

iii. Visual ground inspection of track and signal equipment;

iv. Testing the operation of a grade crossing warning system;

v. Removal of isolated debris from crossing surface; or

vi. When required, parking a vehicle on the shoulder of the road or the right-of-way in the immediate vicinity of grade crossing.

b. All workers must wear high-visibility reflective apparel and any work vehicles in the vicinity must employ 360 degree flashing lights and/or 4-way emergency flashers.

c. In all cases the railway company shall safely restore normal operations of the system as soon as possible.

18.3 Traffic Control for Scheduled Work in the Vicinity of a Grade Crossing

When carrying out scheduled work in the vicinity of a highway/railway grade crossing, except as provided in Sections 18.1 and 18.2 above, a sufficient number of flag-persons or other means of manual or positive protection, must be provided when:

a. Work is to be carried out on a line of the railway that may cause obstruction of sight-lines at a highway/roadway grade crossing not equipped with an automatic warning system when there is the possibility of the operation of a train.

b. The crossing warning system which includes either the warning lights with or without gates, advance warning system, or interconnected traffic signals or prepare to stop signs are unable to operate properly due to scheduled maintenance or construction work within the rail approach to the crossing or the road approach to the crossing when there is the possibility of the operation of a train.

c. Work equipment is close enough to the crossing to obstruct the motorist view of approaching trains or is continuously activating the warning system.

d. Test of a highway/roadway grade crossing warning system causes the operation of the light units or gate arms at the same time that a train or other railway equipment may enter onto the operating control circuits of the warning system.

e. Traffic is required to pass a worker, equipment or other obstruction that

may block all or part of the traveled roadway, except as outlined in Section 18.2 above (Very Short Duration Work).

f. Train movements are anticipated and the presence of track units or work equipment could lead to confusion for highway users.

Should the work affect the highway/roadway grade crossing for an extended period of time or result in roadway lane closures, the road authority must be notified in advance as provided for in Section 18.4.

18.4 Traffic Control for Lane Closures and Long Duration Construction Work

Before undertaking work which will require the regulation of traffic over a grade crossing for an extended period of time or which will require lane closures, the road authority must be notified well in advance and:

a. A written traffic control plan must be prepared (see Figure 2);

b. A flag-person or other mutually agreed to means of manual protection in accordance with the traffic control plan must be provided;

c. The foreman or other person in charge of the work must:

i. Be governed by instructions from the road authority ensuring the flagging protection procedures to be followed for such work conforms to the applicable provincial or road authority requirements;

ii. Ensure that all protective devices as determined above are in place prior to commencement of work;

iii. Determine who will perform the flagging duties, whether the road authority, railway personnel or a contractor;

iv. Ensure detailed instructions and job briefings are provided to persons performing traffic control duties; and

v. Notify Signals and Communications of work to be done at the crossing and arrange for the Signal Maintainer or other authorized and qualified person to isolate/deactivate/reactivate

automatic warning devices, if applicable.

19.0 Equipment Required

19.1 For daytime grade crossing work requiring manual protection, each flag-person shall be provided with:

a. A traffic control hand held approved STOP/SLOW paddle as shown in Figure 2 is recommended. A red flag may be used when a STOP/SLOW paddle is not available;

b. Approved high visibility reflective vest or similar apparel;

c. Required personal protective equipment;

d. An effective means of communication when flag-persons are not visible to each other.

19.2 A flag-person used for scheduled or construction work must have the following clothing and equipment:

a. A STOP/SLOW sign as shown in Figure 2, mounted on a 4 foot long pole;

b. Approved high visibility reflective vest or similar apparel;

c. Required personal protective equipment;

d. An effective means of communication when flag-persons are not visible to each other;

e. The appropriate traffic cones, barricades, signs, lighting and other traffic control devices prescribed by the province in which the work is being performed.

These requirements may be altered or augmented as necessary to meet the requirements prescribed by the province and the traffic control plan.

19.3 During the hours of darkness, or in other conditions of poor visibility, in addition to the above equipment requirements, each flag-person is to be provided with a working flashlight which may be fitted with a red signalling baton or a lit red fusee.

20.0 Flagging Procedures

20.1 General Procedures

a. During traffic control each flag-person must remain on duty at the assigned station until relieved.

b. Except as provided by section 20.4, a flag-person must not direct traffic for more than one lane at the same time.

c. A flag-person shall not perform any other work while physically directing vehicular traffic.

d. A flag-person must stand in a safe position on the side of the lane he/she is flagging with an unobstructed view of approaching traffic.

e. A flag person must ensure that it is safe for a movement to proceed before signalling for that movement to proceed.

f. No employee other than the flag-person may give signals to a motorist except in an emergency.

g. Only one flag-person may give a signal to a motorist at one time.

h. A flag-person must make all motions and signals for traffic control precisely and deliberately so that the meaning of signals is clearly understood.

20.2 Hand Signals

(A) When using a STOP/SLOW paddle a flag-person must:

i. Use the normal signals shown in Figure 4 when stationed on the driver's right side of the traffic lane under the flag-person's control.

ii. The signals shown in Figure 4 will be reversed when the flag-person is stationed on the drivers left side.

iii. The flag-persons sign must not be used to wave traffic on and must never be displayed to traffic in other than a static manner.

(B) When using a red flag, a flag-person must use the following procedures:

i. To stop traffic; face traffic and extend the flag staff horizontally across the traffic lane in a

stationary position so that the full area of the flag is visibly hanging below the staff. The free arm shall be held with the palm of the hand above the shoulder level toward approaching traffic.

ii. To direct traffic to proceed; stand parallel to the traffic movement and with flag and arm lowered from the view of the road users, motion with the free hand for road users to proceed. Flags shall not be used to signal traffic to proceed.

iii. To alert or slow traffic; face traffic and slowly wave the flag in a sweeping motion of the extended arm from shoulder level to straight down without raising the arm above a horizontal position. The flag-person shall keep the free hand down.

20.3 Emergency Vehicles

Emergency vehicles such as fire trucks, police vehicles, and ambulances pose special problems for flag-persons and emergency procedures to be used should be known prior to commencement of flagging operations.

a. When the flag-person becomes aware that an emergency vehicle is approaching, he or she should immediately contact the other flag-persons in order to open a path for the emergency vehicle(s).

b. If there is a hazard that will affect the safety of an emergency vehicle, yourself or others, the emergency vehicles must be stopped, even ever so briefly, in order to relay specific instructions.

20.4 Traffic Control with one Person

Whenever one person is required to flag at crossings where vehicles can move in either direction or more than one lane is involved, the flag-person should:

a. Speak to the driver of the first vehicle stopped to ensure that he/she remains stopped clear of the crossing while the flag-person stops vehicles arriving from the other direction, or from an adjoining lane.

b. When stopping vehicles at a crossing with more than one track, the flag-person should first stop the vehicle whose line of site is most restricted.

20.5 Traffic Control Signs

a. When traffic control is scheduled or of long duration, signs advising of a flag-person ahead should be placed in advance of each flag-person's station. (Examples shown in Figure 3).

b. Signs must be erected as per instructions from the road authority.

c. Signs must be checked to ensure they are functioning as intended.

d. Signs must be removed promptly upon completion of work.

20.6 Scheduled and Construction Work Requiring Traffic Control Plans

a. A detailed traffic control plan must be written and approved by the road authority.

b. These plans should include communication procedures, job briefings and situational awareness.

c. Detailed instructions must be given to the flag-person(s) along with job briefings.

d. Unless otherwise identified in the traffic control plan, grade crossing protection shall be in conformity with the requirements of the Manual of Uniform Traffic Control Devices for Canada (MUTCD).

e. Road closures and barriers should be considered whenever work at a grade crossing is being planned. Barricades must only be placed as per the road authority's instructions.

20.7 Notification of the Signal Maintainer or Other Authorized Personnel

Scheduled track work must not be performed within the limits of an automatic warning system at a grade crossing until the signal maintainer or other authorized and qualified person has been notified. Only Signals and Communications personnel may isolate/deactivate/reactivate automatic warning systems at grade crossings.

Figure 2 STOP/SLOW Sign

Reflectorized flourescent red, diamond grade

Reflectorized flourescent orange, diamond grade

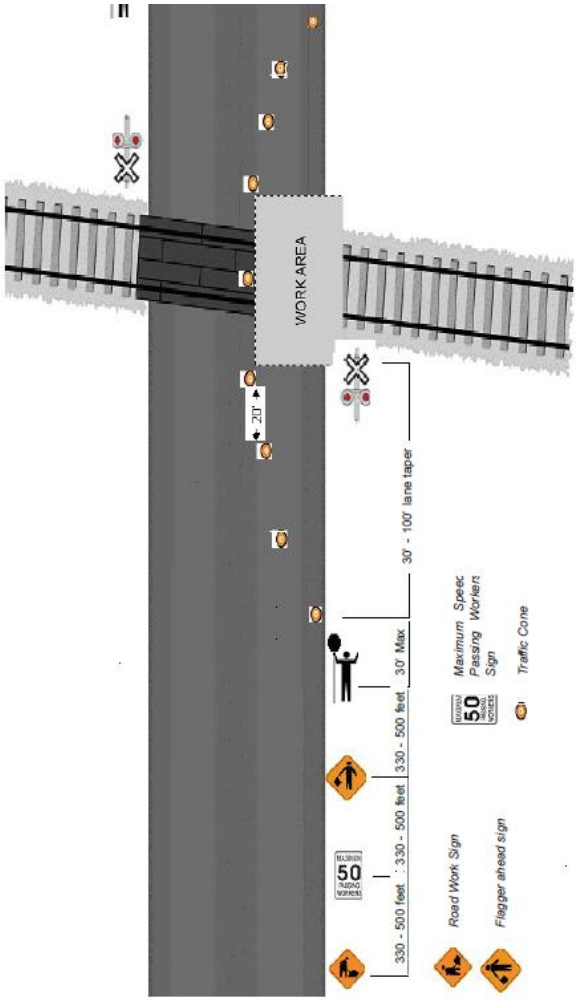
The STOP/SLOW paddle shall have an octagonal shape on a rigid handle. STOP/SLOW paddles shall be at least 450 mm (18 in) wide with letters at least 150 mm (6 in) high. The background of the STOP face shall be red with white letters and border. The background of the SLOW face shall be orange with black letters and border. When used at night the STOP/SLOW paddle shall be reflectorized.

NOTE: All traffic control equipment, including signs and personal protective equipment must be kept clean and in working condition.

Figure 3 Traffic Control Plan

Diagram shows an example of a traffic control plan for protecting work at a grade crossing. (two way traffic, single lane closure)

NOTE: This is an example only. Signs should be placed as per traffic control plan developed with the proper road authority.



Each situation will require individual safety assessment, and consideration must be given to traffic volume, vehicle types, sightlines and distances, sign spacing, duration of work and other factors to ensure traffic control devices are adequate in each case.

1. All signs shall be spaced 330-500 feet (100-150 meters) apart unless otherwise indicated.
2. All signs shall be kept clean and in good condition.
3. Identical signing is required from both directions.
4. The bottom of sign should not be less than 1' (30 cm) above the road surface.
5. All signs must be in accordance with instructions from road authority.
6. Traffic cones are placed at 20 foot (6 meter) maximum intervals when flag-persons are used.

7. Lane taper must not exceed 100' (30 meters) or be less than 30' (10 meters) when flag-persons are used.
8. No vehicles shall be parked on road unless required for actual operations.
9. Traffic Control plan must document procedures to follow to accommodate emergency vehicles. Flag-persons must discuss and understand these procedures prior to commencement of flagging operations.

Figure 4 Hand Signals when STOP/SLOW paddle is used for traffic control

To Stop Traffic

(A) By day
- Face traffic.
- Display "STOP" paddle in right hand.
- When approaching vehicle has almost stopped, use left arm to indicate stopping point.

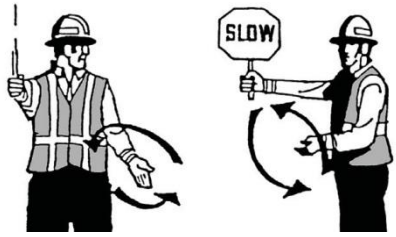
(B) By night
- Face traffic.
- Display static reflectorized "STOP" paddle in right hand and flashlight with red signaling baton attached in left hand.
- Move left arm from 3 to 6 o'clock.
- When approaching vehicle has almost stopped, use flashlight/baton to indicate stopping point.

To Slow Traffic

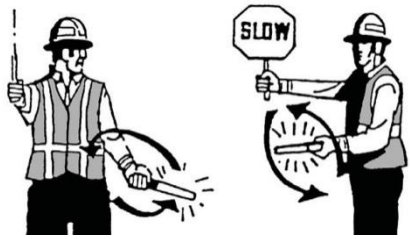
(A) By day
- Face traffic.
- Display static "SLOW" paddle in right hand.
- If traffic slows below desired speed give appropriate "Move Traffic" signal.

(B) By night
- Face traffic.
- Display static reflectorized "SLOW" paddle in right hand and flashlight with red signaling baton attached in left hand.
- Move left arm from 3 to 6 o'clock.
- If traffic slows below desired speed give appropriate "Move Traffic" signal.

To Move Traffic Slowly

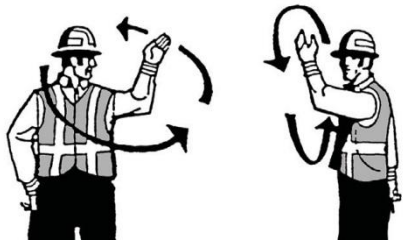


(A) Slowly by day
- Face across the approach lane and look across left shoulder at traffic to be moved.
- Display static "SLOW" paddle in right hand.
- Advance traffic by rotating lower left arm in an elliptical manner in the direction the vehicle wheels will rotate.



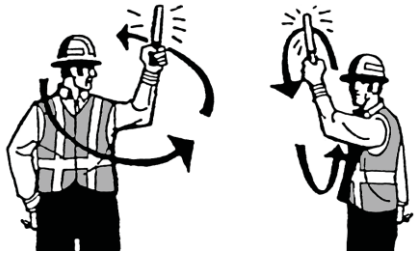
(B) Slowly by night
- Face across the approach lane and look across left shoulder at traffic to be moved.
- Display static "SLOW" paddle in right hand and flashlight, with red signaling baton in left hand.
- Advance traffic by rotating lower left arm.

To Move Traffic at posted speed



(A) At posted speed by day

- Face across the approach lane and look across left shoulder at traffic to be moved.
- Lower right arm to conceal paddle and motion traffic on.



(B) At posted speed by night

- Face across the approach lane and look across left shoulder at traffic to be moved.
- Hold flashlight with red signaling baton in left hand.
- Lower right arm to conceal paddle and motion traffic on with left arm at shoulder level.