Summary of Changes

General Operating Instructions

(GOI)

October 14, 2015

On October 14th, 2015 a complete revision of the General Operating Instructions (GOI) dated October 14th, 2015 will be in effect.

Although it does not form part of the GOI, you will also notice the addition of the new Safety Rule Book placed at the back of the new document.

The following is a summary of relevant changes included in the revised GOI. Prior to the effective date, employees in any service connected with the movement of trains or engines must:

1. Obtain a copy of the revised GOI dated October 14th, 2015.
2. Review the changes, using this document as a guide, and
3. Ask their immediate supervisor or rules instructor to clarify any questions that they have on the changes.

Note:

The revised GOI includes revisions previously carried in your Summary Bulletins (SB) and any bulletined changes to the GOI that have been issued since the Summary bulletin was last issued.

All NEW changes are highlighted with a vertical black bar in the margin.

The main focus of this summary document is to identify changes and revisions of high interest. They may or may not have been previously bulletined.

Summary of GOI Changes

Note:
Every effort has been made to include all significant changes to the new GOI, some smaller revisions may not be included. It is suggested that employees should review the entire document and seek clarification if unsure of the meaning of a particular instruction.

Section 1 – Locomotive & Train Operation / Train Handling

P. 4: New Item 2.6 requires the automatic brake handle on 105 control stands, to be pinned into the proper position to prevent accidental emergency applications due to the seat swiveling and contacting the brake handle.

P. 19: New Item 36.1 which now allows for cycle braking from a minimum application. When used, a sufficient brake reduction must be made prior to passing the next HDB. **CAUTION:** Using this method can result in an increased risk of an undesired brake release.

P. 21: Item 38.5 has been revised to only apply to conventional trains and suggests that the air brake "should" be applied first when both air and DB will be needed. This was changed as there are areas when train handling requires the use of DB before the air brake is set.

P. 38: Horse Power ratings for locomotives have been added to Appendix 4, this is for instructions in the Time Tables that restrict locomotives in specified tracks as governed by horse power ratings.

P. 39: New Appendix 5 contains the Speed Table that used to be contained in the Time Table General.

Section 2 – Distributed Power

References have been added to a couple of items in regards to cycle braking from a minimum and pinning of the automatic brake handle.

Section 3 – Air Brake Tests and Procedures

No new changes other than those that have been previously bulletined.

Section 4 – Hand Brakes – Leaving Equipment

With the revision to Rule 112 for the securement of equipment, this section once again has been revised to meet the new requirements of the rule.

Employees are encouraged to review this entire section.

Some of the highlights are;

- Employee securing equipment must confirm with another employee the manner in which the equipment has been secured.
- In addition to the "cause or allow" current effectiveness test procedures, we have added an additional procedure which allows for sufficient tractive effort to be applied, to cause force on the equipment.
- New list of approved physical securement or mechanical devices
  - Hand Brakes
  - Air brakes
  - Derails
  - Mechanical Emergency Devices
  - Locomotive with an RSC with rollaway protection where air pressure is maintained
  - Bowled terrain

  The following may also be used in a Yard;
  - Retarder / Stop-block / Wheel Chocks / Skates
- Special instructions can be issued to leave equipment further than 100 feet from a derail.
- New flow charts, no longer have separate flow charts for unattended equipment / trains or switching enroute on non-main track. It is either unattended equipment (incl movements) or unattended locomotives. Same for main track, sidings and high risk locations.
- Other than on shop tracks in yards and terminals, all locomotives must be locked and hand brakes applied.
- New requirement should trespassers or emergency responders come in "contact" with unattended equipment, the equipment must be inspected without delay to ensure that it remains secured. Employees who witness trespassers or emergency responders contacting unattended equipment, must report it to the RTC and if in a position to do so, verify that the equipment remains secure.
- New hand brake chart that now covers grades to 0.0%. Our grade location chart still only covers grades to 0.8%. For grades less than 0.8%, local track profiles (if available) will provide grades. If no profile is available and the grade is unknown but less than 0.8%, then the minimum number of hand brakes to be applied will be as indicated in the 0.8% column of the chart.

Section 5 – Train Inspections / HBD Instructions

P. 15: Item 27.0 new note has been added to remind employees that the speed restriction for Key trains also applies at double asterisk HBD locations.

P. 16: Item 28.0 has been changed to better clarify when a HBD is considered as defective. Incorrect axle count is not considered as a defect, unless the count is exceedingly inaccurate or the detector is a double asterisk HBD location.

Section 6 – TIBS Instructions

P. 13: Item 19.2 includes an equation for calculating the DMD difference to enter, following a measured mile test.

Section 7 GOI – Train Marshalling / Equipment Handling

P. 13: Item 7.5 new note added that exempts empty crude oil trains with loaded buffer cars next to the remotes from the remote zone violation.

P. 26: Item 3.1 renamed as Business Equipment. Locomotives assigned to business train service are now shown in the list.

Section 8 – Dangerous Goods

P. 3: Item 3.1(1) second bullet point has been revised to allow for lifting a dangerous goods car with a shipper supplied document and either an electronic work order/instructions or documented verbal confirmation of system waybilling from a CP manager.

Section 9 – Radio Procedures

No new changes.

Section 10 – Dimensional Handling

No new changes other than those that have been previously bulletined. Some minor changes to the specific curves and sidings contained in Item 4.2.

Section 11 – General Information / Special Instructions

P. 7: Item 17.0 Special Control Zone has been updated to reflect rule changes and remove reference to rule numbers.

Section 12 – Track Signs

P. 6: New remote locomotive operation sign.

General Operating Instructions (GOI)

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Effective 10/14/2015

General Operating Instructions (GOI)

Section 1 – 10/14/2015

Locomotive and Train Operation
Train Handling

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LOCOMOTIVE / TRAIN OPERATION

1.0 Duties of the Locomotive Engineer

1.1 Locomotive engineers are responsible to ensure they are familiar with current information regarding the systems and mechanical procedures which apply to locomotives in service on CP. Locomotive engineers are responsible for the motive power in their care and when other duties permit, must make every effort to ensure their efficient and productive operation.

Locomotive engineers must do everything possible to conserve fuel and minimize brake shoe and wheel wear during operation of the train.

1.2 The locomotive engineer must take charge, inspect and leave the train in ways that ensure safe operation of both the locomotive and train.

1.3 As soon as practicable, the locomotive engineer must advise Mechanical Facilities of locomotive failures, defects, safety hazards or any occasion when a train stalls and be governed by their instructions.

The following table identifies the radio codes by Regions with primary and secondary #'s for contacting Mechanical Facilities to request locomotive assistance or report issues:

Note: If there is no answer for your specific region, another region may be contacted.

Region	Primary code	Secondary Code	Direct Telephone #
Pacific (Excluding Laggan)	*(Z)7101#	*(Z)1810#	604-944-5855
Pacific (Laggan), Prairie (AB North & South)	*(Z)7102#	*(Z)1811#	403-303-8850
Prairie (Sask North & South)	*(Z)7103#	*(Z)1812#	306-693-5514
Canada Central	*(Z)7104#	*(Z)1813#	204-934-4208
Canada East (Toronto/North, South Ontario)	*(Z)7105#	*(Z)1814#	416-297-3077
Canada East (Quebec)	*(Z)1815#	*(Z)7106#	514-483-7070
USA East & West	*(Z)7107#	*(Z)1110#	651-778-3622

How to call:

Radio Access procedure:

- Switch to Utility Channel (as indicated in Subdivision Footnotes)
- Enter *(Z)7101# (Z) = Zone Code as indicated in Subdivision Footnotes.
- "OK" tone (two short beeps) will be heard.
- 8 second pause
- "RINGBACK" tone (3 short rings) or Normal Phone Ringing will be heard.
- Wait for answer.
- Dial *(Z)# to disconnect.

Note: Calls will time-out after 13 minutes and will require a callback.

Information that is REQUIRED when talking to Mechanical facilities staff:

- Train ID
- Subdivision and Station or Mileage location
- Urgency (Moving, stopped in single track, stopped in siding, Non-urgent)
- Affected locomotive number
- Locomotive numbers for entire consist (Identify any remotes)
- Description of issue (Provide as much detail as possible including abnormal conditions, safety conditions, fault codes, locomotive condition before failure, and any self-performed troubleshooting steps that were attempted before calling)

1.4 Locomotives must be operated as follows:

On a shop track, locomotives may be operated by;
• certified engine attendant (restricted to confines of the shop track), or • an engine attendant in training under the direction of a certified engine attendant. **Note:** Qualified Mechanical Employees who are trained in specific Rules & Operating Practices, may operate locomotives within yard and terminal areas.
On all tracks, locomotives may be operated by;
• a qualified locomotive engineer (employee or officer) • a locomotive engineer trainee under the direction of a qualified locomotive engineer instructor, • an operating officer (who is not a qualified locomotive engineer) only when: ❖ they are under the immediate direction and control of a qualified locomotive engineer (see note), and
• a non-operating employee or non-employee only when: ❖ they are authorized to be on the locomotive as per CP Access Policy, and ❖ they are under the immediate direction and control of an operating officer who is a qualified locomotive engineer, and
Note: The officer assumes all responsibility for their actions. "Immediate direction and control," requires the qualified employee remain in the operating cab prepared to take control immediately, if required.

2.0 General Instructions

2.1 Employees are restricted from opening engine covers and electrical cabinet doors unless authorized, or in the case of emergency.

2.2 In case of mishap or fire to locomotives or rail diesel cars, the engines and fuel pumps should be stopped, emergency fuel cutoffs tripped and battery switches opened as soon as possible.

2.3 When locomotive consists are in motion, personnel may move from one locomotive to an adjoining locomotive only when both locomotives are equipped with walkways. Hinged walkways should be in the raised position, with safety chains in place, on single locomotives or when coupled to other locomotives not equipped with walkways.

2.4 Locomotives or rail diesel cars must not be stopped over open flame switch heaters unless absolutely unavoidable in which case they should be moved off promptly or switch heaters extinguished.

2.5 Within block and interlocking signal systems, should locomotive consists or rail diesel cars be stopped on sand, whether sanders are operated manually or automatically, they must be moved off the sanded rail immediately to ensure proper operation of the signal system. If they cannot be moved, protection as prescribed by the rules must be provided.

2.6 To prevent accidental emergency applications, when setting up locomotives for trail/remote operation equipped with a 105 control stand, the automatic brake handle must be secured using the pin provided (when equipped).

3.0 Maximum Speed of Locomotive and Rail Diesel Car Consists

3.1 Maximum speed for RDC or a locomotive when operated singly (not coupled to other equipment or another locomotive) is 40 MPH.

4.0 Number of Locomotives in a Basic Consist

4.1 A basic consist is the number of locomotives which may be coupled together, provided current time table permits, and is limited by the number of equivalent driving axles as follows:

4.2 Maximum Driving Axles (non 6 axle territory)

Unless otherwise specified, tracks where 6 axle locomotives are **prohibited** (as indicated in Time Table), the maximum number of equivalent driving axles is 16.

4.3 Maximum Driving Axles (6 axle territory)

On Regions / Tracks where 6 axle locomotives are permitted, the maximum number of equivalent driving axles is 24.

NOTE: See Appendix 4 in Section 1 for equivalent driving axle ratings for locomotives.

4.4 Adding Locomotives to the Basic Consist

Unless otherwise restricted, additional locomotives may be added to the basic consist with the following restrictions:

- excess locomotives must be dead or isolated;
- weight of dead or isolated locomotives must be included in weight of the train;
- all locomotives must have coupler alignment control/bolster stops except when provided for under Item 5.0.

Note: On Distr Pwr Trains, additional Operating Locomotives must not be added to either the lead or remote locomotive consists beyond what is indicated by the instructions in Item 4.6 or Section 7, item 7.0.

4.5 Maximum Train Tonnage

Unless specified by Special or Time Table Instruction, total train tonnage (excluding weight of operating locomotives) will be governed by OC procedures.

4.6 Equivalent Driving Axle Exemption

Items 4.4 and 4.5 are modified as indicated by the instructions below for the lead consist only:

Lead Consist Equivalent Driving Axles	
Loaded Conventional Crude Oil Unit Trains (Maximum **28**)	
Train Type	**With or without buffer cars**
Heavy Uniform / Bulk	**1,2,3,5**
Mixed	
Conventional Trains (Maximum **36**)	
Train Type	
Heavy Uniform	**1,2,3**
Mixed	
Distr Pwr Trains (Maximum **30**)	
Heavy Bulk	**1,4**
Light Bulk	**1**
Notes as indicated above:	
1	TrAM Areas 1 - 2 - 3 only.
2	Head-end 15 cars/platforms must have at least 50-tons of weight (contents + tare) When multi-platform cars are part of the head-end 15 cars, they must average at least 50-tons (contents + tare), with none of the platforms empty/unoccupied
3	Maximum train tonnage must not exceed haulage capacity of 30 driving axles.
4	DB Factor of 25 allowed on Head-end.
5	Crude oil unit trains handling Legacy DOT 111 Tank Cars (As indicated on Outbound Wheel Report) are restricted to 24 equivalent driving axles.
Train Handling Instructions, when operating with greater than 24 Equivalent DA's	
When operating at speeds less than 12 MPH, Tractive Effort (as indicated on the lead unit) should not be allowed to exceed 135k lbs (110k if 36 D/A). Extreme caution must be used when operating at high tractive efforts, as a pull-apart may occur due to excessive forces.	
If operating in FTO, manual control must be used if Tractive Effort (as indicated on the lead unit) approaches or exceeds 100k lbs.	
Unless otherwise allowed (as indicated above), the Dynamic Brake factor per consist must not exceed 20.	
The Locomotive Engineer is responsible to ensure that the Equivalent Driving Axles and Dynamic Brake factors do not exceed the required limits. This may require the cutting out of traction motors and/or isolating locomotives.	

5.0 Handling Locomotives NOT Equipped with Coupler Alignment Control

5.1 The following CP locomotives are not equipped with Coupler Alignment Control:

CP Locomotives in series…				
1000	**1100**	**1200**	**1400**	**1500**
1600	**1700**	**6700**	**8100**	

5.2 Leased Locomotives

Unless otherwise specified, locomotives leased by CP will be equipped with coupler alignment control.

Note: If necessary to move locomotives owned by private industries, they must be regarded as **not being equipped**, and must be marshalled as outlined in item 5.3 below, or item 7.2.

5.3 Unless otherwise indicated, the method for handling these locomotives is as follows:

As part of the Lead Locomotive Consist
Only one locomotive not equipped with coupler alignment may be moved in a consist. When it is part of the lead locomotive consist (single or multiple), it must be marshalled **next behind the lead locomotive.** If marshalled as the second locomotive of a consist with no operating locomotive behind, it must have two loaded cars weighting at least **45 tons** and **less than 65 feet** in length as the first and second cars behind the locomotive.
Without MU Capability or in Train
When this series or type of locomotive is not equipped for multiple locomotive operation due to design, mishap, damage, etc., it must be marshalled and handled in accordance with item 7.2.

5.4 In a terminal area the restrictions in item 5.3 do not apply when more than one of these series of locomotives are coupled together in a consist. It is the locomotive engineers responsibility to know before proceeding which locomotives in his care are not equipped with coupler alignment control and to handle the movement avoiding the use of dynamic brake and or independent brake on curves and turnouts.

6.0 Operating Restrictions – Yard Switchers

6.1 Yard Switchers equipped to operate in road service cannot be used in multiple with any other class of locomotive even when equipped with MU features.

7.0 Dead or Disabled Locomotives

7.1 Crews are governed by restrictions and/or instructions from a Mechanical Officer in charge or contained in Part 4 of the Schedule-B (Movement of defective Locomotives).

7.2 Handling dead/disabled locomotives in a train.

Dead, isolated or disabled locomotive, including those listed in item 5.1, which cannot be added to the basic consist, may be handled in the train provided:

A	It is separated from the lead locomotive consist handling the train and from other locomotives marshalled as follows**…** • between at least **4 loaded** cars (two on each side) weighting at least **45 tons** and **less than 65 feet** in length. **Exception:** The requirement to marshall these locomotives between **4 LOADED** cars will not apply when there are no loaded cars marshalled to the rear of the locomotives being handled in the train. In this case, 2 loaded (45 ton <65 foot) cars in front and 2 empty cars behind that are less than 65 feet in length may be used. **(See Appendix 3 for Marshalling Examples)**
DYNAMIC BRAKE FACTOR MUST NOT EXCEED 10 AND THE USE OF INDEPENDENT BRAKE ON CURVES MUST BE AVOIDED.	
B	No more than two locomotives may be marshalled **in-train** and each must be marshalled between loads as described in **A,** unless the exception applies.
C	A single locomotive which has a damaged drawbar may be moved at the extreme rear of train providing: • the locomotive is dead, with air brakes set for “Dead in Train” • the air brakes are operative • the train is mostly loaded cars (at least 2/3 loads) • there are no large blocks of empty cars (10 or more) marshalled anywhere ahead of the disabled locomotive and the 2 cars immediately ahead of the locomotive, loaded or empty, must be less than 65 feet in length.

8.0 Pre-Departure Locomotive Inspections

8.1 Locomotive Safety Inspection Locations

At locations where a locomotive safety inspection has been performed by mechanical services personnel, the locomotive engineer must be notified verbally or in writing (Schedule B or other method used to convey the information) that:

1 - the inspection was completed, and

2 - the nature of any safety defects when a locomotive is being moved for repair, and

3 - to ensure safety of movement, any restrictions.

Before departing, the locomotive engineer must:

A	Record any safety defects on the Crew Information Form.
B	Know that the DB factor does not exceed the maximum permissible limit, and record the DB factor on the Crew Information Form.
C	Ensure that the headlights, ditchlights, bell and whistle are working on the lead locomotive.
D	Know that the flagging equipment is fully supplied on the lead locomotive.
E	Ensure that the hand brakes are released. **NOTE:** If the locomotive consist does not roll freely when movement is commenced, stop and check hand brakes on all locomotives.
F	Unless advised verbally or in writing (Schedule B) that a locomotive brake test was previously completed at that location, perform a locomotive brake test in accordance with GOI Section 3, Item 2.0.
G	Unless advised verbally or in writing that a locomotive safety inspection was previously completed at that location, perform a locomotive pre-departure inspection in accordance with Item 8.2. **NOTE:** At safety inspection locations where remote locomotive(s) are to be added to a train or a rear end remote is set up for lead position (switching ends), the remote locomotive(s) must receive a safety inspection.

8.2 Locations Other than Locomotive Safety Inspection Locations

At locations where a locomotive(s) has laid over more than eight hours without a safety inspection, prior to departing, the locomotive engineer or other qualified person must perform a locomotive pre-departure inspection as follows:

A	start up the engines, if shutdown.
B	inspect the running gear and trucks for visible defects.
C	inspect the locomotive(s) for any other apparent hazards likely to cause an accident or injury.
D	where applicable, the Automatic Reporting Unit (ARU) must be disconnected. (Refer also to item 10.4.)
E	record any defects on the Crew Information Form and Locomotive Defect Tag (Form 2067).
F	know that the DB factor does not exceed the maximum permissible limit and record the DB factor on the Crew Information Form.
G	know that the air brake system is set up correctly for lead and trailing locomotives.
H	ensure that the headlights, ditchlights, bell and whistle are working on the lead locomotive. Locomotives with one or more of these defects may depart only when authorized by the Superintendent - OC. The designated repair points for ditch lights are: Coquitlam, Calgary, Winnipeg, Toronto and Montreal.
I	know that the flagging equipment is fully supplied on the lead locomotive.
J	ensure that the hand brakes are released on all locomotives.
K	perform a locomotive brake test in accordance with GOI Section 3, Item 2.0.

NOTES:

- At other than safety inspection locations where remote locomotive(s) are added to a train, the remote locomotive(s) must receive a pre-departure inspection.
- Where remote locomotive(s) have already been added to a train but the train lays over more than 8 hours, no pre-departure inspection is required.
- When a rear end remote locomotive is set up to operate in the lead position (switching ends), that locomotive must receive a pre-departure inspection at that time.

8.3 Changing Off with Another Locomotive Engineer

A	Examine the Crew Information Form. If the form does not clearly indicate that the DB factor is within permissible limits, check each locomotive and then update the Crew Information Form.
	NOTE: Normally a remote consist will not include enough locomotives to exceed the maximum permissible DB factor, so a personal check is not required

8.4 USA Destined Locomotives

A	Each locomotive that is destined to or in service in the USA shall be inspected at least once during each calendar day (24 hour period from midnight to midnight).
B	This inspection may be either a mechanical safety inspection or a pre-departure inspection by the locomotive engineer.
C	In addition to the minimum pre-departure inspection requirements provided in Item 8.2, the engineer must ensure that an FRA Form F6180-49A (blue card) is displayed in the cab.
D	A written report of the inspection, using Form 2068 Daily Inspection Report, or equivalent, must be completed and filed with mechanical.
E	A record shall be maintained on the locomotive showing the place, date and time of the most recent inspection.
F	If any safety defects are identified during an inspection or that develop while enroute, the engineer must complete a Non-Complying Tag (Form 2067), and attach to the isolation switch on the defective locomotive and note the defect on the CIF.
G	The Non-Complying tag shall include the following information: - The words “Non-complying locomotive” - Locomotive initials and number - Nature of defect - Movement restrictions, if any - Destination - Name of the railway company and name of employee completing the tag.
H	All non-complying conditions must also be reported to Mechanical as soon as possible.

9.0 Movements Not Headed by a Locomotive

Except for snowplows, cab cars on commuter trains or other similar passenger equipment, movements not headed by a locomotive must not exceed 25 MPH.

10.0 Cold Weather Operation: Leaving Locomotives Unattended

10.1 High Idle Protection:

Most CP locomotives have been equipped with high idle feature which will automatically increase engine RPM if cooling water temperature drops below a certain point.

Locomotives not equipped with this feature have to be throttled up manually (from the controlling locomotive).

10.2 Locomotives that may NOT be Equipped:

Leased Units, Yard Engines, low horse power road switchers and most SOO and former SOO locomotives are NOT equipped with High Idle protection.

Many StL&H, D&H, DM&E and ICE locomotives may NOT be equipped with high idle protection.

Note: If in doubt, the MECHANICAL should be contacted and be governed by instructions received. If required, the locomotive(s) must be manually throttled up as per the instruction below.

10.3 Manual Throttle-up Procedure:

IF…
Temperatures are at, or expected to drop below minus 20° Celsius (- 20°C) **and**
any locomotive in the consist that may not be equipped with high idle protection **and**
such locomotives are being left unattended,
THEN…
manually throttle up the consist as follows: On Leading locomotive ensure: **1 -** Generator Field switch is OFF. **2 -** Control/Fuel Pump & Engine Run switches are ON. **3 -** REVERSER is inserted and in NEUTRAL. **4 -** Throttle is in #4 position.
Note: Locomotives equipped with the High Idle feature should be ISOLATED so that they do not rev up unnecessarily. This should be noted on the Crew Information Form.

10.4 Automatic Reporting Units (ARU)

The following instructions do not apply to GE – AC Locomotives.	
A	In areas where locomotives are connected to an ARU, do not increase the throttle to notch 4 unless so advised by maintenance personnel.
B	Unattended locomotive consists which are tied up at locations where an ARU is located or a portable ARU is used at a remote location, must have the ARU connected as per local operating instructions or as per instructions posted at the ARU or within the portable unit.
CAUTION: Before moving the locomotive(s), check to ensure ARU cable is unplugged:	
NOTE: If the reverser is placed in a direction before the ARU is unplugged, the locomotive wheel slip alarm will activate.	

11.0 Draining A Locomotive In Freezing Weather

11.1 Draining Locomotives.

Cold Weather Operation	During cold weather operations IF a locomotive dies and cannot be restarted, THEN the cooling system MUST be drained using the manual drain valve.
Silent Alarm Circuit	CP locomotives are equipped with an Alarm Silence Switch so even when isolated will "sound the alarm" if the engine shuts down If a locomotives is not equipped with an Alarm Silence Switch and must be ISOLATED and cannot be regularly monitored, arrange to shut-down and manually drain the locomotive.
Automatic Drain Valve	Do not rely on automatic drain valves. IF a locomotive dies and cannot be restarted, THEN the cooling system MUST be drained using the manual drain valve.

11.2 When the engine of a locomotive is shutdown and the engine cooling water must be drained.

Refer to the draining instruction posted in the cab. If in doubt, contact Mechanical Facilities for instructions.

PRECAUTIONS
When it is necessary to drain the coolant from a locomotive, ensure the drain pipe or pressure relief outlet is not pointed at you.
If the locomotive is not equipped with a pressure relief valve on the expansion tank and it is required to remove filler pressure cap, ensure that coolant temperature gauge indicates that coolant temperature is normal or cold prior to attempting to remove the filler cap.
Stay clear of the filler pipe connector when releasing pressure. Once the pressure is vented, carefully remove filler pressure cap.
Unless otherwise authorized by Mechanical, any former SOO, D&H, DM&E, foreign and leased locomotives not equipped with an Alarm Silence Switch that for any reason is required to be ISOLATED when trailing in a consist must be shut down and drained during freezing weather.
When draining water, ensure no one is near the drain pipe. Also care should be taken as to where cooling water containing compound is drained.

11.3 Adding Locomotive Water

Due to the high temperature of the water in the cooling system, there is potential risk for injury when adding water to locomotives. Water fill instructions are located in the locomotive cab or at the water filling station on the locomotive. A thorough understanding of the instructions is required prior attempting to add water to a locomotive. If in doubt as to the procedure or if the instructions are missing, contact Mechanical and be governed by their instructions.

Water Filling Precautions
Locomotives should idle for at least 10 minutes to allow water to drain from Radiators into the tank.
When equipped, open the spring loaded water fill valve to relieve pressure before (at least *60 seconds)* and during filling.
If required to open the expansion tank (radiator) cap, **Do not** open the cap unless you have pulled down the Vent Valve handle for at least *60 Seconds*.
On some locomotives, a radiator cap cover has been installed to prevent removing the radiator cap. **DO NOT REMOVE THIS COVER** unless authorized by Mechanical personnel.

11.4 GE AC Locomotives - Drain Valve Circuit Breaker

The drain valve circuit breaker on the engine control panel is to remain ON at all times.

12.0 Causes of a PCS Operation (Pneumatic Control or Power Cut-off Switch)

NOTE: In the following instructions, PCS also refers to PC or Power Cut-Off lights.

The following will cause the PCS switch to operate:

An emergency brake application.
A penalty brake application caused by: - a timing out of the reset safety control (RSC), - the safety control foot pedal being released, or - exceeding the maximum speed of the locomotive.

13.0 Penalty / Emergency Brake Application Recovery

Ensure the throttle/dynamic brake handle(s) are in IDLE/OFF.	
Penalty	**Emergency**
On a locomotive equipped, depress the safety control foot pedal.	
Place the AB handle in SUPPRESSION.	Place the AB handle in EMERGENCY.
On a locomotive equipped with a safety control foot pedal, wait for the PCS light to extinguish.	Wait 60 seconds AND on locomotives equipped with an electronic display screen, wait for release message to appear.
On a RSC equipped locomotive, operate any system reset and wait for brake pipe exhaust to cease, or the PCS light to extinguish.	
Return the AB handle to RELEASE .	
WARNING - PCS RECOVERY	
The throttle and dynamic brake handle MUST NOT be moved from the IDLE position before attempting an automatic brake release. Following the release, ensure brake pipe pressure is being recharged AND the PCS light is out.	
NOTE: On some locomotives, after the exhaust ceases, the PCS light will not extinguish until the AB handle is returned to the RELEASE or RUNNING position.	

14.0 Recovery from an Emergency Brake Application – TIBS Failure

14.1 When TIBS is known to be defective and it is necessary to recover the PCS while standing on a grade, and

IF the state of charge of the brake pipe cannot be determined or is in doubt, and

IF the locomotive brakes are not sufficient to prevent train movement,

THEN a sufficient number of retainers and/or hand brakes must be applied to hold the train standing, before releasing the automatic brake.

14.2 Emergency Brake Application Recovery Procedure - Retainers/Handbrakes

A	Refer to: • GOI Section 1 Appendix 1, Descending Heavy Grade Protocol, item 6.0, “Use of Retaining Valves,” or • Time Table footnotes regarding mandatory use of retainers or handbrakes. See also GOI Section 1, item 40.3.
B	When hand brakes are used, they must be released before moving the train, but only after the train air brake system is fully charged.
C	When High Pressure (HP) retainers are used, the train must not exceed 20 MPH. The train must be stopped every 20 minutes for a period of 10 minutes in order to allow the wheel and brake shoes time to cool off.

15.0 Starting/Stopping Locomotives

Procedures to Start / Stop Locomotives are posted within the locomotive cab or starting station. If required, further information is available through Mechanical Facilities.

16.0 Engine Shutdown - Crankcase Overpressure

Certain conditions can cause a severe build-up of dangerous gases within the engine crankcase and could ignite and cause injury.	
On locomotive equipped, if the crankcase pressure button trips (pops out), DO NOT attempt to restart the engine.	
GE Engines:	
1	**Low levels of overpressure:** When a low level overpressure is sensed, the computer will return the engine to idle. When this occurs, the engine **must** be shutdown manually, and **must not** be restarted. **Do not reset** any such indication.
2	**High levels of overpressure:** When a high level crankcase overpressure is sensed, the computer will return the engine to idle, and the engine should shutdown. When this occurs, if not automatically shutdown, the engine **must** be shutdown manually, and **must not** be restarted. **Do not reset** any such indication.
Summary: Any engine shutdown (GM or GE) account excessive crankcase pressure **must** be left shutdown until inspected by mechanical personnel. Report defect to Mechanical Facilities and book on the Crew Information Form.	

17.0 Locomotive Stop Start Systems

17.1 All Stop Start Systems must be operational on a year round basis. Do not disable or override these systems except as provided below.

17.2 There are 3 types of systems on CP:

ZTR Smartstart System
QEG 1000 (Q-tron Electronic Governor)
AESS - GE system "Auto Engine StopStart System (AESS)".

17.3 If a stop start system did not shut down the engine, it will not re-start the engine; manual re-start is required (e.g., place the isolation switch in START/STOP/ISOLATE position and re-start as per normal procedure).

17.4 RE-START: If a stop start system did shut down the engine, the system will re-start the engine automatically. With systems enabled, and throttle in IDLE, any one of the following will cause automatic re-start to occur:

- Coolant temperature falls below 37°C (100°F)
- Ambient temperature falls below -2°C (5°C on GE's)
- Battery voltage falls below 63 Volts
- Reverser: moved to FORWARD / REVERSE (on some GP9s, GF switch must be ON)
- Locomotive brake cylinder pressure falls below certain levels
- Main reservoir pressure falls below 105 psi (not on GP38 & GP9 series locomotives)

Exception: On SD40 and GE AC Locomotives, Main Reservoir, Brake Pipe & Brake Cylinder pressures are not monitored if the locomotive Start/Stop (ECS) switch is in the ISOLATE position. On GP38 & GP9 locomotives, Main Reservoir pressure is not monitored, regardless of the ECS switch position.
Distributed Power Trains: Except during cold weather operations, the remote(s) must be left in the Isolate Mode to prevent the remote(s) from trying to maintain brake pipe pressure. **Note:** Start/Stop (ECS) switch on Lead Locomotive must be left in the RUN position.
Warning: It is important to ensure that locomotives and/or trains are properly secured and tested, as it is expected that M/R, B/P and B/C pressures will eventually leak off.
During cold weather operations and/or if air is required to be maintained on the train, the Start/Stop (ECS) switch must be left in the RUN position. The Stop / Start system will still operate, however the main reservoir pressure will prompt a restart of the locomotive

17.5 IMPORTANT – Stopped on a descending or ascending grade?

GE locomotives with operational AESS will shut down 10 to 30 minutes after loading and other locomotives may shutdown after 20 minutes.
You may not be aware that a trailing or remote locomotive has been automatically shutdown.
To begin auto re-start of the locomotives • ensure Generator Field is ON • select Forward or Reverse
Before releasing the brakes and attempting to move the train, wait 2 ½ minutes. It will take this long for the locomotive(s) to be re-started and then provide traction or dynamic brake.
If the procedures above do not restart the locomotive(s), secure the train, if locomotive brakes are insufficient to hold the train. Make an Emergency Brake application. This should cause the shutdown locomotives / remotes to restart.

17.6 Shutdown Warning:

If the lead locomotive is a GP38/GP9 series or the ECS switch is in the isolate position on other locomotives types. and An automatic brake application is in effect when an auto shutdown occurs:
WARNING If the brake pipe / main reservoir pressure drops and an auto restart occurs, a undesired release of the brakes may occur.

18.0 Operating over Railway Crossings at Grade

Before passing over Railway crossings at grade, the throttle must be reduced to No. 4 position or lower at least eight seconds before reaching the crossing. If speed is less than 25 MPH and throttle is in No. 4 position or lower, the throttle must be reduced one position, adhering to the same eight second interval. This procedure is necessary, to ensure reduction of motor and generator voltage to a safe level, to prevent damage to electrical equipment from flashovers.

Note: This instruction does not apply to AC traction motor equipped locomotives.

19.0 Operating Through Water

Locomotives should not be operated through water of a depth of more than three inches above the rail. They may be operated through water if the depth is three inches or less above the top of the rail, but at a speed not exceeding three miles per hour.

Should a locomotive operate into water at a speed greater than 3 MPH, the following should be done immediately:
Place the throttle in idle and reduce the speed as quickly as possible.
Place the generator field switch in OFF and advance throttle to notch 4 to increase the volume of air supplied by the traction motor blowers to prevent water from entering the traction motors.
Provided the traction motors are not flooded, resume power with caution and watch for any abnormal operation. If locomotive operates normally (no ground relay, etc), it may be considered safe to proceed.
If the motors are flooded, power should not be reapplied.
Whether water has affected the motors or not, the occurrence must be reported to Mechanical and noted on the Crew Information Form.

20.0 Rail Diesel Cars (RDC)

Refer to VIA Rail operating instructions.

21.0 Short Time Ratings – DC Locomotives

Note: AC traction locomotives are not subject to short time ratings or traction motor stall burn.

21.1 Short Time Ratings

Unless the locomotive is isolated, Locomotive Engineers should observe the load meter on DC traction motor locomotives, but particularly so when under slow speed full throttle conditions.

If the load meter enters the short time current rating, or if an AC locomotive is controlling in a consist with DC locomotives trailing, the rating table must not be exceeded in order to avoid traction motor damage.

Speed	Rating
11 MPH	continuous
10.5 MPH	60 minutes
10 MPH	30 minutes
9 MPH	15 minutes
8 MPH	10 minutes
5 MPH	5 minutes

Note: On DC locomotives equipped with PTC, QEG or QES systems, if the short time ratings are exceeded, the system may automatically reduce power or cut out the locomotive should the traction motors start to overheat.

21.2 If the load meter enters the short time current rating, to avoid traction motor damage, the short time rating must not be exceeded.

21.3 It should be understood that the different short time rating zones are not to be considered as consecutive ratings.

For example: The locomotive must not under any circumstances be operated at the ¼ hr rating for ¼ hr, then at the ½ hr rating for ½ hr, then at the 1 hr rating for 1 hr.

21.4 If operating in the short time rating zone, but the load is then reduced such that the load meter falls below the short time rating zone for less than 20 minutes, and then the pointer re-enters the short time rating zone, the time operating in the short time rating zones must be added together. Do not exceed the time indicated by the most restrictive zone reached by the load meter.

21.5 Should it appear that the short time rating will be exceeded, the RTC and Mechanical must be advised and the train crew shall take the necessary corrective action by either,

- Stopping the movement and cooling the traction motors for 20 minutes by centering the reverser, place the GF switch OFF and advance the throttle to No. 4 position, or
- reducing or doubling the grade.

21.6 In addition, to avoid traction motor damage, DO NOT power up the locomotive to hold a train at a standstill on a grade OR allow the locomotive to stand without movement for more than 10 seconds after the throttle is opened.

Note: Not applicable on AC Traction Motor equipped locomotives.

22.0 Locomotive Speed Indicators

22.1 Locomotive engineers must verify that speed indicators are in working order when leaving a shop track.

22.2 The speed indicator must be checked for accuracy, as soon as possible after leaving a terminal. This check must be made before reaching maximum speed and again after maximum speed is reached, and thereafter as often as may be required. When speed indicator inaccuracy is observed, speed must be adjusted accordingly and the exception noted on a Crew Information Form.

22.3 In the event the speed indicator on a controlling locomotive fails enroute, the locomotive engineer will advise the RTC accordingly. Arrangements will be made so that the controlling locomotive leaving the next scheduled crew change location will have an operative speed indicator.

If a suitable replacement locomotive is not available within the lead consist or at the next crew change location, the OC may authorize the train to proceed to the next locomotive facility where repairs can be made or locomotive replaced.

23.0 Locomotive Event Recorders & Cameras

23.1 Locomotive Event Recorders are installed to record data in relation to locomotive operation and mechanical performance.

23.2 The data will be monitored to provide information in a minimum of the following areas:

- Rule compliance/speed control
- Train handling/fuel conservation
- Training/qualification standards
- Accident/incident analysis
- Litigation/claims and legal
- Identifying mechanical problems.

23.3 Locomotive Video Camera Systems.

A number of CP and Foreign locomotives have been equipped with forward facing on board video camera systems, designed to capture images from crossing accidents and incidents that may occur.

In addition to the camera, a microphone is positioned underneath the cab in the airbrake compartment to capture the sound of the horn, bell and air brakes. Crew conversations are not audible.

The Locomotive Camera System switch (LCS), must be "On" at all times, except for a system malfunction or authorized by the General Manager OC. Any practice or action which otherwise interferes with the normal and proper functioning of this equipment will be considered tampering with a safety device and will be subject to discipline or dismissal.

Note: Crews must ensure that the camera's view is unobstructed at all times.

24.0 Response to Alarms

24.1 **IF** the locomotive alarm is sounding and/or being displayed, the cause of the alarm must be investigated as soon as practical.

24.2 Continuous Wheel Slip / Pinion Slip Indication / Locked Axle Alarm

If wheel slip, pinion slip and/or locked axle indicator and accompanying ALARM indicates slipping, even though throttle or dynamic braking are reduced enough to prevent slipping:
STOP MOVEMENT IMMEDIATELY.
Contact Mechanical Facilities and be governed by their instructions.

25.0 Locomotive Speed Sensor Failure

If it has been confirmed that a speed sensor defect exists on a locomotive that will be allowed to travel to a maintenance facility, the crew must confirm with Mechanical Facilities, if the locomotive must be marshalled within the lead consist to enable close observation. The Crew Information Form must be updated accordingly.

26.0 Temporary Wheelsets

When a defective traction motor assembly is replaced with a temporary wheelset, the locomotive engineer will be advised by mechanical personnel of any speed/operating restrictions. The locomotive must be marshalled in the lead consist to allow close observation and CIF updated accordingly.

27.0 GE 4000/4400 Power Limit Switch

27.1 At speeds less than 15 MPH, the Power Switch on GE AC locomotives can be used to reduce HP on the locomotive. The reduction in HP only applies to the locomotive where the switch has been set to the reduced or 4000 HP position, it is not trainlined to other locomotives in the consist.

The HP boost system will automatically reduce the HP to 4000 when GE AC locomotives reach 25 MPH or greater and will not regain 4400 HP until speed is less than 15 MPH.

28.0 Fire Season and Prevention

28.1 Locomotives that idle for extended periods, tend to discharge sparks from the exhaust stack.

28.2 Actions which will help reduce sparks:

Where locomotives may have been idling for extended periods, it is beneficial to advance the throttle to notch 5 for at least ten (10) minutes before working the locomotives under heavy load. Extra care is required near open top sulphur trains.
If spark emissions do occur, decrease throttle to reduce the distance that sparks may be thrown. This will also help reduce the size and heat content of the sparks.
Enroute, to minimize sparks; - if the locomotives have been "drifting" in IDLE or operated in low throttle positions for several miles, it is beneficial to advance the throttle slowly, one notch at a time. - use dynamic brake. It should be considered the primary choice of retardation, and - use contour braking/throttle modulation by allowing the natural resistance of grade, curvature and friction to slow the train.

28.3 Whenever possible, if a locomotive is suspected of starting fires, it must be shut down to prevent further damage to right of way or adjacent areas. Report accordingly on the Crew Information Form and notify Mechanical Facilities.

28.4 Train Crews should be particularly alert to detect any evidence of excessive spark emission from locomotives or the train.

28.5 When yard locomotives are moved on freight trains, they must be moved dead or isolated to their destination. They must not be restarted or operated by train crews enroute.

29.0 Broken Drawbar - Towing Cable Safety

29.1 When using locomotive 7/8" tow cables to move equipment (including multi-platform cars), do not exceed the following maximums:

Car Weight	Maximum Ascending Grade
331 to 400 tons	Level to 0.7 percent
261 to 330 tons	0.7 to 1.0 percent
211 to 260 tons	1.0 to 1.5 percent
181 to 210 tons	1.5 to 2.0 percent
156 to 180 tons	2.0 to 2.5 percent
Nil to 155 tons	2.5 to 3.0 percent
Not permitted	Over 3.0 percent

Example: a 5 platform car between 331 to 400 tons may be towed up a grade which is .7%. If the grade is steeper, be governed by item 29.4.

29.2 SAFETY PRECAUTIONS

WARNING! Tow cable may snap. DO NOT stand within striking distance of a tow cable when pulling.
Do not attempt with a cable less than 7/8" diameter.
Do NOT attempt to tow more than one car except multi-platform cars when required.
Cable must be carefully inspected for surface defects which will drastically reduce safe load limit; do NOT use defective cables.
Avoid pinching the cable while pulling as this will also reduce the safe load limit.
When possible, an employee should be in position to operate the hand brake on a car being towed unless doing so will place this employee in vicinity of tow cable
When possible, apply a light hand brake to the car being towed to avoid slack action that will cause shock loading of the cable and may result in cable failure.

29.3 Tow cable connections:

Do NOT connect a tow cable to an axle.
Do NOT connect a tow cable to a truck side frame.
Connect tow cable securely to the center of a car (e.g., at center sill near broken drawbar/knuckle location); if this is not possible, be governed by item 29.4 below.

29.4 When there is doubt about the safe movement of any car with a locomotive tow cable, arrangements must be made to:

- have another locomotive couple onto and move the car from the other end, or
- have mechanical services employees deployed to assist and supervise movement of the defective car.

29.5 After a locomotive cable has been used to tow a car, please report on the Crew Information Form and advise Mechanical. This is so arrangements can be made for a locomotive service facility to inspect the cable and if damaged, replace it.

29.6 **IMPORTANT**: Find and remove the broken drawbar (and related debris) from the track. If this removal cannot be safely accomplished because of the size and weight of a drawbar, request help from Mechanical or other employees in the area.

30.0 Electronic Display Screen Failure

30.1 If one display screen fails, the locomotive may continue in service.

30.2 When one or both screens fail, report the defect to Mechanical. When reporting screen defects, please report with as much detail as possible what the failure mode was (e.g., screen went completely blank, or screen momentarily re-booted etc.).

30.3 Complete Screen Failure (Both Screens)

If both display screens have failed or display asterisks (***) instead of air pressure readings, it may be due to one of the following conditions:	
1	Display screen may lose communication with the electronic brake valve. This results in a PENALTY brake application which is non-recoverable unless communication is restored.
2	If locomotive speed is 0 MPH, the computer is programmed to perform a periodic "self-diagnostic check" during which air pressure readings will be replaced with asterisks (***). When the self-test is complete normal air pressure readings should return.

Trouble shooting procedure:

Ensure train is stopped, because the following steps will also cause a penalty brake application.		
1	ON GE locomotives, reset (switch OFF, then ON) the ELECTRONIC AIR BRAKE & BATTERY CHARGE/COMPUTER circuit breaker.	ON EMD locomotives, reset (switch OFF, then ON) the AIR BRAKE COMPUTER & CAB/DISPLAY COMPUTER circuit breaker.
This will put the computers through a self-check and should reactivate the screens to display all air pressure functions.		
2	If step 1) was successful, recover penalty PCS, perform a Continuity test and proceed.	
3	If step 1) was not successful, a replacement lead locomotive is required. If the train has to be moved in order to exchange locomotives, it will be necessary to operate the brakes and controls from a trailing locomotive. Change operating cabs as follows: • if required, apply hand brakes to ensure train is protected from unintended movement • to ensure brake pipe pressure is 0 psi throughout the train, place automatic brake valve handle in EMERGENCY and activate TIBS emergency braking feature • on the defective locomotive, turn the air brake computer circuit breaker OFF; this will automatically configure the defective locomotive's automatic and independent brakes for trailing mode; set up all other controls for TRAILING. **Note:** If there is no available trailing locomotive, do not move the train. Wait for another locomotive.	

31.0 Snowblaster Operations – If equipped

The snowblaster uses compressed air from the Main Reservoir to clean snow off the railhead. The intention is to prevent train stalls when operating through snow (or other poor rail conditions such as rain etc.) on ascending grades.

The device will be mounted near each lead axle sand bracket on the front of the locomotive.

GE AC4400 & ES4400	**EMD SD90MAC's**
Activation:	
A manual electrical switch (toggle) and label will be mounted on the EC panel or operators screen. This will activate or disable the snowblaster.	A separate switch on the control console (labelled "Snow Remover") will activate the snowblaster.
Automatic Operation:	
It will be triggered by the lead axle sand pushbutton providing certain conditions are met (e.g., locomotive speed below 12 mph, tractive effort, engine RPM, no bell and no horn), main reservoir pressure greater than 125 psi.	The EMD snowblaster will automatically operate when the snow removal switch is "ON" and certain other conditions are met (no bell, main reservoir pressure greater than 120 psi, sand application).
Manual Operation:	
Below 12 MPH the GE & EMD snowblaster can be manually activated by pressing the "lead axle sand" push-button. **Note:** when operating under 12 MPH in full throttle conditions, when rail conditions are poor account snow or rain, the lead axle sand push-button must be used.	
Additional Information:	
A manual shut-off valve will be located below deck (on the locomotive engineer's side in front of the fuel tank) that will allow manual shut-off of air flow to the device. The shut-off valve is identified with a tag labeled "Snow Remover." There is also a decal on the side sill that says "Rail Cleaning C/O Cock."	At any speed, by cycling the snow removal switch ON-OFF-ON, the snowblaster will manually operate for a period of 60 seconds. This feature is useful when approaching snow-covered rails, or wet rails where loss of traction is anticipated.
CAUTION: Use of the device may result in reduced visibility near ground level account blowing snow or debris. When employees are entraining or detraining, or when other persons are standing on or near the track, the Snowblaster should not be manually activated by pressing the lead axle sand switch or cycling the "snow removal" switch (SD 90's).	

TRAIN HANDLING

32.0 General Instructions

32.1 The locomotive engineer will be responsible for proper train handling in yard and road service.

32.2 Braking practice will depend on weather and rail conditions, speed and weight of train, braking capacity, grade and other factors.

32.3 Do not handle cars without charging the air brake system unless the cars can be handled safely and stopped as required by the locomotive brakes. If necessary, couple the air hoses and charge the air brake on a sufficient number of cars to control the movement.

Note: A cut of cars may be considered sufficiently charged with air only after the last car being charged with air has had the air cut in, with its rear angle cock closed, for at least 5 minutes. The locomotive engineer must ensure main reservoir pressure on the locomotive is at least 105 PSI for the entire 5 minutes.

On beltpack operations, the 5 minutes must commence only after the message “Brake Recovery Complete” has been heard.

32.4 The above conditions will govern the point at which a brake application should be initiated, as well as the speed at which a running release can be safely made. A running release must not be attempted under circumstances which will cause damage to couplers or draft attachments.

32.5 Braking should be done with care to avoid skidding of wheels, and damage to cars and contents due to excessive slack action.

32.6 When coupling together two portions of a train, a brake pipe reduction of 35 psi is to be made before opening the angle cock, unless train movement can be prevented with the locomotive brakes.

32.7 Unless otherwise directed or Isolated for Mechanical / locomotive failure, the lead locomotive must be on-line at all times.

32.8 A train or locomotive must start down a heavy or mountain grade at a slow speed, gradually allowing speed to increase as braking power is seen to be ample.

Train crews shall not operate down heavy or mountain grades where, in their judgment, a combination of ambient temperatures and heavy snow conditions are such as to make the operation unsafe.

32.9 Uncontrolled Movements – Stop Required

Any movement descending a **Heavy or Mountain** grade that attains a speed 5 MPH above permissible speed is considered an uncontrolled movement and must be stopped immediately by whatever means available, including (if necessary) using an EMERGENCY brake application.

The movement must not proceed until it has been determined that sufficient braking is available to control the movement. This may require securing the train to recharge the brake system and/or the use of retainers.

32.10 Winter Conditions

A - During weather conditions which may cause snow or ice buildup to occur between brake shoes and wheels, periodic running brake tests must be performed to insure proper braking effort is being provided.

B - During weather conditions described above, when trains are approaching a location which will require the use of the train air brake, the locomotive engineer must make an automatic brake application sufficiently in advance of that location to determine that brakes are working properly.

C - If there are abnormal train braking indications (e.g., the brakes have had time to warm up and speed should be decreasing, not remaining the same or increasing) the train shall be stopped by a full service brake application with dynamic brake fully applied (using care not to jackknife the train). If, in the locomotive engineer's judgment, circumstances require an emergency brake application, this is to be done without hesitation.

D - After stop is made, train will be inspected to determine that brake shoes are free of snow and ice buildup before proceeding.

E - Immediately after proceeding, a running brake test must be made at a safe speed to determine whether or not the brakes respond properly.

32.11 When snow and ice conditions are such that they are building up in yard tracks, elevator tracks, industrial tracks and **particularly on crossings** within such tracks, the locomotive must be run through the tracks prior to cars being set out, lifted or moved.

Note: In the application above, extreme caution must be used at crossings with minimal rail activity and high vehicular traffic.

33.0 Use of the Independent Brake

A - The blocking of the independent brake handle in the BAIL position is prohibited.

B - Locomotive engineers are to acquaint themselves with the proper use of the bail inasmuch as the number of locomotives in the consist dictates the time that the independent brake handle must be depressed. To release the locomotive brakes when train brakes are applied, hold the independent brake handle in the BAIL position for four seconds per locomotive in the consist.

C - Use of the independent brake to control train speed can cause overheating of the locomotive wheels. Therefore, the independent brake should not be used to control train speed except as per Section 1, item 38.7(c) and 42.4.

D - Full application position on the independent brake is used when the locomotive is stationary.

E - To control a consist of seven or more locomotives, the automatic brake is to be used instead of the independent brake.

34.0 Use of the Automatic Brake

34.1 When commencing a service application and the train air brake system is FULLY charged, the initial equalizing reservoir reduction must not be less than 5-7 psi.

34.2 When commencing a service application and the train air brake system is NOT FULLY charged, one of the following methods must be used:

A - On Conventional or Distr Pwr trains (except tail end remote), make an equalizing reservoir reduction of at least 7 psi below the rear car brake pipe pressure.

B - On Conventional or tail end remote equipped trains, using the equalizing reservoir gauge, measure at least a 7 psi reduction from the point where the service exhaust starts to blow.

C - On Conventional and Distr Pwr equipped trains, the following method may be used, but in order to avoid an undesired release, it is necessary to understand the following information:

- **True Gradient**

  After charging or re-charging, if brake pipe pressure (BPP) on the rear car has stopped rising, then the train air brake system is considered FULLY charged (true gradient). For example the rear car has reached 88 psi and won't increase any more. The highest obtainable rear car pressure must be recorded on the Crew Information Crew form.

- **False Gradient**

  During charging or re-charging, if BPP on the rear car is still rising, then the train air brake system is NOT FULLY charged (false gradient). For example the rear car has reached 85 psi, but is still rising.

  - **Amount of False Gradient -** equals True Gradient minus False Gradient.

EXAMPLE:		
- **88** psi	highest/normal rear car BPP	(True Gradient)
- **85** psi	current rear car BPP	(False Gradient)
= **3** psi		(Amount of false gradient)

When commencing a service application and the train is NOT FULLY charged,

1 - determine the amount of false gradient (e.g., in the example above it was 3 psi)

2 - reduce equalizing reservoir pressure 7 psi plus the amount of false gradient (e.g., 7 + 3 = 10 psi)

D - the application of paragraphs A and C above, if TIBS fails to display rear car brake pipe pressure and it is necessary to apply the brake with the train air brake system not fully charged, an equalizing reservoir reduction of at least 5 psi more than the last reduction must be made.

34.3 Using the regulating valve to make brake pipe reductions is prohibited.

34.4 Should locomotive brake pipe pressure be reduced below 48 psi during service brake operation, the train must be stopped and the brake system recharged.

34.5 Where practicable, a train must not be started until the air brakes are fully released. In the absence of brake pipe flow indication or last car brake pipe pressure reading, a time allowance should be made, under normal conditions, allowing one minute for every 50 cars in the train.

34.6 Running Release of the Brakes – Conventional Trains.

Following a release of the Automatic Brake, the throttle must not be advanced or dynamic brake adjusted until the air has been seen rising (minimum 3 psi) on the **rear** of the train. This may require or result in stopping the train to allow for the brakes to release.

34.7 Reporting Undesired Brake Releases

Locomotive engineers are responsible for reporting undesired brake releases to their immediate supervisor and advise the location of occurrence by subdivision and mile, as well as description of use of the automatic brake prior to the release.

35.0 Use of Throttle

35.1 The throttle should always be handled using good judgment and in a manner that results in smooth operation.

36.0 Minimizing Sticking Brakes

A - Do not overcharge the train brake system above standard pressure, unless otherwise specified as per special instructions.

B - Whenever a train is operating in a false gradient condition, if an angle cock is closed such as when changing a defective air hose, a buildup of brake pipe pressure in the cars ahead of the closed angle cock may result in sticking brakes when the angle cock is opened. In order to eliminate the possibility of sticking brakes, a full service brake pipe reduction must be made before the angle cock is closed.

C - The total brake pipe reduction should be 10 psi or more before the release is made. An overall reduction of less than 10 psi should therefore be increased to 10 psi or more before releasing. Brake pipe exhaust must be stopped for at least 20 seconds before releasing.

D - Whenever air brakes are used to stop a train, unless performing a continuity test, the minimum reduction must be at least 10 psi prior to the release of the brake.

36.1 Cycle Braking from a Minimum Application.

In some train handling situations where the increase to a 10 psi reduction can result in undesired train dynamics, it is permissible to release and apply the brake from a minimum application.

When this method is used, a sufficient brake pipe reduction and release must be made prior to passing the next Hot Box Detector to eliminate the possibility of a hot wheel alarm due to sticking brakes.

⚠ CAUTION The use of this method can result in an increased risk of an undesired brake release. The locomotive engineer must diligently monitor brake pipe activity and be prepared to react in the event an undesired brake release occurs.

37.0 Emergency and Penalty Brake Applications

37.1 All employees concerned must familiarize themselves with the location of the emergency valves on locomotives and cars so equipped. Emergency valves are to be used only in cases of emergency, and when used must be opened wide and left open until the movement is stopped. Members of the train crew are to communicate to the extent possible in the event of an emergency brake application so as to ensure personal safety.

37.2 An EMERGENCY BRAKE APPLICATION must not be made unless it is necessary. In cases that require stopping in the shortest possible distance, when contact has been made or to avoid imminent contact with, someone or something that could result in harm to members of the public, employees or property, an EMERGENCY BRAKE APPLICATION must be made.

- On trains so equipped, the TIBS emergency brake feature must also be activated.
- If accessible to other crew members, the conductor's emergency valve must be opened fully and left open until the movement stops.

37.3 When an EMERGENCY BRAKE APPLICATION occurs from any source, the locomotive engineer must immediately:

- activate the TIBS emergency feature (if so equipped)
- place the automatic brake handle in the EMERGENCY position and leave it there until the movement stops.

37.4 In the event of a PENALTY or EMERGENCY BRAKE APPLICATION while moving, the locomotive engineer must, until the movement stops, regulate locomotive brake cylinder pressure to obtain the shortest possible stop required by the situation. Care and good judgment must be exercised to avoid locomotive wheel slide and severe in-train forces.

Note: After an emergency brake application, brake pipe vent valves will remain open for as long as one minute. No attempt should be made to release brakes or recharge the brake pipe until this interval has elapsed.

37.5 If there is an indication by the air flow indicator or otherwise that the air brakes are being applied from other than the automatic brake, the locomotive engineer must immediately shut off power, placing the automatic brake handle in full service position if on a freight train, or in emergency position if on a passenger train, and leave in that position until movement stops.

The automatic brake handle should be returned to the Release position as soon as practicable, so that any break in a hose or brake pipe may be more readily found. Care is to be taken that sufficient main reservoir pressure is maintained.

37.6 To stop a locomotive in an emergency situation, if both the air brake and the dynamic brake are inoperative, "plug" or reverse the traction motors. This procedure may be hazardous to personnel and equipment and should only be used as a last resort. It should be performed as follows:

A - Alert all personnel on the locomotive.

B - Place the throttle in IDLE.

C - Place the reverser handle in the position opposite to the direction of locomotive movement.

D - Advance the throttle to FIRST notch only.

38.0 Dynamic Braking (DB)

38.1 Using Dynamic Brake

A	Except as otherwise restricted, full available DB may be used with up to a maximum of 200,000 lbs (referred to as DB factor of 20).

Note: On a Distributed Power train, TrAM messages will indicate if the use of DB must be restricted based on the number and location of locomotives in the train. If restricted, the TrAM message will indicate the maximum retarding force to be used, and *is based on DB being cut in on all locomotives on the train*.

B - Summary of available DB on locomotives:

Locomotive Type or series	Retarding Force per locomotive	DB Factor
All 4 axle (except GP60)	= 40,000 lbs	4
CP SD40-2 / SD30c	= 60,000 lbs	6
Leased SD40/40-2/GP60	= 60,000 lbs	6
All CP AC4400 & ES44AC	= 98,000 lbs	10
EMD (SD90MAC & SD70AC)	= 96,000 lbs	10
CEFX 1026 - 1059 (AC4400)	= 96,000 lbs	10
SD60	= 80,000 lbs	8

NOTE: Some older SD40/40-2 locomotives and other 4 & 6 axle locomotives: Leased Units, Yard Engines, low horse power road switchers and most SOO and former SOO locomotives are NOT equipped with DB.

Many StL&H, D&H, DM&E and ICE locomotives may NOT be equipped with DB.

Note: If in doubt, check locomotive control stand for DB controls or refer to locomotive information on consist list or contact Mechanical Facilities.

EXAMPLE:

3 CP SD40s = 3 times factor 6.0 = 18 (DB factor is 18)

2 SD90MACs = 2 times factor 10 = 20 (DB factor is 20)

C - DB should be cut-IN on the lead locomotive and cut-OUT on trailing locomotives so that DB factor does not exceed 20 on the lead consist or 20 on any remote consist.

D - Locomotives required to have the DB cut-OUT that are not equipped with a cut-OUT switch, must be isolated.

E - Information in regard to the DB factor can be ascertained by:

- information provided on part 3 of the Schedule B form,
- checking each locomotive OR
- information provided on the Crew Information Form.

F - Whenever the locomotive consist is altered in such a way that DB must be cut-OUT on certain locomotives, the locomotive engineer in charge must record the details on the Crew Information Form for the information of the next crew.

G - When changing off with another locomotive engineer, if the Crew Information Form does not clearly indicate that the DB factor is 20 or less, then the locomotive engineer in charge must inspect the consist, limit DB properly, and then update the Crew Information Form accordingly.

H - Unless otherwise provided, if the DB factor of any foreign locomotive is not known or is in doubt the following applies:

- On 4 axle locomotives the DB factor is 6.
- On all 6 axle DC traction locomotives the DB factor is 8.
- On all 6 axle AC traction locomotives the DB factor is 10.

CAUTION: the DB factors above are estimates; actual DB capacity may be different than indicated by this instruction.

38.2 When changing from motoring to DB when the train is in motion, pause for ten seconds with the throttle in IDLE.

38.3 When moving into the braking zone, pause at the minimum braking position long enough to adjust train slack, then move the handle slowly within the braking zone to obtain the desired braking effect.

38.4 After releasing the DB in preparation for applying power, the throttle must be advanced with care to ensure gradual adjustment of train slack.

38.5 When commencing the descent of Heavy or Mountain grades with a conventional train, and it is known that both the DB and the train air brake will be required to control the train, the train air brakes should be applied first to prevent severe run-in forces from developing.

38.6 Handling Dynamic Brake (DB) in the following situations:

A - At **Sidings** and **Crossovers**	When entering a siding or crossover, the DB effort **MUST NOT** exceed 60 Klbs (500 amps on DC Traction motor power) before reaching the turnout and until at least half the train has entered the siding or crossover.
B - When governed by **Temporary Speed Restriction**	**The use of Dynamic Brake is prohibited when approaching or occupying a temporary speed restriction.** Air brake and good train handling practices must be used to control train speed until the train has fully passed over the temporary speed restriction. **Exception:** When operating on Heavy or Mountain grades, DB may be used to supplement air brakes as follows: DB effort **MUST NOT** exceed 60 Klbs (500 amps on DC Traction motor power) for approximately ***one half mile*** prior to the beginning of, or when the locomotive is moving over any track governed by temporary speed restriction.
C - On **Yard Tracks**	When operating on any yard track, the DB effort **MUST NOT** exceed 60 Klbs (500 amps on DC Traction motor power).

38.7 A - The train air brakes and DB may be used in conjunction with each other. To avoid skidding locomotive wheels during this operation, the locomotive brakes must be bailed off manually to protect against a DB interlock malfunction.

B - When the release of an automatic brake application is to be followed by a DB application or an increase in DB, the DB should be applied before releasing the automatic brakes. However, the DB should be reduced for at least two minutes after releasing the automatic brakes to prevent a run-in of slack of jackknifing proportions.

C - The independent brake may be used in conjunction with DB but only at speeds of 10 MPH and lower.

- On locomotives without extended range DB, wheels are likely to skid if independent brake pressure of more than 25% at 10 MPH or 50% at 5 MPH is used, based on maximum pressure posted in the cab.

- On locomotives with extended range DB, close observation of DB effort displays and locomotive brake cylinder pressure is required to ensure that total braking effort does not cause wheel slide or loss of DB as per IPS pressure settings described below.

D - Independent Pressure Switches (IPS)

These are switches activated by pre-determined pressures in locomotive brake cylinders that will reduce, remove or restore DB levels. IPS are designed to help prevent locomotive wheel slide on locomotives equipped with extended range DB. IPS switches will function as intended during normal DB or DB holding operation.

IPS pressure settings operate as follows:

1 - On GE Locomotives:

GE locomotives are not equipped with Independent Pressure Switches (IPS). The locomotive computer will monitor wheel rotation in conjunction with brake cylinder pressure and DB levels. DB will be automatically reduced if a combination of DB and brake cylinder pressure are too high.

2 - On EMD SD90's:

IPS pressures are set at 10, 15 and 23 psi. When the locomotive is in DB, and

- if locomotive brake cylinder pressure rises to 15 psi, DB is reduced
- and if pressure continues to rise to 23 psi, DB is removed entirely
- if pressure is then lowered to 15 psi, DB is restored but at a reduced level and
- if pressure is then lowered further to 10 psi, DB is restored entirely.

3 - On DC traction locomotives with extended range DB, (see list in item 38.7 e), IPS pressures are set at 10 and 15 psi. This means that if the locomotive is in DB and

- if locomotive brake cylinder pressure rises to 15 psi, DB is reduced or removed entirely.
- if pressure is then lowered to 10 psi, DB is restored entirely.

E - The following locomotives are equipped with extended range dynamic brake:

Locomotive Type	Locomotive Number
AC4400	CP 9500 to 9683 CP 8500 to 8580 CP 8600 to 8655 CP 9700 to 9740 CP 9750 to 9784 CP 9800 to 9840 CEFX 1026 to 1059
ES44AC	CP 8700 to 8899 CP 8900 to 8960 CP 9350 to 9379
SD90MAC	CP 9100 to 9160
SD60	CP 6200 to 6262
SD40/SD40-2 **SD30c**	CP 786 SOO 778 CP or SOO 6601, 6602, 6604, 6606, 6608, 6610 6613 and 6615 CP5000 to 5019
Caution: Due to renumbering or rebuild, not all DC locomotives may be listed above. The locomotive engineer must monitor for wheel slide or loss of DB effort when using DB and independent is applied.	

F - Traction motors can be cut-OUT one at a time on GE AC locomotives. With a traction motor cut-OUT, DB is available but at a reduced level (5/6 capacity). This does not alter the DB factor of 10.

G - On EMD locomotives, if a traction motor is cut-OUT, DB is nullified.

38.8 DB Holding Feature

A feature that HOLDS or maintains DB if an emergency or penalty brake application occurs for any reason. The PCS switch will open immediately, but normal DB control is retained indefinitely. All of CP locomotives and CEFX 1026 - 1059 locomotives are equipped with DB holding features.

Trailing locomotives depend on the controlling locomotive for DB holding feature. If the controlling locomotive is equipped with DB holding, then trailing locomotives will hold DB if an emergency brake application occurs. Conversely, if the controlling locomotive is not DB holding equipped, then trailing locomotives will not hold DB if an emergency brake application occurs.

On Distr Pwr operated trains, the remotes will not hold DB if an emergency or penalty brake application occurs but will develop 45 psi locomotive brake cylinder pressure.

38.9 DB Holding Feature Operating Instructions:

A - On CP locomotives with an Emergency or Penalty PCS switch open, and with a locomotive in DB holding mode, DB interlock will not prevent the build-up of locomotive brake cylinder pressure caused by the drop in brake pipe pressure. This build-up of locomotive brake cylinder pressure can only be reduced by operation of the independent bail.

B - While in dynamic braking mode, if a controlling locomotive is equipped with DB holding feature, and if an emergency or penalty brake application occurs for any reason, the locomotive engineer must regulate brake cylinder pressure (bail and depending on the situation, moderately apply independent brake) so that the DB holding feature will function as intended. Close observation of DB effort displays and locomotive brake cylinder pressures is required.

C - After the movement stops, Emergency PCS and Penalty PCS must be recovered as per Operating Instructions.

38.10 Dynamic Brake Interlock (DBI)

A feature which (while operating in DB) prevents application of the locomotive air brakes when automatic service brake applications are made; unless otherwise specified, DBI does not function during Emergency or Penalty brake applications.

38.11 Required Dynamic Brake Locations

When operating on the specific areas listed below, unless otherwise specified, Dynamic Brake must be available on the required number of locomotives for haulage of the train, up to a maximum of 200,000 lbs (referred to as DB factor of 20).

Note: On a Distributed Power train, TrAM messages will indicate if the use of DB must be restricted based on the number and location of locomotives in the train.

If restricted, the TrAM message will indicate the maximum retarding force to be used, and *is based on DB being operative on all locomotives on the train*.

British Colombia		
Subdivision	**Location**	**Train Direction**
Columbia*	Between Castlegar and Mile 36	Westward
* Including Eastward on Non Main Track MP 47.6 to MP 44.2		
Fording River	Entire Subdivision	Southward
Mountain	Entire Subdivision	Westward
Mountain	Specific Instructions – Eastward	
Train Tonnage	Required DB Factor	
Less than 5500	0 **	
5500 to 7299	10	
7300 to 9799	20	
9800 to 12200	30	
** When handling less than 20 cars, a minimum of one locomotive with operational DB is required.		

Alberta		
Subdivision	**Location**	**Train Direction**
Laggan	West of Lake Louise	Westward
Laggan	Copithorne Spur	Both
Pecten	Entire Subdivision	Northward
Red Deer	Rockyview Spur	Westward
Shantz	Entire Subdivision	Both

Southern Ontario		
Subdivision	**Location**	**Train Direction**
Hamilton	Between Mile 70 and Desjardins	Southward

38.12 Dynamic Brake Test (Safety Inspection Locations)

Safety Inspection Location – Location where a certified locomotive inspector performs a safety inspection for which the results are available via Schedule B, personal contact or radio.

Prior to operating in a territory listed in item 38.11, it must be confirmed that the Dynamic Brake has been tested at a Safety Inspection location. This information may be obtained:

- in writing (Schedule B form),
- in person, or by radio from a person who has access to the test results (Mechanical staff).

Note: the results must be recorded on the Crew Information Form in the DB Status Chart. If the Crew Information Form does not indicate that the Dynamic Brake was tested at a Safety Inspection Location, **this information must be obtained before the next crew change off location or the test must be performed by a qualified person / manager.**

38.13 Dynamic Brake Operation Test

When a Dynamic Brake Test has been performed as per Item 38.12, the operation of the DB must be verified by performing a running DB test prior to descending the first location where Dynamic Brake is required (see item 38.11).

Note: the results of the first DB running test must be recorded on the Crew Information Form in the shaded area of the Dynamic Brake Status Chart. Each subsequent locomotive engineer must confirm that the DB running test has been performed as indicated on the Crew Information Form.

If the test has not been performed, then a running DB test must be made prior to descending the first location listed in item 38.11 and the results indicated on the Crew Information Form as indicated in the note above.

38.14 Enroute Dynamic Brake Failure

In the event that Dynamic Brake becomes inoperative, a running test of the air brakes must be made prior to operating in a territory listed in item 38.11.

The train may be operated to the next Locomotive Safety Inspection Location for that train, unless arrangements are made to replace the locomotive(s).

Note: Unless not required, a train must not depart with a defective dynamic brake from the last Locomotive Safety Inspection location prior to a territory listed in item 38.11. (examples: Westward from Alyth / Eastward from Coquitlam / Coal Trains ex Golden)

38.15 Transfer of Information

If a locomotive is set off enroute, a copy of the Crew Information Form must be left with the locomotive that indicates that the Dynamic Brake Test and the Dynamic Brake Operational Test have been performed.

If lifting a locomotive enroute, the information from the Crew Information Form must be transferred to the Crew Information Form for that train. If the Crew Information Form does not indicate that the Dynamic Brake was tested at a Safety Inspection Location or no form is available, **this information must be obtained before the next crew change off location.**

39.0 Restrictions When Moving Backward

Note: Extreme caution and good judgment must be used when making reverse movements. Throttle is to be advanced slowly and only sufficient enough to cause the equipment to move. Once the equipment starts to move, throttle is to be reduced to only maintain movement.

39.1 The following table is to be used when moving backward, shoving, doubling over or assisting.

The tractive effort (amp) values in the table are for the indication that will be shown on the lead locomotive.

Unit Type	Maximum Tractive Effort on:	
AC	**Curves & Turnouts**	**Straight Track**
1 unit	150 klbs	Maximum available
2 units	75 klbs	110 klbs
DC	**Curves & Turnouts**	**Straight Track**
1 unit	900 amps	900 amps
2 units	450 amps	600 amps
3 units	300 amps	450 amps
Exception: If the above ratings are not sufficient to move, then the ratings may be exceeded, but only to the extent to cause or allow movement of the equipment. Extreme caution and good judgment must be used as there is a high risk that jackknifing may occur.		
Note: No more than 2 AC or 3 DC locomotives may be operating when making reverse movements. Additional locomotives must be isolated.		

39.2 On Distr Pwr trains, if at least 35 cars/platforms separate each locomotive consist, then each locomotive consist is permitted the limits as indicated in item 38.1.

39.3 On Distr Pwr trains which have (or will have) the remote locomotive located at the extreme rear of train, a maximum of 2 AC locomotives in the lead consist may be operating ("on the line") when moving backward, shoving or doubling over. Use only enough power to start the movement, increase throttle very gradually and avoid using throttle 5 or greater in conjunction with heavy brake pipe reductions to control the movement. Whenever practicable, if you are coupled to the remote, use it to help move backwards so that buff force is reduced behind the head end locomotives.

40.0 Equipment Handling

40.1 Non-Main Track

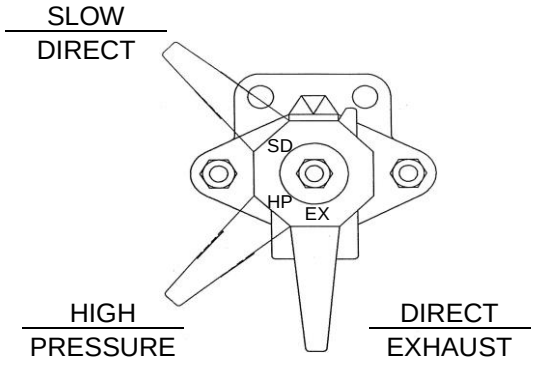
To control equipment and prevent severe in-train forces when operating on non-main track, good judgment must be used on throttle and braking decisions when initiating, maintaining or slowing movement.

Movements handling more than 50 cars / platforms operating on Non-Main Track through Yards, Turnouts, etc, must use caution and good judgment, including a blended brake application of Air and Dynamic Brake (when available).

40.2 Prior to coupling brake pipe hoses between equipment, employees must ensure that the hoses are either blown free of foreign matter (dirt or snow) or in the case of an uncharged system, the hoses must be shaken to ensure such foreign matter is removed.

40.3 Use of retaining valves

A	The use of retaining valves will be governed by Time Table instruction or Special Instructions.
B	Retaining valves must be used on any downgrade where in the judgment of the locomotive engineer their use is considered necessary. Handles should be placed in high pressure position on loaded cars and in slow direct position on empty cars. Please refer to items 14.1 and 14.2.
C	Retaining valve positions EX - Direct Exhaust; air from brake cylinder will exhaust directly to atmosphere. SD - Slow Direct; air from brake cylinder will SLOWLY exhaust DIRECTLY to atmosphere. HP - High Pressure; air from brake cylinder will exhaust to atmosphere, retaining 20 psi in the brake cylinder. **NOTE:** Some retainers have a low pressure position which will retain 10 psi in the brake cylinder.



41.0 Assisting Trains

(Note: This instruction is governed by the Table in item 39.1.)

41.1 a) When a locomotive is assisting, if practicable, the brake pipe hose must be coupled and the angle cocks open. The locomotive engineer of the lead locomotive shall operate the brakes. On the assisting locomotive, the automatic brake must be cut "OUT" and the handle left in the RELEASE position. The independent brake must be cut IN to allow use of the bail.

Note: The following procedures apply when assisting a train with a manned locomotive(s) or train.

I. It is not required to couple the brake pipe between the assisting locomotive(s) / train and the train being assisted provided both locomotive engineers have a thorough understanding of the task at hand, and they have completed a Job Briefing discussing all pertinent information such as; number of loads, empties, tonnage, length, number of locomotives, Dynamic Braking, any traction motors cut out, speed, braking practices, and where the assisting locomotives will be cut off. Once movement has commenced, radio communication between the locomotive engineers must be maintained at all times and any sudden changes to train operation, Air Flow or the integrity of the train air brake system must be immediately communicated and the appropriate action taken.

The train being assisted must be:

- operating without a caboose, riding platform or crew transportation car.
- equipped with a fully operative SBU or tail end remote.
- requires help to crest an ascending grade.

II. While moving, if there is any indication that an EMERGENCY application has occurred, the assisting locomotive engineer must:

- immediately reduce the throttle to IDLE and
- apply about one-half of full independent brake.

Note: If assisting with a train, an emergency brake application must be made.

This will help avoid severe slack run-in while the movement stops.

III. If the operating engineer indicates that a SERVICE application will or has occurred, the assisting locomotive engineer must:

- immediately reduce the throttle to IDLE and
- regulate locomotive brake cylinder pressure to the degree required to avoid severe in-train forces.

Note: If assisting with a train, SERVICE applications must be avoided if possible. If a SERVICE application is required, then the assisting train must initiate a SERVICE application and throttle modulated to avoid high in-train forces.

IV. A definite understanding of the train's operation must be maintained between both locomotive engineers at all times, especially when starting, slowing or stopping the train.

V. Caution and good judgment must be used when assisting movements. The throttle on assisting locomotives is to be advanced slowly and only sufficient enough to assist with causing the equipment to move. Once the equipment starts to move, throttle is to be reduced to only help maintain movement.

If assisting with a train the table in item 39.1 does not apply, however, extreme caution must be used when modulating the throttle to prevent excessive buff and draft forces from occurring on either train.

b) An assisting consist must not be coupled behind restricted equipment being handled at the rear of a train.

41.2 Placement of Assisting Locomotives in a Train

Note 1: This applies to all train types mentioned in Section 7.

Note 2: A TrAM check is **required** to determine compliance for assisting locomotive placement. If the locomotive types being used to assist do not match those in the Distr Pwr Trains, the TrAM check must be done with types of locomotives that provide the same axle count as the assisting locomotives. For instance, if the assisting locomotives are three GP38s (total axle count 12), the TrAM check may be done by substituting one AC locomotive (axle count also 12) for the three GP38s. Refer to GOI Section 1, Appendix 4 for axle counts.

Adding Assisting Locomotive(s) to head end of train	
Conventional trains	**Distr Pwr trains**
Must comply with GOI Section 1, Item 4.0, "Number of Locomotives in a Basic Consist"	Maximum 24 driving axles allowed unless otherwise provided for in GOI Section 1, Item 4.6

Adding Assisting Locomotive(s) to Extreme Rear	
Conventional Trains	
As per table in item 39.1	
Distr Pwr Trains	
A. Distr Pwr Train with Remote Consist at Extreme Rear	
As per table in item 39.1, maximum of 24 driving axles allowed on assisted trains only. **Note:** the remote locomotive at the extreme rear must be included in the number of locomotives that will be assisting. E.G. – If one locomotives will be assisting a train with one tail end remote, then the total locomotives as per the table in 39.1 would be two.	
B. Distr Pwr Train with Remote Consist Placed Mid Train	
As per table in item 39.1	
• Heavy Bulk • Heavy Uniform • Light Bulk • Light Uniform	• Mixed
1. At least 25% of train weight must be between the last in-train remote locomotive consist and assisting locomotive(s).	1. Cars immediately ahead of assisting locomotive(s) must pass Remote Zone Rules for one remote locomotive (5 cars or platforms). A TrAM check must be used to confirm this situation.
Note: A TrAM check will fail if more than 12 driving axles are on the rear of the train. In this case, the provisions of item 39.1 apply with a maximum of 24 driving axles allowed.	

Adding Assisting Locomotive(s) to Mid Train Location
Conventional & Distr Pwr Trains
• All train types
Assisting locomotive(s) are to be considered as remote locomotives in this application. A TrAM check MUST be used to verify marshalling and remote zone rules.

Assisting A Train With Another Train
Conventional & Distr Pwr Trains
TrAM check and table in item 39.1 does not apply, however, extreme caution must be used when modulating the throttle to prevent excessive buff and draft forces from occurring on either train.

42.0 Train Handling Guidelines

42.1 Knowledge of the road and train make-up are the most important factors the locomotive engineer must take into account when developing a train handling plan to operate safely, efficiently and with competence.

The particular care and attention required when starting or stopping a train must also be exercised when the train is undergoing a transition from bunched to stretched or vice versa. Changes in slack due to grade changes and/or train make-up, as well as those initiated by the locomotive engineer must be handled in such a way as to maintain the in-train forces within acceptable levels.

42.2 High Horsepower AC Locomotives - Tractive Effort

Knuckles for standard freight cars (C-Grade) are designed to withstand approximately 300,000 lbs of continuous tractive effort. Knuckles for bulk commodity freight cars (E-Grade) are designed to withstand approximately 400,000 lbs of continuous tractive effort.

One AC Traction Motor equipped locomotive is able to develop up to 180,000 / 200,000 lbs of tractive effort when starting a train from a standstill.

At 13 MPH, one SD40 locomotive in throttle 8 will develop 71,000 lbs of tractive effort and at 8 MPH, one AC Traction Motor equipped locomotive in throttle 8 may develop up to 180,000 / 200,000 of tractive effort.

Due to the high level of tractive effort AC Traction Motor equipped locomotives are able to develop, caution must be exercised when starting trains to avoid train separation.

42.3 Starting Freight Trains

Factors to be considered:
Throttle response characteristics of locomotive consist.
Weight and length of train.
Amount of slack in train.
Weather.
Grade.
Rail conditions.
Proximity of curves in relation to head portion of train.
Train marshalling.
Rear car should be started with care, using lowest throttle possible to start train moving.
After train is moving, throttle may be moved to the next higher position to provide a smooth acceleration consistent with good train handling practices.

42.4 Stopping Freight Trains

Factors to be considered:
Knowledge of the territory over which you are operating is extremely important. With this familiarity, planning ahead will enable you to select the most desirable train handling method.
Unless rules specify otherwise, during planned stopping, slowing or controlling train speed, if dynamic brakes are available, the power braking method should be avoided.
Total braking effort from dynamic and air brakes should be kept at the lowest practical level when stopping in curve territory.
When the instructions require that the locomotive brakes be applied to complete a stop, brake cylinder pressure must be sufficient to prevent a run-out of slack without creating excessive buff forces.
A 30 second pause between split reductions minimizes in-train forces.
Unusual blocking of loads or empties (train marshalling) must be considered in choosing the proper train handling method.
The various train handling methods must be known and understood. The method that you select should be the one that minimizes in-train forces and locomotive fuel consumption.

42.5 Back-Up Movements

Factors to be considered:
Locomotives can develop enough buff force to cause trailing locomotives and cars in train to jackknife.
The number of powered axles in the locomotive consist determines the potential total buff force.
Slack should be stretched, when necessary, to reduce buff forces when starting.
Short car/long car combinations, proximity of curves to head end of train and trains with empties on head end require special consideration.

42.6 Slowing or Controlling Freight Trains

Methods to be considered:
Throttle Modulation - Slowly reduce throttle to adjust train slack gradually until desired speed is reached.
Dynamic Brake - If the dynamic brake alone will provide sufficient retardation to slow or control speed, use of the train brakes is unnecessary.
Stretch Braking - Throttle 4 or less with automatic brake application.

43.0 Definition of Track Profiles

43.1 Undulating Grade

A track profile with grade changes so often that an average train passing over the track has some cars on three or more alternating ascending and descending grades. The train slack is always tending to adjust as cars on descending grades tend to roll faster than those on ascending grades.

43.2 Ascending Grade

An ascending grade is considered HEAVY between and including 1.0 and 1.8 percent. A LIGHT grade is below 1.0 percent.

43.3 Descending Grade

A descending grade is considered HEAVY between and including 1.8 and 1.0 percent, while a light descending grade is below 1.0 percent.

43.4 Mountain Grade

A grade is designated a MOUNTAIN grade when it is greater than 1.8 percent.

43.5 Cresting Grade

A long ascending grade which rapidly changes to a long descending grade, both of significant magnitude to require a change in the train handling procedure when the grade is topped.

43.6 Sag or Dip

A rapid decrease in grade followed by an increase in grade sufficient to result in abnormal slack adjustment.

Summary

Two major considerations should govern your selection of the type of train handling method for a given situation.

1 - The first concerns the importance of minimizing in-train forces and slack action, thereby reducing derailment possibilities and avoiding costly damage to equipment and/or lading.

2 - The second consideration is the importance of utilizing the most fuel efficient method of train handling. From a fuel consumption viewpoint, dynamic braking is superior to stretch braking whenever the throttle position, during stretch braking, is RUN 2 or greater.

44.0 Passenger Train Handling

44.1 When approaching stopping points, after gradually shutting off power or adjusting throttle as required, and after allowing for any necessary slack adjustment, the initial reduction must be at least 10 psi to ensure brakes apply throughout the train. Subsequent brake pipe reductions will depend upon train speed.

44.2 To avoid slack action, the locomotive brake may be held off during the first reduction, if necessary, until the train brakes have applied.

44.3 After the speed of the train has been reduced sufficiently, the brakes may be graduated off, if necessary.

44.4 When the speed has decreased or the deceleration rate is too high, brake cylinder pressure should be reduced in graduated steps. This is accomplished by moving the automatic brake handle to RELEASE position, on a Passenger equipped 26 type brake valve, move the handle slightly toward release position in the application zone. The equalizing reservoir gauge should show an increase of approximately 4 psi. Do not attempt a further graduation after the brake pipe pressure has been restored to within 10 psi of the standard brake pipe pressure. Graduations should be spaced so a relatively low brake cylinder pressure will be retained when the train is moving 15 MPH or less, especially with cast iron shoes.

44.5 When making a spot stop in passenger service, braking should be commenced at a sufficient distance from the stopping point to allow for two distinct automatic brake applications.

The final application should be commenced at a speed which will permit a light reduction to bring the train to a stop. Time should be allowed for all brakes throughout the train to be released before starting this application.

44.6 When making slowdowns on passenger trains, the slack should be kept stretched by working light power. As the train slows down from the brake application, the throttle must be reduced to prevent excessive load meter readings.

44.7 When passenger trains are controlled by use of a back-up hose or valve, the locomotive engineer must not allow the speed to become excessive. When it is noted that brakes are being applied, place the automatic brake cut-off valve in OUT position. Power must be reduced as required and brakes must not be released until stopped or a signal is received to continue the movement.

44.8 Unless in regular passenger train service, cars with UC (Universal Control) type brake equipment are normally set to be hauled in freight trains. If on occasion they are to be hauled in a passenger train, it is only necessary to cut in the supplementary or emergency reservoir if so equipped.

44.9 When passenger cars equipped with D-22 or 26-F control valves are handled in freight trains, the graduated release cap on the control valve must be turned to the direct release position.

45.0 Fuel Conservation

Whenever practicable, the most fuel efficient method of operating must be used.

A	Dynamic Brake should be considered the primary choice of retardation.
B	Use contour braking/throttle modulation, allow the natural resistance of grade, curvature and friction slow the train.
C	Use a combination of low power split reduction and dynamic braking.
D	Unless authorized by Time Table or Special Instruction, High Throttle Power Braking (notch 5-8) is prohibited.
E	Whenever practicable, avoid increasing the throttle while the brake is set.
F	When a train is going to be delayed for a period of time greater than 20 minutes, the RTC is responsible to communicate to the affected crew: • the location and estimated duration of delay • the crew will then, using the pacing chart, (see APPENDIX 2) calculate the speed required based on their distance from the delay point and the duration of the delay.
G	Avoid short bursts of speed.
H	When charging the train air brake system, advance the throttle only when MR pressure cannot be maintained at or above 105 psi., then promptly return the throttle to IDLE as soon as MR pressure exceeds 105 psi. **Note:** Does not apply to GE AC Locomotives.
I	When you are making your train handling decisions, safety and rules compliance are the first consideration. However, fuel conservation must be a major factor in the train handling method selected.
Train handling practices in conjunction with fuel conservation will be monitored through random event recorder downloads and on the job observations and evaluations of operating officers to ensure that all locomotive engineers are making the proper fuel conservation decisions.	

45.1 Check Fuel Level

Locomotive engineers are responsible to check fuel level on locomotives:

- which are set off enroute,
- which are picked up enroute,
- and whenever requested to do so by an RTC or a company supervisor.

This information must be relayed to the RTC immediately.

45.2 Compliance with Train Document Messages

The locomotive engineer and conductor are jointly responsible to ensure that the number of operating locomotives in their consist is in compliance with messages on train documents. When a locomotive has been isolated for fuel conservation, it should remain isolated unless given permission by the RTC to put it back on-the-line.

When enroute changes occur (e.g., locomotives or cars are picked up/set off), determine the appropriate number of operating locomotives and isolate excess locomotives.

Locomotives which are shut down or isolated must be noted on Part 1 of the Crew Information Form. When changing off with another crew, if the Crew Information Form does not clearly indicate that train document fuel conservation messages are being complied with, then the locomotive consist (excluding remote locomotives) must be inspected and excess locomotives isolated.

45.3 Fuel Conservation Technology

Unless otherwise authorized by the OC, fuel conservation technologies such as LEADER or Fuel Trip Optimizer when equipped and operational on the lead Locomotive must be used on Subdivisions accepted for their use.

Exemption: For the purpose of training, locomotive engineer trainees are exempt from the requirement of engaging fuel conservation systems, however, they must initialize the system so that it is available for use.

A	When initialization of a fuel conservation system is performed, the preferred method is for the train to be stationary. If a moving initialization is necessary, unless otherwise indicated by local instruction, maximum speed must not exceed 15 MPH. The preliminary FTO initialization must be accomplished within 35 miles of the originating station. • When a train is staged enroute or a train crew will be relieved, the crew must select the “END TRIP” feature. • When a relief crew takes control of a train, they must request a new trip initialization and compare train and TGBO information for the current subdivision. **Note:** If the train is within 35 miles of the final destination, the train must be operated manually, as the system will not initialize for the current subdivision if a new trip is requested. **Important:** Train crews are required to review all active TGBO information and if required, operate in manual mode to comply with any restrictions.
B	When initializing the GE – Fuel Trip Optimizer (FTO) system, crews are responsible to ensure the information provided by the system corresponds to the documentation for the train. Any discrepancies must be reported to the FTO 7/24 desk.
C	Crews are responsible to make changes to the train details in Fuel Trip Optimizer, using the Edit Consist (EC) feature when train details have changed and whenever the FTO consist details do not match the actual equipment on the train. Any changes to the consist must be reported to the FTO 7/24 desk so that the train details can be updated to generate the proper information for the next regular crew change location. **Note:** Unless otherwise indicated by local instruction, all changes made using the Edit Consist feature must be performed while the train is stopped.
D	To contact the FTO 24/7 Fuel Analyst Desk. Via radio: 1) Switch To: Utility Channel 2) Dial: *(z)706# 3) Listen For: "OK" + 8 seconds + "RINGING" 4) To disconnect: Dial *(z)# (z) = subdivision zone Note: For those areas where the above instructions are not applicable, local instructions will be issued for contacting the desk via radio. Via office phone: 1-800-308-6426 or 1-877-301-5009

45.4 Locomotive Shutdown for Fuel Conservation

Note: Locomotives (including remote(s)), equipped with an enabled ZTR Smartstart, Q-tron QEG system or GE AESS system are exempt from the requirement to manually shut down locomotive(s) as indicated below.	
A	To conserve fuel, shutdown the locomotive(s) under the following conditions; • the ambient temperature is expected to remain at or above 5 degrees Celsius AND • it is known the locomotive(s) will be standing for 15 MINUTES or more.
B	Care and good judgment are to be used to determine if, and when, a diesel engine will be shutdown. When in doubt, contact local Mechanical personnel, or a Supervisor for information surrounding the decision to shut down a locomotive or to leave it idling. **Note:** Equipment with locomotive(s) attached that will be shut down and **unattended**, must be left secured as per GOI Section 4. Trains left unattended for less than 15 MINUTES must be secured as required, but the locomotives can remain running.
C	Advise Mechanical Facilities when locomotives are shutdown enroute and advise yard or terminal staff when locomotives are shutdown in yard areas. In addition, document on a Crew Information Form, the time locomotives are shutdown in the event the locomotives are left for others.
D	**Note:** If the locomotive to be restarted has been shut down for twenty-four hours or more, to ensure engine protection, contact Mechanical personnel for guidance.

APPENDIX 1: Descending Heavy Grade Protocol

1.0 Purpose

This document is to provide train handling guidelines while descending grades. All CROR, GOI and Time Table Special Instructions remain in effect.

2.0 Descending Heavy Grades

The following tables list the grades that are heavy grades (1.0 % to 1.8 % for a distance of two miles or more).

Note 1: Those descending grades indicated by the ***shaded rows*** may require the brake to be set for longer than 10 minutes with a 10 psi brake pipe reduction or more, where time table speeds may be greater than those required by item 4.1 (B).

Item 4.1 (B) speeds are indicate by either [30] or [35] .

Examples: 1.00%[35] or 1.30%[30]

Note 2: Each table lists the descending grades where ALL items apply and those where all except item 4.1 (B) applies.

Vancouver			
Subdivision	**Location**	**Max. Grade**	**Train Direction**
ITEMS 3.0 TO 8.0 APPLY			
Cascade	MP 40.6 – 42.7	1.30%[30]	Westward

BC Interior			
Subdivision	**Location**	**Max. Grade**	**Train Direction**
ITEMS 3.0 TO 8.0 APPLY, EXCEPT ITEM 4.1 (B)			
Fording River	MP 33.5 - 31.3	1.80%	Southward
Fording River	MP 30.3 - 27.0	1.70%	Southward
Fording River	MP 20.9 - 12.7	1.80%	Southward
Fording River	MP 11.6 - 8.5	1.80%	Southward
Byron Creek *** Note:** MP 11.4 - 10.9% is 2%	MP 10.9 - 0.0*	1.70%*****	Northward
Cranbrook	MP 1.8 - 17.7	1.20%	Westward
Cranbrook	MP 54.4 - 60.2	1.00%	Westward
Cranbrook	MP 63.6 - 67.3	1.00%	Westward
Cranbrook	MP 105.2 - 95.5	1.00%	Eastward
Cranbrook	MP 112.8 - 108.7	1.00%	Eastward
Cranbrook	MP 117.4 - 120.7	1.00%	Westward
Mountain	MP 1.5 - 7.0	1.10%	Westward
Mountain	MP 21.2 - 24.7	1.10%	Westward
Mountain	MP 31.3 - 34.5	1.20%	Westward
Mountain – MacDonald Track	MP 77.0 - 68.3	1.00%	Eastward
Mountain – Connaught Track	MP 84.9 - 79.3	1.00%	Eastward
Mountain	MP 93.9 - 95.9	1.80%	Westward
Mountain	MP 98.9 - 101.8	1.80%	Westward
Mountain	MP 106.6 - 110.0	1.20%	Westward
Mountain	MP 113.8 - 119.8	1.20%	Westward
Mountain	MP 122.5 - 125.5	1.20%	Westward
Columbia	MP 8.9 - 14.2	1.30%	Westward
Columbia	MP 40.2 - 43.8	1.40%	Northward
Shuswap North Track	MP 5.0 - 1.9	1.40%	Eastward
Shuswap South Track	MP 6.1 - 1.9	1.00%	Eastward
Shuswap	MP 9.5 - 12.5	1.10%	Westward
Shuswap	MP 15.1-20.1	1.50%	Westward
Shuswap	MP 21.2 - 24.3	1.00%	Westward
Shuswap North Track	MP 79.4 - 70.9	1.00%	Eastward
Shuswap South Track	MP 79.4 - 70.9	1.60%	Eastward
Shuswap	MP 79.4 - 89.9	1.10%	Westward

Alberta			
Subdivision	**Location**	**Max. Grade**	**Train Direction**
ITEMS 3.0 TO 8.0 APPLY			
Crowsnest	MP 86.0 - 84.0	1.80%[30]	Eastward
Crowsnest	MP 78.0 - 75.0	1.10%[35]	Eastward
Crowsnest	MP 70.2 - 65.5	1.30%[30]	Eastward
Crowsnest	MP 62.0 - 58.5	1.40%[30]	Eastward
Laggan	MP 34.0 - 27.5	1.00%[35]	Eastward
Red Deer	MP 29.2 - 32.5	1.20%[35]	Northward
Maple Creek	MP 141.0 - 146.0	1.30%[30]	Westward
Brooks	MP 5.4 - 0.3	1.30%[30]	Eastward
ITEMS 3.0 TO 8.0 APPLY, EXCEPT ITEM 4.1 (B)			
Pecten	MP 20.0 - 16.0	1.50%	Northward
Pecten	MP 12.0 - 7.9	1.50%	Northward
Pecten	MP 5.5 - 1.3	1.50%	Northward
Laggan South Track	MP 122.3 - 117.3	1.80%	Eastward
Laggan North Track	MP 122.3 - 116.0	1.00%	Eastward
Shantz	MP 12.7 - 9.3*	1.80%	Eastward
*** Note**: portions between MP 12.7 - 9.3 are 2.00%			
Shantz	MP 7.2 - 9.2	1.50%	Westward
Shantz	MP 5.8 - 3.2	1.70%	Eastward
Wetaskiwin	MP 84.0 - 86.0	1.13%	Westward
Wetaskiwin	MP 90.5 - 87.5	1.03%	Eastward

Saskatchewan			
Subdivision	**Location**	**Max. Grade**	**Train Direction**
ITEMS 3.0 TO 8.0 APPLY			
Indian Head	MP 79.0 - 83.0	1.00%[35]	Westward
Weyburn	MP 152.0 - 149.2	1.00%[35]	Northward
ITEMS 3.0 TO 8.0 APPLY, EXCEPT ITEM 4.1 (B)			
Expanse	MP 21.0 - 25.3	1.00%	Southward
Hardisty	MP 126.5 - 130.5	1.00%	Westward
Lloydminster	MP 66.8 - 73.9	1.00%	Northward
Lloydminster	MP 80.0 - 74.0	1.00%	Southward
Radville	MP 84.6 - 81.4	1.30%	Eastward

Manitoba			
Subdivision	**Location**	**Max. Grade**	**Train Direction**
ITEMS 3.0 TO 8.0 APPLY			
Minnedosa	MP 74.0 - 64.6	1.43%[30]	Eastward
ITEMS 3.0 TO 8.0 APPLY, EXCEPT ITEM 4.1 (B)			
Bredenbury	MP 3.6 - 0.0*****	1.61 %*****	Eastward
*** Note:** between mile 2.6 and 1.9 the grade is 2%			
Bredenbury	MP 53.0 - 56.0	1.13%	Westward
Bredenbury	MP 58.5 - 56.0	1.27%	Eastward
Bredenbury	MP 76.0 - 84.5	1.32%	Westward
Bredenbury	MP 89.0 - 84.5	1.38%	Eastward
Minnedosa	MP 75.5 - 77.5	1.33%	Westward

Northern Ontario			
Subdivision	**Location**	**Max. Grade**	**Train Direction**
ITEMS 3.0 TO 8.0 APPLY			
Nemegos	MP 4.6 - 6.9	1.10%[35]	Westward
Nemegos	MP 98.5 - 100.8	1.20%[35]	Westward
White River	MP 12.2 - 15.2	1.20%[35]	Westward
White River	MP 74.0 - 70.4	1.10%[35]	Eastward
White River	MP 96.6 - 93.7	1.10%[35]	Eastward
Heron Bay	MP 77.5 - 74.4	1.35%[30]	Eastward
Heron Bay	MP 77.6 - 81.0	1.40%[30]	Westward
Heron Bay	MP 109.0 - 105.4	1.38%[30]	Eastward
Nipigon	MP 1.8 - 9.0	1.68%[30]	Westward
Nipigon	MP 101.1 - 94.7	1.40%[30]	Eastward
Kaministiquia	MP 16.0 - 8.58	1.26%[35]	Eastward
Kaministiquia	MP 39.8 - 33.0*	1.11%[35]	Eastward
***Note:** For information only, mile 38.90 to 38.71 is 1.42 %			
ITEMS 3.0 TO 8.0 APPLY, EXCEPT ITEM 4.1 (B)			
Nemegos	MP 12.1 - 14.3	1.20%	Westward
White River	MP 36.3 - 40.7	1.10%	Westward

Southern Ontario			
Subdivision	**Location**	**Max. Grade**	**Train Direction**
ITEMS 3.0 TO 8.0 APPLY			
MacTier	MP 39.0 - 41.0	1.25%[35]	Northward
MacTier	MP 21.0 - 10.0	1.00%[35]	Southward
Galt	MP 74.2 - 71.2	1.00%[35]	Eastward
Galt	MP 39.0 - 32.8	1.06%[35]	Eastward
Galt	MP 24.5 - 20.6	1.00%[35]	Eastward
Cartier	MP 83.6 - 85.6	1.15%[35]	Westward
Windsor	MP 3.0 - 1.0	1.07%[35]	Eastward
ITEMS 3.0 TO 8.0 APPLY, EXCEPT ITEM 4.1 (B)			
Hamilton	MP 46.7 - 52.5	1.04%	Northward
Havelock	MP 177.0 - 173.4	1.00%	Eastward
Havelock	MP 172.2 - 166.3	1.00%	Eastward
Havelock	MP 140.1 - 127.5	1.10%	Eastward
Belleville	MP 200.5 - 203.8	1.14%	Westward
Belleville	MP 206.4 - 209.1	1.75%	Westward
Nephton	MP 19.5 - 17.0	1.25%	Southward
Nephton	MP 14.7 - 12.7	1.50%	Southward
Nephton	MP 8.6 - 6.6	1.80%	Southward
Nephton	MP 8.6 - 11.0	1.22%	Northward

Montreal			
Subdivision	**Location**	**Max. Grade**	**Train Direction**
ITEMS 3.0 TO 8.0 APPLY, EXCEPT ITEM 4.1 (B)			
Adirondack Outremont Spur.	MP 4.0 - 1.5	1.58%	Southward

3.0 Uncontrolled Movements - Stop Required

Any movement descending a Heavy or Mountain grade that attains a speed 5 MPH above permissible speed is considered an uncontrolled movement and must be stopped immediately by whatever means available, including (if necessary) using an EMERGENCY brake application.

The movement must not proceed until it has been determined that sufficient braking is available to control the movement. This may require securing the train to recharge the brake system and/or the use of retainers.

4.0 Train Handling

Note 1: Wherein this Protocol it states "rear car BP pressure", it also refers to Tail End Remote locomotive BP pressure.

Note 2: The Automatic Brake, false gradient and cycle brake principles for tail end remote operated trains as instructed in GOI Section 2, item 4.0 apply.

The following guidelines apply when cresting and descending a hill under normal operation.

4.1 Special Restrictions: Heavy Trains

Trains with a Weight per Operative Brake exceeding 100 tons must:

A - Unless it is known that sufficient braking is available, crest the hill and balance train speed at least 5 MPH below permissible speed until braking is seen to be ample.

B - NOT exceed the following speeds while the lead locomotive is between the mileage locations indicated by the shaded rows in item 2.0.

- 35 MPH on grades 1.0% to 1.29%
- 30 MPH on grades 1.3% to 1.8%

4.2 Handling Guidelines

Actions
Crest the hill and gradually reduce the throttle to balance train speed below permissible speed.
If it is known train air will be needed to supplement dynamic brake, make a minimum brake pipe reduction as the train crests the hill. Then slowly apply Dynamic Brake as needed.
If necessary, make additional brake pipe reductions in 2-3 psi increments.

4.3 Without Dynamic Brake

Step	Action
1	Crest the hill and gradually reduce the throttle to balance train speed below permissible speed.
2	Reduce throttle to the 4th notch or lower.
3	Make a minimum brake pipe reduction while the rear portion of the train is approaching the crest of the hill.
4	Check head-end display unit (TIBS) and observe brake pipe reduction at rear of train.
5	Balance train speed with throttle.
6	If necessary, make additional brake pipe reductions in 2-3 psi increments as the entire train moves onto the hill.
7	Continue to balance train speed down the hill with the throttle.

4.4 Brake Pipe Pressure Reduction

WARNING: If brake pipe at rear of train does not reduce it may be an indication of a blockage in the brake pipe or a closed angle cock. Stop train immediately. If necessary place the automatic brake into emergency activate the TIBS Emergency Brake Feature (if applicable) and open the Conductor's emergency brake valve.

5.0 Movement After Emergency Application

Caution: Job Briefing Required

- Before the Emergency PCS is recovered, the locomotive engineer must initiate a discussion with the conductor as regards the need for hand brakes and/or retainers. They must consider train location, amount of train on grade, proximity of lesser grade, weather, rail or any other condition that may affect train braking.
- When agreement cannot be reached, the crew must contact a Trainmaster / Road Foreman and be governed by his/her instructions.

6.0 Use of Retaining Valves

Retaining valves will be used under the following conditions:

If …the train is standing on a grade listed in item 2.0 and;

- it is the second emergency brake application on the grade, and;
- locomotive brakes are not sufficient to prevent train movement;

Then… do not attempt to recover the emergency PCS until retaining valves or hand brakes are set as follows:

1 - on grades listed that are 1.3% to 1.8%, set retainer valves to the high pressure (HP) position on at least 50% of the loaded cars and on grades listed that are 1.0% to 1.29%, set HP retainers on at least 25% of the loaded cars.

Note: Whenever a train is moved with HP retainers applied, do not exceed 20 MPH. In addition, the train must be stopped every 20 minutes for a period of 10 minutes in order to allow the wheels and brake shoes time to cool off.

OR

2 - on grades listed that are 1.3% to 1.8%, apply handbrake on at least 50% of the loaded cars and on grades listed that are 1.0% to 1.29%, apply hand brakes on at least 25% of the loaded cars. The handbrakes must not be released until after the train air brake system is fully charged.

Note: This does not alter the requirements to apply hand brakes or retainers when conditions are such that their use is considered necessary after one emergency brake application.

7.0 Who to Contact

If train goes into emergency from any source while descending any of the grades listed in item 2.0 and the locomotive engineer is not confident he/she can move the train safely, they must contact the RTC and request to speak directly to a Trainmaster / Road Foreman.

8.0 Moving from a Planned Stop / Emergency

Heavy or Mountain Grade: Conventional or Distr Pwr

Note: **Heavy grades** are 1.0% to 1.8%. (See Item 2.0)

Mountain grades are greater than 1.8% (See Time Tables or special instructions for specific train handling procedures)

Important: On **Distr Pwr** trains, ensure all remotes are in MU, the "Front" group.

Step	Action
1	Recover from Emergency application as per Operating Instructions. When recovered, place Dynamic Brake in DB #8
2	*Monitor speed and rear car BP pressure. On **HEAVY** grades, if train is accelerating in DB #8, prior to exceeding 50% of permitted speed;* ***OR*** *On **MOUNTAIN** grades, prior to exceeding 5 MPH;*
	Action
	Make an effective minimum application by reducing brake pipe 7 psi below rear car BP pressure or make an effective minimum reduction on tail end remote trains as per GOI Section 2 Item 4.1 if in a false gradient.
3	***IF** speed still increasing;* APPLY 2 psi supplements until grade is balanced and speed held within permissible limits

9.0 DP Comm Loss With Train in Emergency

IF Locotrol communication is lost with one or more remotes AND **IF** train is in emergency, then Locotrol must be shut down as per the following:

- Secure the train with hand brakes and on LOADED bulk trains,
- On **HEAVY** grades apply 50% retainers
- On **MOUNTAIN** grades apply 100% retainers

Shutdown Locotrol on the lead Locomotive first.

Ensure Automatic Brake handle is left in EMERGENCY on the lead locomotive.

End Distr Pwr on each Remote Locomotive		
Step	**Switch/Part**	**Setting**
1	**Control Stand**	
	Engine Run Switch	ON
	CAUTION: DO NOT move AB to release in this procedure.	
	Automatic Brake (AB)	EMERGENCY for 60 seconds
	AB	HANDLE OFF
	Ensure PCS is EXTINGUISHED	
	Independent	RELEASE
2	**IFD Screen**	
	Operator function (if displayed)	SELECT
	Air Brake Setup	SELECT
	IND Brake Lead/Trail	TRAIL
	AB Result	CUTOUT
	Save Setup	SELECT& CONFIRM
3	***Ensure IND Brake is in TRAIL and Auto Brk is CUT OUT***	
	Locomotives	ISOLATE
4	Brake Cylinders (on each Truck)	CUT-OUT
	Repeat all the above steps on each remote unit.	
5	**This completes the Locotrol Shutdown Procedure. The train is now conventional and emergency PCS may be recovered on lead locomotive.**	
	Caution: You must cut-IN the air brakes on each set of trucks when the remote unit is marshalled to the head end or Locotrol is subsequently powered up again.	

APPENDIX 2: Pacing Chart

Delay Time Minutes	4	10	15	20	25	30	35	40	45	50	55	60
Miles from Delay Point	SPEED REQUIRED IN MPH											
4 Miles	60	24	16	12	10	8	7	6	-		-	-
5 Miles	75	30	20	15	12	10	9	8	7	6	-	-
6 Miles	90	36	24	18	14	12	10	9	8	7	6	6
7 Miles	-	42	28	21	17	14	12	10	9	9	8	7
8 Miles	-	48	32	24	19	16	14	12	11	10	9	8
9 Miles	-	54	36	27	22	18	15	13	12	11	10	9
10 Miles	-	60	40	30	24	20	17	15	13	12	11	10
15 Miles	-	-	60	45	36	30	26	22	20	18	16	15
20 Miles	-	-	-	60	48	(40)	34	30	27	24	22	20
25 Miles	-	-	-	-	60	50	43	38	33	30	27	25
30 Miles	-	-	-	-	72	60	51	45	40	36	33	30
35 Miles	-	-	-	-	-	70	60	52	47	42	38	35
40 Miles	-	-	-	-	-	-	69	60	53	48	44	40
45 Miles	-	-	-	-	-	-	-	68	60	54	49	45
50 Miles									67	60	54	50

Example: You are informed by the RTC that you will be delayed for 30 minutes at a location 20 miles from your present location. If your permissible speed is over 40 MPH, reduce to 40 MPH to pace your movement. See circle in table.

APPENDIX 3: Preferred Marshalling Examples: (applicable to items 5.3 and 7.2)

Lead Locomotive Consist			Loaded Buffer Cars 45t/<65ft		Unit	Loaded Buffer Cars 45t/<65ft		Unit	Loaded Buffer Cars 45t/<65ft		Trailing Train
AC	**GP**	**AC**	Car	Car	**GP**	Car	Car	**GP**	Car	Car……	trailing train
AC	**GP**	**AC**	Car	Car	**GP**	Car	Car……				trailing train
AC	**GP**		Car	Car	**GP**	Car	Car……				trailing train
AC	**GP**		Car	Car……							trailing train
AC	**GP**	**AC**	……..…(no buffer cars required)……..……..……..								trailing train

Note: GP's are any locomotive(s), (Switcher (SW) or General Purpose (GP)) in the series listed in item 5.1 **or** any locomotive that cannot be handled in the controlling locomotive consist. AC can be either AC or DC locomotives and the total number is not limited by these examples, provided that, the operating locomotives have coupler alignment control. Also, these examples do not limit the possibility of having other cars between the lead consist and the loaded buffer cars or between buffer cars that are required on either side of a GP or other locomotive.

APPENDIX 4: Equivalent Axle Counts and DB / HP Factors

CP Unit Type and/or Model[3]	Equivalent Axles	DB Factor	HP
DS-15[1] **DS-17[1]**	4	N/A	1500
DRS-17	4	4	1750
DRS-20 **(GP38)**	4	4	2000
GP20c ECO	4	4	2000
DRS-20/24 **Mother/Daughter**	4	4	N/A
DRS-30 **(GP40)**	4	4	3000
DRF-30 **(SD40-2)**	6	6	3000
SD30c ECO	6	6	3000
DRF-38 **(SD60)**	8	8	3800
DRF-44 **(AC4400)** **(ES44AC)**	12[2]	10	4400

Other Road Models[3]	Equivalent Axles	DB Factor	HP
GP50	6	6	3500
SD50	7	6	3600
SD70 **SD70M**	8	8	4000 4300
SD80MAC	10	10	5000
(SD90MAC) **(SD70MAC)** **(SD70Ace)**	12[2]	10	4300
B-30-7A **B-36-7** **B-32-8** **B-40-8**	5	4	3000 3600 3200 4000
C-30 **(Dash 7)**	6	6	3000
C-32, C-36 **(Dash 8)**	7	6	3200 3600
C-39 **D-8** **D-9** **D-9-40CW** **D-9-44CW**	8	8	3900 4000 4000 4000 4400

Notes:

1. Must not be used in multiple with any other class of locomotive (Max operating speed 35 MPH).
2. If coupled to DC locomotives not equipped with QEG, QES or PTC, short time ratings must be observed as per GOI Section 1 item 21.0.
3. Locomotives not shown, will be handled and rated at the direction of the Operations Center Calgary.

APPENDIX 5: Speed Table

Time required to travel in minutes given a speed and distance																
Miles	5 MPH	10 MPH	15 MPH	20 MPH	25 MPH	30 MPH	35 MPH	40 MPH	45 MPH	50 MPH	55 MPH	60 MPH	65 MPH	70 MPH	75 MPH	Miles
1	12	6	4	3	2.4	2	1.7	1.5	1.3	1.2	1	1	.9	.8	.8	1
2	24	12	8	6	4.8	4	3.4	3	2.6	2.4	2.1	2	1.8	1.7	1.6	2
3	36	18	12	9	7.2	6	5.1	4.5	4	3.6	3.2	3	2.7	2.5	2.4	3
4	48	24	16	12	9.6	8	6.8	6	5.3	4.8	4.3	4	3.6	3.4	3.2	4
5	60	30	20	15	12	10	8.5	7.5	6.6	6	5.4	5	4.6	4.2	4	5
6	72	36	24	18	14.4	12	10.2	9	8	7.2	6.5	6	5.5	5.1	4.8	6
7	84	42	28	21	16.8	14	12	10.5	9.3	8.4	7.6	7	6.4	6	5.6	7
8	96	48	32	24	19.2	16	13.7	12	10.6	9.6	8.7	8	7.3	6.8	6.4	8
9	108	54	36	27	21.6	18	15.4	13.5	12	10.8	9.8	9	8.3	7.7	7.2	9
10	120	60	40	30	24	20	17.1	15	13.3	12	10.9	10	9.2	8.5	8	10
11	132	66	44	33	26.4	22	18.8	16.5	**14.6**	13.2	12	11	10.1	9.4	8.8	11
12	144	72	48	36	28.8	24	20.5	18	16	14.4	13	12	11	10.2	9.6	12
13	156	78	52	39	31.2	26	22.2	19.5	17.3	15.6	14.1	13	12	11.1	10.4	13
14	168	84	56	42	33.6	28	24	21	18.6	16.8	15.2	14	12.9	12	11.2	14
15	180	90	60	45	36	30	25.7	22.5	20	18	16.3	15	13.8	12.8	12	15
16	192	96	64	48	38.4	32	27.4	24	21.3	19.2	17.4	16	14.7	13.7	12.8	16
17	204	102	68	51	40.8	34	29.1	25.5	22.6	20.4	18.5	17	15.6	14.5	13.6	17
18	216	108	72	54	43.2	36	30.8	27	24	21.6	19.6	18	16.6	15.4	14.4	18
19	228	114	76	57	45.6	38	32.5	28.5	25.3	22.8	20.7	19	17.5	16.2	15.2	19
20	240	120	80	60	48	40	34.2	30	26.6	24	21.8	20	18.4	17.1	16	20
21	252	126	84	63	50.4	42	36	31.5	28	25.2	22.9	21	19.3	18	16.8	21
22	264	132	88	66	52.8	44	37.7	33	29.3	26.4	24	22	20.3	18.8	17.6	22
23	276	138	92	69	55.2	46	39.4	34.5	30.6	27.6	25	23	21.2	19.7	18.4	23
24	288	144	96	72	57.6	48	41.1	36	32	28.8	26.1	24	22.1	20.5	19.2	24
25	300	150	100	75	60	50	42.8	37.5	33.3	30	27.2	25	23	21.4	20	25
26	312	156	104	78	62.4	52	44.5	39	34.6	31.2	28.3	26	24	22.2	20.8	26
27	324	162	108	81	64.8	54	46.2	40.5	36	32.4	29.4	27	24.9	23.1	21.6	27
28	336	168	112	84	67.2	56	48	42	37.3	33.6	30.5	28	25.8	24	22.4	28
29	348	174	116	87	69.6	58	49.7	43.5	38.6	34.8	31.6	29	26.7	24.8	23.2	29
30	360	180	120	90	72	60	51.4	45	40	36	32.7	30	27.6	25.7	24	30
31	372	186	124	93	74.4	62	53.1	46.5	41.3	37.2	33.8	31	28.6	26.5	24.8	31
32	384	192	128	96	76.8	64	54.8	48	42.6	38.4	34.9	32	29.5	27.4	25.6	32
33	396	198	132	99	79.2	66	56.5	49.5	44	39.6	36	33	30.4	28.2	26.4	33
34	408	204	136	102	81.6	68	58.2	51	45.3	40.8	37	34	31.3	29.1	27.2	34
35	420	210	140	105	84	70	60	52.5	46.6	42	38.1	35	32.3	30	28	35
36	432	216	144	108	86.4	72	61.7	54	48	43.2	39.2	36	33.2	30.8	28.8	36
37	444	222	148	111	88.8	74	63.4	55.5	49.3	44.4	40.3	37	34.1	31.7	29.6	37
38	456	228	152	114	91.2	76	65.1	57	50.6	45.6	41.4	38	35	32.5	30.4	38
39	468	234	156	117	93.6	78	66.8	58.5	52	46.8	42.5	39	36	33.4	31.2	39
40	480	240	160	120	96	80	68.5	60	53.3	48	43.6	40	36.9	34.2	32	40

Time/mile	MPH
12 min 00 sec.	5
6 min 00 sec.	10
4 min 00 sec.	15
3 min 00 sec.	20
2 min 24 sec.	25
2 min 00 sec.	30
1 min 43 sec.	35
1 min 30 sec.	40
1 min 20 sec.	45
1 min 12 sec.	50
1 min 05 sec.	55
1 min 00 sec.	60
55 sec.	65
51 sec.	70
48 sec.	75
45 sec.	80
42 sec.	85
40 sec.	90

Instructions

NOTE: When the distance is one mile, use the table to your left.
For distances between 1 and 40 miles use the table above.

Large table:

1. In the vertical column to the left (or right) find the distance to travel.
2. Follow this row until it intersects with the average travelling speed.
3. The time required to travel is given.

Example: The distance between Indian Head and Qu'Appelle on the Indian Head Subdivision is 11 miles. At an average speed of 45 MPH it should take 14.6 minutes to travel. See cells in grey.

Decimal point: *Multiply the decimal by 6 in order to get seconds.*

Example: 14.6 equals 14 minutes and 36 seconds (6 X 6).

Small table:

1. Note the time required to travel 1 mile.
2. Compare your time with the left column.
3. The column to the right indicates your speed.

Example: It took your train 1 minute and 30 seconds to travel the one mile distance. Your average speed is 40 MPH.

Section 2 – 10/14/2015

Distributed Power

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Distributed Power Operations

1.0 Introduction

Distributed power systems are designed to provide synchronous or independent control of one to four locomotive consists located at points along the train used in addition to the lead unit. The system provides control of the remote(s) by command signals transmitted over a radio link.

1.1 Distributed Power Types

CPR locomotives utilize two kinds of Locotrol:

	GE (AC4400's)		EMD
LEB / LSI	CP 9500 - 9582 (CP1) CP 9583 - 9683 (CP2) CP 8500 - 8580 (CP3) CP 8600 - 8655 (CP4)	CP 9700 - 9740 (CP5) CP 9750 - 9784 (CP6) CP 9800 - 9840 (CP7) CEFX 1026 -1059	CP 5000 - 5019 (SD30)
	GE (ES44AC's)		
LEB	CP 8700 - 8759 (CP8)	CP 8760 - 8859 (CP9)	CP 8860 - 8889 (CP10)
LEB / ECP	CP 8890 - 8899 (CP10) *These locomotives are equipped for dual mode.	CP 8900 - 8960 (CP11)	CP 9350 - 9379 (CP12)

CP UHF Radio equipped locomotives will link to BNSF or UP remote locomotives. Also BNSF and UP Locotrol units will be able to link to CP UHF Radio equipped remote locomotives. There is an entry on the lead set up screen to select the initials of the remote unit. The default initials are CPR.

1.2 Abbreviations

AB	Automatic Brake
BP	Brake Pipe
C Brk	Circuit Breaker
IB	Independent Brake
DP	Distributed Power (Distr Pwr)
DP Screen	Distributed Power Operations Screen (Locotrol LEB/LSI)
Remote	Remote locomotive consist

1.3 Displaying DP Screen (Locotrol LEB / LSI)

In these instructions, the term "DP Screen" refers to the Distributed Power Operations screen; the term "locomotive screen" refers to the screen which normally displays the speedometer, tractive effort, etc. Sometimes the terms right or left screen are also used.

It is possible to select a COMBINED screen that displays abbreviated remote unit information. The main purpose of the COMBINED screen is when one display screen has failed. The COMBINED screen displays remote unit throttle/DB level, tractive effort, brake pressure and air flow.

To change from the COMBINED screen to the full REMOTE screen, the locomotive must be stopped with the reverser centered and independent brake fully applied.

To set up the standard remote operations screen, select DISTR POWER key on one display (left or right), then select the DP MAIN MENU key and then on the other display select the DISTR POWER key. The DISTRIBUTED POWER OPERATIONS SCREEN will be displayed. It shows remote unit throttle/DB level, tractive effort, BP pressure, air flow, remote mode, ER pressure, BC pressure and main reservoir. Use the other display for Locotrol mode functions or other locomotive information or functions as required.

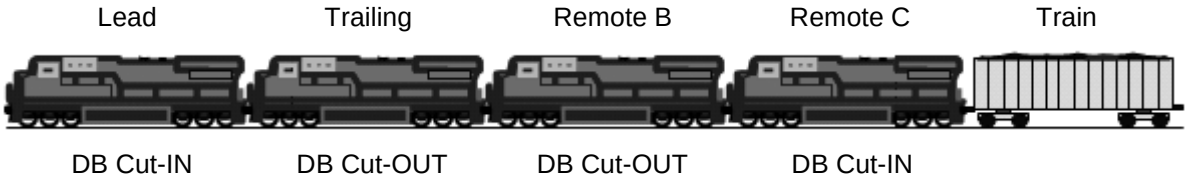
General Instructions

2.0 Locotrol - Restrictions

a) All locomotives on the head end - In certain situations, it may be necessary to operate Locotrol equipped locomotives (with Locotrol equipment powered up) that are normally positioned throughout the train, as part of the lead locomotive consist.

With all locomotives located on the head end, it is very important to ensure that available dynamic brake does not exceed a factor of 20. Refer to GOI Section 1, item 38.1.

EXAMPLE: With 4 GE AC4400 locomotives on head end.



Only the brake pipe hose will be coupled between the remote consist(s) and the lead consist. **The jumper cable must not** be connected between the lead and remote consists.

All operating instructions for Locotrol apply, however from a TrAM perspective, the train will be considered as a conventional train. These trains must be considered as Locotrol equipped with the exception that no cars separate the lead and remote consists. The train must be operated with all Remote Brake Valves OUT.

NOTE: Except as provided by Section 1 Item 4.6, on distributed power trains, the DB factor of the head end consist and the DB factor of the remote consist must each not exceed 20.

b) Remote Locomotive Operating Restrictions – Mixed Locotrol Trains ONLY (as defined in Section 7, item 2.3)

Independent Motoring (Back Group)

i) When the remote locomotive(s) is in independent motoring (back group), use the same throttle position as the lead locomotive consist, or a lower throttle position than the lead locomotive consist.
EXCEPTION: When lifting a heavy train on an ascending grade the throttle position of the remote(s) may be higher than the lead locomotive consist. Pay close attention to keep in-train forces at an acceptable level.

ii) When the lead consist is in dynamic brake, do not use the remote locomotive(s) in throttle position.

Restrictions when Moving Backward

When moving backward on mixed trains, Section 1, Item 39.0 applies.

2.1 Maximum Distances Between Locomotive Consists – Distr Pwr Trains

Note: Distr Pwr trains with a remote in excess of 10'000 feet must operate in multiple remote configurations, i.e. must have a minimum of two remote positions.

If combined air flow to the brake pipe does not exceed 60 CFM, the maximum distance between the lead and remote consist is 10,000 feet.

If combined air flow to the brake pipe is between 61 and 90 CFM and no more than 60 CFM at any one locomotive consist on the train, the maximum distance between any of the locomotive consists is:

- Single Remote Trains: 5500 feet.
- Multiple Remote Trains: 7500 feet.

2.2 Handling dead remote locomotive(s) on the extreme rear of a Distr Pwr train, (Brake Cylinder pressure failure)

In the event Tail End Remote(s) shutdown enroute and cannot be restarted, arrangements must be made with the RTC to conventionalize or re-marshall the train at the first available location. The train may proceed to an alternate location, providing **all** of the following conditions are met.

- Must still have communication between the lead and remote.
- Remote unit must be in the Isolate mode with the remote feed valve cut out.
- Main Reservoir pressure on the remote must be 85 PSI or greater.
- Must pass a TrAM check.

Note: During freezing weather, drain the locomotive as per GOI Section 1 Item 11.0.

Note: Locomotive Engineer must monitor the main reservoir on the remote. If the MR pressure drops below 85 PSI and/or communication is lost(*) with the remote, then train speed must be reduced to 25 MPH and only proceed to the first available location and be conventionalized or remote(s) replaced.

* This does not include intermittent comm loss that is experienced with normal operations.

⚠ CAUTION **If main reservoir pressure has depleted, the brakes will be inoperative on the remote, even if the brake pipe is reduced or the unit is placed into emergency!**

3.0 Remote Independent Application and Release

When the independent brake handle is moved to the desired position, the command will be sent to the remote(s) and acted on providing the remote(s) is in one of the following modes:

NORMAL, IDLE, BV OUT, ISOLATE, SPEED or STOP / SHTDN / ENGINE S/D.

NOTE: If REMOTE, S/O (Set OUT), EXECUTE are pressed, then remote(s) independent brake is automatically set to maximum (72 psi).

4.0 Automatic Brake

4.1 False gradient brake applications (Also see Sec 1 Item 36.1 – Cycle Braking from a Minimum)

a) Except in paragraph b) below, in distributed power operation, the sound of the service exhaust **must not** be used to measure a service reduction. If necessary to apply the brakes with the train brake system not fully charged, the rear car BP pressure must be known, then make an automatic brake application as per GOI Section 1 item 34.2 (A&C) (e.g., 7 psi below the reading on the rear car) or (e.g., determine the amount of false gradient etc.).

b) If there is only one remote and if it is on the extreme rear of the train, the sound of the service exhaust can be used to measure a service reduction. If necessary to apply the brake with the train air brake system not fully charged, using the equalizing reservoir gauge, measure at a least a 7 psi reduction from the point where the service exhaust starts to blow.

c) If there is more than one remote and if one remote is on the extreme rear of the train, and it is necessary to apply the brake with the train air brake system not fully charged, an equalizing reservoir reduction of at least 5 psi more than the last reduction must be made.

Example: Immediately prior to release, there was a 10 psi reduction in effect. To comply with this instruction make a 15 psi straight away reduction.

d) On trains equipped with TIBS, if the display unit fails to display BP pressure and it is necessary to apply the brake with the train air brake system not fully charged, an equalizing reservoir reduction of at least 5 psi more than the last reduction must be made.

Example: Immediately prior to release, there was a 10 psi reduction in effect. To comply with this instruction make a 15 psi straight away reduction.

4.2 Air Flow Indicators

a) When operating with the remote brake valve(s) IN (charging), the lead locomotive air flow indicator does not indicate the true state of charge in the entire train air brake system. The sum of the lead and remote air flow indicators can be used to indicate the true state of charge of the entire train air brake system.

b) When recharging with one or more of the remote brake valve(s) IN (charging), if insufficient recharge time has elapsed prior to making an air brake application, there will be a false gradient condition between the rear car and the remote ahead of the rear car. If the remote brake valve(s) are OUT and the entire system was recharged with the remote brake valves OUT, then the Air Flow Indicator does give a true indication.

4.3 Low BP Feature

Should BP pressure be reduced to less than 45 psi, the low BP feature causes an emergency brake application, unless the reverser handle is centered and the independent brake is fully applied.

4.4 Cycle-braking on trains with remote located at extreme rear

IF - the automatic brake valve is moved to the Full Service position during service brake operation and

IF - any additional brake pipe reduction must be made to control train speed,

THEN - the train must be stopped (e.g., immediately make an additional 10 psi reduction or if needed, an emergency brake application) . The brake system must be recharged. If the locomotive brakes will not prevent train movement while recharging, then high pressure (HP) retainers must be applied. The correct percentage of retainers is:

- on heavy grades of 1.0% to 1.29% apply HP retainers on 25 % of loaded cars
- on heavy grades of 1.3% to 1.8% apply HP retainers on 50% of loaded cars
- on mountain grades apply HP retainers on at least 65 % of loaded cars.

NOTE: Handbrakes may be required to recharge the air brake system.

4.5 Loss of Air Source – Distr Pwr Trains

In the event that one or more of the air sources on a Distr Pwr train fails, the train must be stopped immediately and a Full Service Brake Application made. Upon Release, it must be ascertained if the combined air flow to the brake pipe will meet air flow requirements. The requirements of Item 2.1 must also be met and if necessary, train must be remarshalled or reduced.

⚠ CAUTION **Hand Brakes:** Prior to release of the brakes, unless movement can be prevented with locomotive brakes, sufficient hand brakes MUST be applied.

5.0 Remote(s) Communication

NOTE: The lead locomotive can lose radio communication with one or more remotes. For example, if communication is lost between the lead locomotive and remote C, then all other remotes (B, D & E) will still function normally because they still have communication with the lead locomotive. Remotes do not communicate with each other and do not "know" that the lead locomotive has lost communication with another remote.

5.1 **COMM** - This indicator is illuminated if communication between the lead and a remote(s) is interrupted. The lead locomotive will declare a communication interrupt 45 seconds after the last successful check or 10 seconds after an unsuccessful automatic brake application or release message.

5.2 What happens to the remote(s) when communication is lost with lead locomotive?

a) In a state of communication loss, the remote(s) assume a state of AUTOMATIC OVERRIDE and will remain in the state of motoring or dynamic braking that existed just prior to the loss of radio contact.

b) On CP & UP Units, Automatic Override is NULLIFIED if the remote brake valve is OUT, in which case the remote(s) will return to IDLE from MOTORING; however they will retain DYNAMIC BRAKE (even with the remote brake valve OUT). N/A on BNSF units, they will return to idle.

c) In order to drop OUT a remote brake valve(s) when operating in a state of COMM loss, make an initial automatic brake application of at least 20 psi. If brake is already set, make an additional brake application of at least 20 psi. This 20 psi reduction must be a "straight-away" reduction, not a split reduction. When the service exhaust stops blowing, the remote brake valve is OUT and automatic override is nullified. This procedure is known as "Comm Loss Idle Down" (CLID).

⚠ WARNING

Making a 20 psi reduction to drop out a remote brake valve(s) so that the remote(s) will go to IDLE is not a failsafe procedure. This is because the remote(s) must detect a significant change in BP charging flow rates and this detection is difficult if:

- the train brake had just been released prior to the loss of communication OR
- if there is significant BP leakage OR
- if a brake application of more than 20 psi was already in effect.

Consideration to making an emergency brake application must be given if operating conditions dictate that the remotes must be idled immediately or to set the remotes into the box car mode.

⚠ WARNING

A communication interrupt which lasts for 90 minutes will cause the system to CLID on remote(s) without communication (Brake Valve will cut-out and remote(s) transition to IDLE, however DB will be maintained.

5.3 What happens to the remote(s) which still have communication?

They simply obey all throttle, dynamic brake and air brake application and release commands from the lead locomotive.

5.4 Box Car Mode

If a CP, BNSF or UP Remote is in a state of "Comm Loss" and an Emergency or Penalty application has occurred. Once the penalty timer expires, the lead unit can be recovered normally. The Remote will transition to a "Box Car" mode and responds as follows:

- The Lead unit charges the Brake Pipe.
- When the Remote Brake Pipe rises above 60 psi, the independent brakes are released.
- The operator now has control of his train using head end power only.
- Until communication is restored, the remote will now function as a Box Car.

Note: If communication is restored with the Lead, and the Remote is in "Box Car" mode, the operator will see a "Comm Loss Idle Down" event and Remote screen will indicate "**ISOLATE**" on the display. The remote can be reset to "**NORMAL**" mode as follows:

- Make a sufficient brake pipe reduction, 15 psi or greater.
- Allow the brake pipe to stabilize.

Press **NORMAL / EXECUTE** and then release the brake.

Note: if the remote was in the SETOUT mode prior to the Comm Loss, then Box Car mode is inhibited.

5.5 BP Rise

On CP locomotives the BP rise feature has been aligned with BNSF and UP design and will respond as follows:

If there is communication between the lead and remote(s) and a unknown brake pipe rise occurs when a brake application is in effect, a brake pipe rise alarm will be indicated on the lead unit, however the unit(s) will continue in the commanded state.

If there is a "Comm Loss" between the lead and remote(s) and a unknown brake pipe rise occurs when a brake application is in effect, the remote(s) will go into a state of Comm Loss Idle Down and transition to REMOTE ISOLATE mode (Note: if in DB, it will be maintained). Once communication is restored, you must command the remote(s) to NORMAL mode to regain control of the remote unit(s).

Note: If the lead unit experiences a un-commanded brake pipe rise while the reverser is centered and full independent brake is applied, then a emergency brake application will occur.

5.6 Remote sensed emergency brake application

On CP & UP locomotives, if a remote senses an emergency brake application it will report PC and zero brake pipe pressure. The emergency is then propagated through the brake pipe and via radio command to the lead and any other remote(s). Upon receipt of the command, the lead and other remotes will also initiate the emergency command.

BNSF units will perform in the same manor except that the lead unit will not initiate an emergency until the pneumatic emergency is sensed on the lead unit. On all unit types, this does not occur if the remote(s) is in set-out mode.

5.7 Flow Sensor Check Required With Locomotives in Train

A flow sensor check must be performed:

- the first time cars are placed between a lead locomotive and a remote or between remotes AND
- subsequently when 60 or more cars are added between a lead locomotive and a remote or between adjacent remotes.

If a flow sensor check is required, follow the procedure in item 7.5.

6.0 Controlled Tractive Effort feature (CTE Mode) on ES4400AC Locomotives

CP ES4400AC locomotives are equipped with a feature (CTE) that will limit tractive effort on remote locomotives to 110,000 lbs each, this system reduces excessive forces at the rear of the train during slow speed / high throttle operations.

This feature is available on all CP ES4400AC locomotives. At this time CP does not operate with two AC remotes on the rear of a train and therefore we do not use the CTE mode. Note: Select UP locomotives are also equipped with CTE mode.

Operation:

- The Lead unit and Controlling Remote must be equipped with CTE software for the CTE mode to work, otherwise they will only operate in the Full Tractive Effort (FTE) mode.
- Only the remote(s) will work in the reduced mode, the lead unit(s) will still produce full tractive effort.
- At Locotrol power up, FTE or CTE must be selected.
- The Distributed Power Operations Screen on the lead locomotive will indicate if the remote is in the FTE or CTE mode.
- The Main Operating Screen on the controlling remote will indicate if the tractive effort is limited.

To change the remote from the CTE mode to the FTE mode, the following steps are required:

- Locomotives must be linked with good communication – No (comm) loss.
- Locomotives must be stopped. (UP Locomotives must be unlinked, BNSF units are not equipped)
- Brake Cylinder pressure on locomotives must be greater than 25 psi.
- Throttle at Idle.
- Reverser centered.

Select the system mode screen (press **MODE**).

- Press the **SEL FTE** button and then depress **EXECUTE**.
- You should receive a **FTE OK** system event notification.
- If there is no communication after 45 secs, an **FTE Error** message will appear and you will be prompted to select the FTE mode again.

Locotrol Start-up and Shut Down

7.0 Preparing Locotrol Equipment for Service

If the Locotrol equipment is not set up by mechanical personnel, the following procedures must be followed by the locomotive Engineer to set up Locotrol for service.

Locotrol equipped locomotives are qualified every 180 days by mechanical services to work in distributed power service. There is no longer a requirement for mechanical to previously qualify locomotives (Link & GO) to operate as a set.

⚠ CAUTION

Hand Brakes: Without exception, unless movement can be prevented with locomotive brakes sufficient hand brakes MUST be applied. BP hoses must be connected between lead and remote consists.

7.1 Setting Up the Remote(s):

NOTE: Set up REMOTE(s) first, then LEAD. Follow these steps in order for each remote:

	Setting Up Remotes	Locotrol LEB / LSI Remote(s)	
1	**CONTROL STAND:**	ENGINE RUN ..... **OFF** GENERATOR FIELD ..... **OFF** CONTROL or CONTROL/FUEL PUMP..... **ON** DYNAMIC BRAKE C Brk ..... **ON** Power Limit **Switch** (AC4400s) .....**4000 HP/ENABLE** Reverser .....**REMOVED** Independent Brake ..**LEAD - FULLY Applied** (later to RELEASE) Automatic Brake ..... **Cut-IN - RELEASE** (later to Handle OFF)	
2	**ENGINE CONTROL (EC) PANEL:**	EC/ISOLATION Switch ..... **RUN** LEB COMPUTER C Brk .....**ON**	
3	**CIRCUIT BREAKERS**	**AC 4400's In Nose, under a protective shield:** DP RADIO ..... **ON** DP TRAINLINE ..... **ON**	**ES4400AC's, on Engine Control(EC) Panel** DP RADIO ..... **ON**
4	**LOCOMOTIVE SCREEN**	Press: • **DISTR POWER,** • **REMOTE SETUP.** Set: • **LEAD LOCOMOTIVE ID & NUMBER,** • **DIRECTION** (SAME/OPPOSITE). Press: • **DONE** (an emergency PCS occurs). Follow IFD screen prompt to place: • IB handle to **RELEASE**, • AB handle to **HO** (handle off).	
5		Set up all locomotives coupled to a remote in conventional trailing mode.	
6	After all remotes have been set up, lock all doors on the remote(s) and locomotives coupled to the remote, then set up the lead locomotive as per 7.2. On locomotives equipped with a 105 control stand, secure the automatic brake handle using the pin provided (when equipped).		

7.2 Setting Up a Locotrol Lead Locomotive:

NOTE: Set up the LEAD locomotive after the REMOTE(s). Follow these steps in order for the lead locomotive.

	LEAD SET UP	Locotrol LEB / LSI	
1	**CONTROL STAND**	ENGINE RUN .....**ON** GENERATOR FIELD .....(for now) **OFF** CONTROL or CONTROL/FUEL PUMP.....**ON** DYNAMIC BRAKE C Brk .....**ON** Reverser .....**NEUTRAL** Independent Brake.....**LEAD - FULLY Applied** Automatic Brake.....**Cut-IN – RELEASE**	
2	**ENGINE CONTROL (EC) PANEL**	EC/ISOLATION Switch.....**RUN** LEB COMPUTER C Brk.....**ON**	
3	**CIRCUIT BREAKERS**	**AC 4400's In Nose, under a protective shield:** DP RADIO ..... **ON** DP TRAINLINE ..... **ON**	**ES4400AC's, on Engine Control(EC) Panel** DP RADIO ..... **ON**
4		Set up all locomotives coupled to the lead in conventional trailing mode.	
5		Link Locotrol (item 7.3) and perform a BP test (item 7.4).	

7.3 System Linking (Locotrol Lead Locomotive)

	Locotrol LEB / LSI
1	On right screen, press DISTR POWER (if displayed). Press LEAD SETUP.
2	Using COUNT UP/DOWN, DIGIT LEFT/RIGHT, enter locomotive ID & number of first remote (unit B). Press LINK. Ensure screen displays LINKED OK beside B.
3	Enter locomotive ID & number of second remote (unit C). Press LINK. Ensure screen displays LINKED OK beside unit C. Repeat procedure for remotes D and E as applicable.
4	Press DONE / ACCEPT. System advances to Distributed Power System Log screen.
5	Press DP MAIN MENU. Check event log and alarm log for fault conditions. Air brake system failures and back-up emergency valve failures must be corrected. Press EXIT.

7.4 BP Test (Lead Locomotive)

	Locotrol LEB / LSI	
1	Ensure FULL independent brake. To recover PCS, place AB in EMER (for 60 seconds) and then move to RELEASE as per message on screen.	
2	On the DP screen, press: • DP MAIN MENU (if displayed), • EXIT (if displayed), • DISTR POWER, • DP CONTROL	On the main screen, press: • DISTR POWER (if displayed), • DP MAIN, • SYSTEM
3	Wait for message PERFORM BRAKE PIPE TEST WHEN READY, and then go to next step.	
4	When flow rates have stabilized and the sum is less than 90 cfm and do not exceed 60 CFM at any one location. Press BRK PIPE TEST, press EXECUTE	
5	When message box says SET AUTOMATIC BRAKE HANDLE TO MINIMUM, move AB handle to MINIMUM REDUCTION.	
6	If successful, BRAKE PIPE TEST OK will be displayed, Select DP MAIN MENU. Press: • MODE, • RUN, (RUN – FTE on ES4400AC) • EXECUTE, • EXIT. Locotrol is now fully operational.	
7	If BP TEST is not successful, move AB to RELEASE, check angle cocks, recharge BP and repeat steps 3, 4, 5 & 6.	
	⚠ CAUTION If the distance between the remote locomotives are less than 700 feet or if the remote locomotives are set up back-to-back for testing purposes, the LOCOTROL system may not sort the remote locomotives properly in accordance with their physical placement in the train. On CP locomotives, if the distance is insufficient, the system will automatically revert to the order in which the remotes were entered and the following message will be displayed "*Remotes Remain in Operator Linked Order*". Following the BP Test, the locomotive engineer must confirm that the remotes are properly labeled and shown in the proper position.	
8	If the automatic brake handle is moved to a greater than minimum application, the system will cancel the test and display the following message "Brake Pipe Test cancel - excessive application". To correct, release the brake, recharge to less than 30 CFM on lead and remote(s) and perform the test again. There is also an optional brake pipe test that can be performed on demand at any time while the train is stopped. **Note** - if this test is selected on demand, and if it does not pass, the remote(s) will revert to IDLE mode.	
9	When BP Test is complete after initial set-up, perform a locomotive brake test as per Section 3 Item 2.0.	

7.5 Flow Sensor Check Required With Locomotives in Train, as per item 5.7

A Flow Sensor Check is performed as follows:

	Locotrol LEB / LSI
1	Automatic Brake must be released.
2	Ensure unit A and unit(s) B, C, D, and E (as applicable) display charging flow rates less than 60 cfm.
3	Wait for the air flow charging rate to stabilize (minimum 90 seconds).
4	Place the Locotrol Distributed Power RADIO circuit breaker OFF.
5	Make an AB application of at least 20 psi and wait for the service exhaust to cease.
6	Place the Locotrol Distributed Power RADIO circuit breaker ON.
7	Ensure the applicable remotes B, C, D, and E each report FLOW OUT. This means the Flow Sensor check was successful and that it is OK to bring in the remote brake valve(s). To bring in the remote brake valve(s), press: MORE MENU (if displayed) > REMOTE MENU (if displayed). For each remote, press: NORMAL > EXECUTE. Move AB handle to RELEASE.
	NOTE: If step 7 was not successful, repeat steps 1 through 7 (in the application of step 3, it is important to have steady stable air flow.)

7.6 Directional Verification Test (DVT)

A directional verification test must be performed any time it is suspected that a remote is not providing power in the same direction as the lead locomotive.

	Locotrol LEB / LSI
1	Distr Pwr must be in RUN mode and Gen Field must be on.
2	On multiple DP trains, place remotes in IDLE except for the remote to be tested.
3	Place Reverser in FORWARD or REVERSE.
4	Select MOVE to BACK and ensure the fence (divider line) is between the DP “A” Lead and DP “B” Remote.
5	Select TRACTION and EXECUTE.
6	Release independent brake and increase throttle by using MORE TRACTION button.
7	Validate that the Train / Slack movement corresponds to the Reverser position selected.
8	Select IDLE to return the remote to idle.
	Repeat the steps to test each remote position.
	When complete, select the MOVE to FRONT and NORMAL / EXECUTE the remotes. Ensure that they display “Norm” and indicate flow rates.

8.0 Shutting Down Locotrol (Unlinking)

8.1 Shutting Down the Lead Locomotive

NOTE 1 - Train must be stopped, throttle IDLE, independent brake FULLY applied.

2 - Shutdown Locotrol on LEAD locomotive FIRST, then REMOTE.

3 - Hand brakes may be required. The train will be standing with a penalty brake application while Locotrol is being shutdown.

	Locotrol LEB / LSI	
1	On locomotive screen, press: (soft key) • **DISTR POWER** (if displayed), • **DP MAIN**, • **SYSTEM**.	
2	Press: • **UNLINK,** • **EXECUTE**. System unlinks, and penalty brakes apply.	
3	Press: • **END DIST PWR,** • **EXECUTE.**	
4	**CIRCUIT BREAKERS (AC4400's) (In Nose, under a protective shield):** DP .....**OFF** DP TRAINLINE .....**OFF**	**CIRCUIT BREAKER (ES4400AC's) On Engine Control (EC) Panel:** DP .....**OFF**

8.2 Shutting Down the Remotes

Shut down the remote(s) AFTER the lead locomotive. Follow these steps in order for each remote.

	Locotrol LEB / LSI	
1	On locomotive screen, press: (soft key) • **DISTR POWER,** • **END DIST PWR,** • **EXECUTE.**	
2	Ensure **DP ON**, or **DP REMOTE ENABLED** indicator is **OUT**.	
3	**CIRCUIT BREAKERS (AC4400's) (In Nose, under a protective shield):** DP .....**OFF** DP TRAINLINE .....**OFF**	**CIRCUIT BREAKER (ES4400AC's) On Engine Control (EC) Panel:** DP .....**OFF**
4	**CONTROL STAND:** Set up control stand and electronic air brake system for either lead or trailing unit operation.	
5	The shutdown of Locotrol equipment is now complete.	

9.0 Changing Ends

To change ends: Re-configure the lead as a remote, then re-configure middle remote(s) to the new lead and re-configure the tail-end remote as the new lead.

Note: After re-configuring remotes, lock all doors on the remote(s) and locomotives coupled to the remote.

⚠ CAUTION **Handbrakes:** Unless movement can be prevented with locomotive brakes, sufficient hand brakes must be applied.

9.1 To re-configure LEAD as remote:

	Locotrol LEB / LSI	
1	**Press:** **DISTR POWER** (if displayed) **DP MAIN – SYSTEM – UNLINK – EXECUTE** (a penalty brake will occur) **END DIST PWR – EXECUTE**	
2	**CIRCUIT BREAKERS (2) (AC4400's) (In Nose under protective shield):** DP TRAINLINE……ON DP RADIO……ON	**CIRCUIT BREAKER (ES4400AC's) On Engine Control (EC) Panel:** DP .....ON
3	**Press:** • **DISTR POWER** • **REMOTE SETUP** **Set:** • **new LEAD LOCO #** • **DIRECTION (SAME/OPPOSITE)** **Press:** • **DONE**	
6	**CONTROL STAND:** Reverser .....**REMOVED** Independent Brake.....**RELEASE** Automatic Brake.....**HO (handle off)** ENGINE RUN……..**OFF** GENERATOR FIELD.....**OFF** Power Limit Switch……**4000 HP/ENABLE**	

9.2 To re-configure MIDDLE REMOTE(s) to new lead locomotive (if applicable):

	Locotrol LEB / LSI MIDDLE Remote(s)	
1	**Press:** **DISTR POWER** (if displayed) **END DIST PWR – EXECUTE**	
2	**CIRCUIT BREAKERS (2) (AC4400's) (In Nose under protective shield):** DP TRAINLINE……ON DP RADIO……ON	**CIRCUIT BREAKER (ES4400AC's) On Engine Control (EC) Panel:** DP .....ON
	Press: • **DISTR POWER** • **REMOTE SETUP** **Set:** • **NEW LEAD LOCO #** • **DIRECTION (SAME/OPPOSITE)** **Press:** • **DONE**	

9.3 Re-configure the REMOTE at extreme rear of train as LEAD, and complete the linking and testing on the new Lead locomotive:

	Locotrol LEB / LSI	
1	**Press: DISTR POWER** (if displayed) **END DIST PWR – EXECUTE**	
2	**CIRCUIT BREAKERS (2) (AC4400's) (In Nose under protective shield):** DP TRAINLINE……ON DP RADIO……ON	**CIRCUIT BREAKER (ES4400AC's) On Engine Control (EC) Panel:** DP .....ON
3	**CONTROL STAND:** Independent Brake.....**FULLY Applied** Automatic Brake.....**RELEASE (Recover from Penalty)** Reverser .....**CENTERED** ENGINE RUN……**ON** GENERATOR FIELD.....**ON** Power Limit Switch……**4000 HP/ENABLE**	
4	**Link,** following the procedure in item 7.3.	
5	Perform **BP Test**, following the procedure in item 7.4.	
6	Complete **Flow Sensor Check**, following the procedure in item 7.5.	
1	If provided, install **SBU.** Before testing the TIBS emergency feature as per item 12.7.	
2	Perform a **Locomotive Brake Test.**	
3	Perform a **Train Brake Test.**	

9.4 Modified Locomotive Brake Test Procedure for Changing Ends on Tail End Remote Trains.

STEP	PROCEDURE
1	Change ends as per GOI Section 2 Item 9.0.
2	Test the operation and recovery of the Safety Control System (RSC).
3	Set the Automatic Brake on the train to hold the train on the grade to protect against unintended movement.
4	Release the locomotive brakes by depressing the independent brake handle (bail) for at least 4 seconds for each locomotive in the consist.
5	Fully apply and release the independent brakes.
6	Make a further 10 psi brake pipe reduction and release the automatic brake just prior to departure.

LOCOTROL OPERATION

Front Group and Back Group

10.0 MU Operation (Front Group)

	Locotrol LEB / LSI
1	If **RUN** is displayed in upper **left** corner of the distributed Power Operation screen, each remote is automatically configured with the lead locomotive (FRONT group) and will respond to all air brake, throttle and dynamic brake commands from the lead locomotive.
2	If Locotrol is not in RUN mode, then on the locomotive screen press: • DIST POWER (if displayed) – DP MAIN • MODE – RUN FTE – EXECUTE. (Ensure current mode indicates RUN.)
3	If a remote(s) brake valve has been cut out, then make a 10 psi AB application, select each remote and press **NORMAL – EXECUTE**. Move AB to RELEASE and note charging or flow rates for each remote. (The remote must see a 4 psi rise in BP pressure to allow its brake valve to come in.)
NOTE	Three other choices are available on MODE display: **IDLE, TOWER** and **Speed**. • if IDLE is pressed, the remote remains in idle, but all air brake functions (including remote brake valve IN capability) are enabled. • TOWER should **only** be pressed in the procedure used at Roberts Bank for unloading coal. Delays will occur if TOWER/EXECUTE is pressed elsewhere. • If SPEED is pressed, the remote(s) is enabled for slow speed operation.

11.0 Independent Motoring (Back Group)

	Locotrol LEB / LSI
1	Independent motoring is only available in the RUN mode (i.e., RUN/EXECUTE have been pressed), and the remote(s) is operating in the throttle or dynamic brake position #1 or greater. **Note:** the DP system will not allow the back group to operate in DB if the front group is in traction.
2	When independent mode is required, press: • **CONTROL MENU (if displayed)** • **MOVE TO BACK**
3	This causes a remote unit to be removed from the FRONT group (MU mode) and placed in the BACK group where it can be controlled independently of the lead locomotive. On the DP Operation screen, a green vertical bar separates the front and back group. Each subsequent press of the MOVE TO BACK will move the divider to include the next remote position. Consists to the left of the divider are in the front group and those to the right are in the back group. A consist shown between two vertical bars is in a transition state (matching the selected front or back group).
4	When placed into the back group, its previous throttle/dynamic brake continue at the same level, but can now be controlled by pressing MORE/LESS TRACTION, MORE/LESS BRAKE, IDLE, TRACTION, or BRAKE. When changing between TRACTION and BRAKE, after selection is made, the EXECUTE key must be pressed.
5	To return the remote to the FRONT group, press: • CONTROL MENU (if displayed), • MOVE to FRONT.

Brake Tests

12.0 Train Air Brake Test

12.1 AFM Train Air Brake Test

	Locotrol LEB / LSI
1	Press: • MORE MENU (if displayed) • REMOTE MENU (if displayed). Ensure each remote displays a value for FLOW (0 or higher). This means the brake valve is IN.
2	If a remote brake valve is OUT, then make a 10 psi AB application. • Press **NORMAL – EXECUTE**. • Move AB to RELEASE. (The remote must see a 4 psi rise in BP pressure to allow its brake valve to come in.)
3	When rear car is charged to at least 75 psi (if SBU equipped) and when the flow rates have stabilized and the sum is less than 90 cfm and do not exceed 60 CFM at any one location, AND when a signal is given to apply the brakes, make a full service AB application.
4	Wait 30 seconds after service exhaust ceases. Select remote(s) one at a time, press BV OUT. Press EXECUTE. Ensure each remote reports flow is OUT and BV OUT.
5	When the signal is given to release the brakes, select each remote one at a time, press NORMAL, EXECUTE. Move automatic brake handle to RELEASE.
6	Ensure each remote displays a value for FLOW and that BP pressure is rising at the rear of the train.

12.2 On Demand Train Air Brake Test (must be used when equipped)

	Locotrol LEB / LSI	
1	Ensure FULL independent brake. To recover PCS, place AB in EMER (for 60 seconds) and then move to RELEASE as per message on screen.	
2	On the DP screen, press: • DP MAIN MENU (if displayed), • EXIT (if displayed), • DISTR POWER, • DP CONTROL	On the main screen, press: • DISTR POWER (if displayed), • DP MAIN, • SYSTEM
3	When flow rates have stabilized and the sum is less than 90 cfm and do not exceed 60 CFM at any one location. Press BRK PIPE TEST, then press EXECUTE	
4	When message box says SET AUTOMATIC BRAKE HANDLE TO MINIMUM, move AB handle to MINIMUM REDUCTION.	
5	If successful, BRAKE PIPE TEST OK will be displayed, then: Select DP MAIN MENU. Press: • MODE, • RUN, (RUN – FTE on ES4400AC) • EXECUTE, • EXIT. Brake pipe test is complete.	
6	If BP TEST is not successful, the remote(s) will revert to IDLE mode, check brake pipe for continuity and then command the remote(s) to NORMAL and move AB handle to RELEASE, recharge BP and repeat test.	

⚠ CAUTION If the distance between the remote locomotives are less than 700 feet or if the remote locomotives are set up back-to-back for testing purposes, the LOCOTROL system may not sort the remote locomotives properly in accordance with their physical placement in the train. On CP locomotives, if the distance is insufficient, the system will automatically revert to the order in which the remotes were entered and the following message will be displayed "*Remotes Remain in Operator Linked Order*".

Following the BP Test, the locomotive engineer must confirm that the remotes are properly labeled and shown in the proper position.

If the automatic brake handle is moved to a greater than minimum application, the system will cancel the test and display the following message "Brake Pipe Test cancel - excessive application". To correct, release the brake, recharge the brake pipe and perform the test again.

12.3 Test with a Remote on Extreme Rear of Train

	Locotrol LEB / LSI
1	Press: • MORE MENU (if displayed) • REMOTE MENU (if displayed). Ensure each remote displays a value for FLOW (0 or higher). This means the brake valve is IN.
2	When the sum of the lead and remote air flow indicators is less than 90 cfm and do not exceed 60 CFM at any one location, AND a signal is given to apply the brakes, select each remote one at a time and press BV OUT. Press EXECUTE. Ensure each remote reports flow is OUT and BV OUT.
3	Wait 1 minute for BP pressure to stabilize. Ensure last Remote Screen / TIBS indicates BP pressure at least 75 psi.
4	Make a full service brake application.
5	Wait 30 seconds after service exhaust ceases. Select remote(s) one at a time, press BV OUT. Press EXECUTE. Ensure each remote reports flow is OUT and BV OUT.
6	When the signal is given to release the brakes, select each remote one at a time, press NORMAL, EXECUTE. Move automatic brake handle to RELEASE.
7	Ensure each remote displays a value for FLOW and that BP pressure is rising at the rear of the train.

12.4 Train Air Brake Test Brake Pipe Leakage Method - When AFM test cannot be performed

	Locotrol LEB / LSI
	Perform this train air brake test when the AFM test cannot be performed. (e.g., Air flow indicators are not working.)
	NOTE: Ensure the Locotrol system is in IDLE mode.
1	Press **REMOTE MENU** (if displayed) - ensure remote(s) display a value for FLOW.
2	When the last car / remote is charged to at least 75 psi AND a signal is given to apply the brakes, on the locomotive screen, press DISTR POWER (if displayed). Press DP MAIN, press SYSTEM, press LEAKAGE TEST, press EXECUTE.
3	*The Locotrol system will initiate a 20 psi automatic brake application and then allow BP pressure to stabilize.* *Approximately 1 minute after the service exhaust stops blowing, both the lead and remote brake valves will automatically be cut-out.* *Leakage will be measured by the Locotrol system and PASS/FAIL results of the test will be displayed. This will take approximately 2 to 2.5 minutes.* *Leakage must not exceed 5 psi per minute.*
4	When prompted by the Locotrol console, place the AB handle in the FULL SERVICE position. The brake valve on the lead locomotive is automatically cut-in so that the full service reduction can be made.
5	When the full service reduction is complete and the signal is given to release the brakes, move the AB handle to RELEASE. The remote brake valve(s) will automatically be cut-in.
6	Ensure each remote displays a value for FLOW and that BP pressure is rising at the rear of the train. Ensure the Locotrol system is in RUN mode as per item 10.0 Step 1.

12.5 Testing Locotrol Emergency Brake Feature for Tail End Remote Operation and no SBU

At the location where train is first made up, perform pre-departure emergency brake test with Remote Locomotive on Extreme Rear of Train (without an SBU) as follows;

	PROCEDURE
1	Ensure that the sum of the lead and remote air flow indicators is less than 90 cfm and do not exceed 60 CFM at any one location.
2	Close a brake pipe angle cock anywhere ahead of the remote locomotive on extreme rear of the train. **Note:** it is permissible to close the angle cock immediately behind the lead locomotive consist, except on multiple distributed power trains, the angle-cock must be closed at a location between the last mid remote and the remote located on the rear.
3	Using the automatic brake valve on the lead locomotive, cause an emergency brake application.
4	**Locomotive Engineer**: Verify that an emergency brake application occurs on the remote locomotive (e.g., remote reports PC alarm flashing, BV OUT and B Pipe = 0 PSI.) **Conductor/Qualified Person:** Verify that the emergency propagates to the head end car or to the car/locomotive on either side of the closed angle cock.
5	Recover the emergency brake application on the train as per GOI Section 2, item 17.0.
6	Complete the Crew Information Form / Train Brake Status.

12.6 Testing Locotrol Emergency Brake Feature for Tail End Remote Operation with no SBU - EOT Test Feature (must be used when equipped)

	PROCEDURE
	Note: The lead locomotive and Remotes must be equipped with this feature for the EOT TEST key to be available. • Total charging flow rates on the lead and remote locomotive(s) must be less than 60 cfm.
1	Select **EOT TEST** from DP **SYSTEM** menu, followed by **EXECUTE**.
2	The following message will be displayed; "**EOT TEST: CLOSE ANGLE COCK BEHIND LEAD LOCO"; "PLACE AUTOMATIC BRAKE HANDLE IN EMERGENCY**" **Note: Once consist is armed for the EOT test, remote(s) must transition to an emergency state within two minutes.** **If after 2 minutes the remote(s) have not transitioned to an emergency state, the remote(s) will automatically transition to Remote Isolate Mode.**
3	Close BP behind lead locomotive and place automatic brake handle in emergency position to commence EOT test.
4	Verify DP system log message; "**EOT Remote Test OK**"
5	Upon successful completion of EOT test, "**EOT Remote Test OK**"; "**Open Angle Cock Behind Lead Loco**" will be displayed. Lead and remote locomotives will be in emergency.
6	Open angle cock behind lead and recover emergency as per GOI Section 2, item 17.0 to conclude test.
	Note: If the EOT test is not performed successfully (i.e. test is cancelled or failed be-fore the train is put in an emergency state), the remote(s) will transition to Remote Isolate Mode.

12.7 Testing of TIBS on trains with Remote Locomotive on Extreme Rear of Train (If equipped).

	PROCEDURE
1	In the application of GOI Section 6 Item15.2, after the SBU is armed, • Do NOT close the angle cock on lead end of the remote locomotive at rear of train. • The employee on the locomotive must ensure the Locotrol console indicates charging flow rates on the remote locomotive(s) is less than 60 cfm.
2	When TIBS emergency feature is activated, the employee on the locomotive must ensure that: • the TIBS display and Locotrol console both indicate rear brake pipe pressure = 0 psi and that the PC alarm and BV OUT indicators are displayed for the remote locomotive(s), and • that the emergency brake application propagates from the SBU through to the leading locomotive.
3	Crew members must confirm with each other that the TIBS emergency feature worked as intended.
4	**30** seconds after creating an emergency brake application, the solenoid valve on the SBU will reset; the TIBS test is complete.
5	Recover the emergency brake application on the train as per GOI Section 2, item 17.0.

13.0 Brake Pipe Continuity - (as per GOI Sec 3 item 10.0)

	Locotrol LEB / LSI	
	Manual Test	**Train Check Feature (if equipped)**
1	Make a 15 psi BP reduction and know that BP pressure has decreased at the rear of the train. Wait 30 seconds after service exhaust ceases. Locomotives equipped with the **Train Check Test** feature **must** be used in lieu of the manual test.	
2	Select remote(s) one at a time, press BV OUT. Press EXECUTE. Ensure each remote reports flow is OUT and BV OUT.	From the Main Operating Screen, select: **Distr Pwr > DP Main Menu > SYSTEM > TRAIN CHECK > EXECUTE.**
3	When ready to proceed, select each remote one at a time, press NORMAL, EXECUTE. Move automatic brake handle to RELEASE.	The system will automatically cut-out the brake valves on the remotes and when ready, a crew message will display: ***"Release Automatic Brake When Ready"***
4	Ensure each remote displays a value for FLOW and that BP pressure is rising at the rear of the train.	Release the Automatic, a crew message will display: ***"Train Check In Progress"*** followed by a ***"Train Check OK"*** if test is successful. Remote Brake Valves will automatically cut-in if the test is successful. **Note:** Remote Brake Valves that were cut-out prior to the train check will remain cut-out after the test.
	If pressure is not rising or the Train Check fails, check BP angle cocks and repeat steps 1-4.	
5	Train may be started when brakes have been released.	
6	At points on grades where it is not practical to re-establish BP continuity in the foregoing manner, every effort must be made to ensure correct air pressure readings are maintained at the rear of the train and any variation or other indication that the train may have been tampered with must result in immediate action to secure the train and re-test before proceeding.	

Coupling/Uncoupling and Break-in-Two

14.0 Coupling Lead and Remote Locomotives (with/without cars)

	Locotrol LEB / LSI
1	Recouple the two portions of the train. Place the AB handle in EMERGENCY (for at least one minute), UNLESS movement can be prevented with locomotive brakes. Open the angle cock and then recharge train air brake system as per Emergency Brake Application Recovery outlined in item 17.0.

2	After recoupling the two portions of the train, if it was NOT necessary to make an emergency brake application because movement can be prevented with locomotive brakes, follow these steps:
	• Ensure independent brake is FULLY applied.
	• Make at least a 35 psi AB reduction.
	• Press REMOTE.
	• Select each remote one at a time, and press NORMAL, EXECUTE.
	• **Slowly** open BP angle cock and allow BP to equalize (if opened to quickly, BP may drop to the point where an emergency application will occur) .
	• Move AB handle to RELEASE.
	  ○ Ensure PCS alarm indicator for each remote goes out.
	  ○ Ensure each remote displays a value for FLOW.
	  ○ Ensure BP pressure is rising at the rear of the train.

⚠ WARNING	Do **NOT** exit setout (S/O) mode (see item 15.0 - step 4) unless the lead and remote consists (with/without cars) are coupled together with BP hoses connected and angle cocks opened.

15.0 Uncoupling Lead and Remote Locomotives (with/without cars)

	Locotrol LEB / LSI
1	Before uncoupling lead consist (with/without cars or with/without all remote units), a service brake application must be made. It must be sufficient to prevent train movement while BP hoses are parted.
2	Wait 30 seconds after exhaust ceases.
3	Press MORE MENU (if displayed). Press REMOTE MENU (if displayed).
4	Select each remote to be left standing and one at a time, press SETOUT (S/O). Press EXECUTE. On each applicable remote unit, this will drop out the brake valve and apply full independent brake.
5	Ensure each remote reports FLOW OUT, SETOUT and Brk Cyl = 72 psi.
6	Advise the crew member that it is now OK to close the angle cock on the portion to be moved.
7	Movement of the head end of the train is now permitted.
8	That portion to be left standing must be left in EMERGENCY.
9	It must be observed that each remote to be left standing reports: B Pipe = 0 psi, Br Cyl = 45 psi (or higher) and that PC alarm is flashing.
10	The standing portion must be left in compliance with GOI Section 4.

16.0 Break-in-Two

	Locotrol LEB / LSI
	When a break-in-two occurs on a Locotrol train between the lead consist and the remote consist, or between 2 remote consists, after movement stops:
1	Select each remote and one at a time, press S/O, press EXECUTE. On each applicable remote unit, this will drop out brake valve and apply full independent brake.
2	Press MORE MENU (if displayed). Press REMOTE MENU (if displayed).
3	Ensure each remote reports Brk Pipe = 0, Brk Cyl = 45 psi (or higher), and PCS alarm is illuminated.
4	Determine which remote(s) are still coupled to the lead unit and apply sufficient hand brakes to hold both portions of the train as required.
5	Close the angle cock on the lead portion of the train and recover emergency PCS on lead unit and on the remote(s) units which are still coupled to the lead locomotive.
6	If necessary, remove or repair the equipment which caused the emergency brake application. Recouple the two parts of the train as per item 14.0.

Emergency and Penalty (PCS) Brake Application Recovery

17.0 Emergency and Penalty (PCS) Brake Application Recovery

	Locotrol LEB / LSI
1	If considered necessary, apply sufficient hand brakes to prevent train movement while attempting to recover PCS and recharge train air brake system.
2	Ensure throttle/dynamic brake handle is in IDLE, and reverser is in NEUTRAL.
3	**EMERG PCS:** • Place AB handle in EMERGENCY until IFD/ICE indicate GO TO RELEASE. • Move AB handle to HANDLE OFF and then SUPPRESSION. • Ensure PCS indication goes out on lead locomotive. **PENALTY PCS:** • Place AB handle in SUPPRESSION for 8 seconds. • Ensure PCS indicator goes out on lead locomotive.
4	• Press MORE MENU (if displayed). • Press REMOTE MENU (if displayed). • Select each remote one at a time, and press NORMAL, EXECUTE.
5	On DP screen, ensure: • PCS alarm indicator goes out for each remote. • Each remote displays a value for FLOW. • Ensure BP pressure is rising at the rear of the train.
6	After the train air brake system is recharged, a sufficient BP reduction must be made to prevent train movement while hand brakes (if any) are being released.
7	If necessary, remove or repair the equipment which caused the emergency brake application. Re-couple the two parts of the train as per item 14.0.

⚠ WARNING **PCS Recovery**

The throttle and dynamic brake handle **MUST NOT** be moved from the **IDLE** position before attempting an automatic brake release.
Following the release, ensure **BP** pressure is being recharged AND the **PCS** lights are out.

Locomotives or Trains Being Left Unattended

18.0 Locomotives or Trains Being Left Unattended

	Locotrol LEB / LSI
1	Apply sufficient handbrakes and test their effectiveness.
2	On locomotive screen, press: • DISTR POWER, • DP MAIN, • MODE, • IDLE (and ensure IDLE is displayed in upper left corner of DP screen), • EXIT.
3	ECS switch on the controlling locomotive and remotes must be left in “RUN’ position. **Note: Do not** isolate the remote(s) on the remote menu.
4	Train or Locomotives to be left secured as per instructions contained in GOI Section 4.
5	Center reverser and remove handle.
6	Ensure generator field circuit breaker is OFF.

Loading and Unloading

19.0 Tower Control

19.1 Set-up: **Note: BNSF & UP locomotives do not have Tower Mode.**

	Locotrol LEB / LSI
1	On locomotive screen, press: **DISTR POWER – DP MAIN – MODE – TOWER – EXECUTE** The independent brakes and a Full Service brake will automatically apply. The system will remain in IDLE mode until the tower takes control.
2	Follow screen prompts to place AUTOMATIC to FULL SERVICE and INDEPENDENT to RELEASE position.
3	Center and remove REVERSER; place GEN FIELD circuit breaker OFF.
4	Advise control tower personnel that train is ready for tower control.

19.2 Shut-down:

	Locotrol LEB / LSI
1	Train must have a full service or penalty brake application in effect. If not, the tower still has control.
2	To re-establish control, press: **DP MAIN – MODE – IDLE – RUN (RUN-FTE on ES44AC's) – EXECUTE**
3	Charge the train air brake system and perform required train air brake test.

20.0 Slow Speed Control

Before entering the load out facility, a STOP must be made, and requested loading speed obtained from load out operating staff.

NOTES

- Trailing GE AC units do not require any special set up.
- All CP AC locomotives (except 9700 - 9714) and most BNSF locomotives are equipped with Slow Speed Control. UP locomotives are not equipped.

NOTE: To enter SPEED mode, train speed must be less than 0.1 MPH.

	GE AC4400's	GE ES44AC's
1	Place the throttle in IDLE, center the reverser, apply the independent brake FULLY and RELEASE the AB.	
2	On locomotive screen press: • DISTR POWER, • DP MAIN, • MODE, • SPEED, • EXECUTE	Exit all screens until you are on the Main Operating screen 0000-0, press: • SPEED CONTROL, • SLOW SPEED,
3	Adjust speed using the SPEED UP and SPEED DOWN keys.	
4	Place the reverser in forward, place the throttle in TRACTION 1 and release the INDEPENDENT brake.	Press "SLOW SPEED ON" to activate the system. The system will display a prompt to place the throttle handle in Notch 1. Place the reverser in forward, place the throttle in TRACTION 1 and release the INDEPENDENT brake.
	The Locotrol system will now control power at the desired speed automatically. If train speed is too fast (such as through a sag), apply up to 10 psi of independent brake to control the train.	
5	If tower operator requests a stop, place throttle in IDLE. To resume, place throttle in TRACTION 1.	
6	To end slow speed control mode: **A -** Place the throttle in IDLE. **B -** On MODE screen press IDLE.	To end slow speed control mode: **A -** Place the throttle in IDLE. **B -** On locomotive screen press "SLOW SPEED OFF".
NOTE	When in distributed power operations, the REMOTE MODE overrides the SPEED CONTROL MODE. If a remote has been placed in IDLE or ISOLATE, the remote throttle will remain in IDLE during speed control operations.	

Alarms and Displays

21.0 Audible Alarms – LEB / LSI

The control console includes an audible alarm which sounds to alert the locomotive engineer of alarms or other significant conditions. This alarm device sounds once, twice or three times based on the importance of the condition being reported.

Single Chime	Information only, such as brake pipe test completed.
Double Chime	Alarm or miscompare condition, such as brake warning.
Triple Chime	Major alarm such as sustained wheel slip or locked axle.

22.0 Alarm Displays – LEB / LSI

The location of each alarm is indicated on the display (e.g. "B" indicates alarm at remote).

MU Alarm (white)	General locomotive alarm (e.g. hot engine).
Alarm	New data is on the ALARM screen.
Comm (Yellow)	Communication interrupted for less than 45 seconds.
Comm (Red)	Communication interrupted for more than 45 seconds.
Sys Fail (Red)	Major system malfunction. Emergency brake is applied, further system operation is not allowed.
Whl Slip (Red)	Continuous wheel slip condition. It lights momentarily to indicate non-continuous slip.
PCS (Red)	PC open at lead or remote locomotive.
Lock Axle (Red)	Indicates a locked axle condition.
ENG S/D	Engine Shutdown has occurred.
AUTO TMCO	Automatic traction motor cut-out.

Section 3 – 10/14/2015

Air Brake Tests and Procedures

TABLE OF CONTENTS

1.0 General

1.1 Purpose

These test procedures are intended to ensure the safe operation of brakes on all locomotives, freight trains, and passenger trains operating in Canada. These instructions are in compliance with Transport Canada's Railway Freight and Passenger Train Brake Rules.

1.2 Responsibility

Unless otherwise specified, the conductor and/or locomotive engineer are responsible for determining that the required brake test has been completed prior to departure.

1.3 Observe Locomotive Gauges

Brakes will be operated from the lead locomotive.

All air gauges and displays should be observed with sufficient frequency to know that pressures are as required. Should air flow and/or brake pipe gradient increase and continue beyond the limits established in the test procedures, the train crew must take corrective action or seek the assistance of the Central Locomotive Specialist.

1.4 Definitions

a) **"block of cars"** means two (2) or more cars that have previously received a No.1 or No.1A brake test, as a solid coupled block, for which a record (Brake Status) is available.

b) **"block swap"** means the addition to a train of a maximum of two (2) solid coupled block(s) of cars that have previously received a No.1brake test.

c) **"brakes"** means pneumatic (air) or electronically controlled pneumatic (ECP) brake systems.

d) **"calibrated"** - an indication on the Air Flow Indicator at a position that corresponds to a flow of air into the brake pipe of 60 cubic feet per minute (cfm).

e) **"certified car inspector"** - a mechanical services employee who has been trained and certified to inspect and repair car brake equipment.

f) **"continuity"** - having the capability to transmit a brake signal between the leading locomotive and the rear of the last piece of equipment of a train.

g) **"integrity"** - having the unimpaired capability to supply air to the rear of the last piece of equipment of a train.

h) **"qualified person"** - a person who has the knowledge, training, and experience to perform a specific duty safely and properly. Train crews are qualified to perform certain brake tests and to perform pre-departure and pull-by inspections.

i) **"safety inspection"** - a stationary examination of a locomotive or car for safety defects by a person who is certified or qualified according to the appropriate Transport Canada Rules, to verify that it may move safely or to identify defects which require correction.

j) **"safety inspection location"** - a location designated by the Company, and recorded with Transport Canada, where persons are employed for the purpose of performing safety inspections on cars and/or locomotives.

2.0 Locomotive Brake Test

2.1 Perform a locomotive air brake test when:

- a locomotive has been:
  - placed into service after maintenance,
  - repaired,
  - altered by adding a locomotive, setting off a locomotive from the middle of the consist, or changing operating ends. (A locomotive brake test is not required when setting off the trailing locomotive(s) in a consist.)
- a locomotive engineer takes charge of a locomotive, except when changing off with another locomotive engineer, or as provided in 2.2 below.

2.2 Locomotive Brake Test Information

- If locomotive brake tests are performed by qualified persons other than the locomotive engineer, then prior to departure, the locomotive engineer must confirm the brake test was completed by obtaining the results:
  - in writing (Schedule B form),
  - in person, or by radio from a person who has immediate access to the test results.
- A Locomotive brake test is not required, provided that the locomotive, or locomotive consist has not laid over for more than 8 hours and a valid CIF / Train Brake Status Form or Schedule B (at a Safety Inspection Location) for the consist, is available to the locomotive engineer,.

  Note: The conductor or Locomotive Engineer must indicate the time their consist was tied up, in the “date” column of part 5 of the CIF/TBS form, if a change off will not occur between locomotive engineers.
- If the results of the brake test are NOT made available, then the locomotive engineer must perform the brake test.

Examples:

1) A yard/hostler crew takes a locomotive consist off the shop track that has a schedule B and places the consist on a train.

Is another locomotive brake test required when the outgoing crew takes control?

No, the consist has only been moved from the shop track to a train and provided the schedule B is left with the locomotive consist or the results made available to the locomotive engineer another locomotive brake test is not required.

2) A yard crew takes a locomotive consist off the shop track that has a schedule B and uses the power to perform switching not related to the assigned train.

Is another locomotive brake test required when the outgoing crew takes control?

Yes, in this situation, the consist has been used to perform switching and is considered as placed in active service and unless a transfer occurs between the locomotive engineers or a CIF/Train Brake Status Form or Schedule B is provided to the outgoing crew, another locomotive brake test must be performed.

2.3 Locomotive Brake Test Procedure

Step	Description
1	Ensure the locomotive is protected from unintended movement.
2	Ensure the automatic brake handle is in the release position for at least 2 minutes, to ensure the locomotive air brake system is sufficiently charged.
3	Fully release the independent brakes.
4	Make a 15 psi brake pipe reduction (note build-up of independent pressure). Release the locomotive brakes by depressing the independent brake handle (bail) for at least 4 seconds for each locomotive in the consist.
5	Make a further brake pipe reduction (Full or Extended Service and note build-up of independent pressure) and then release the automatic brake.
6	Fully apply the independent brake.
Any alternate combination of the above steps is acceptable, provided the Independent, Automatic and Bail features are tested.	
7	Test the operation and recovery of the Safety Control System, except when adding a trailing locomotive(s).
Note	A qualified person must be positioned on the ground to observe that all brake pistons extend and retract as intended on the locomotives being tested.

2.4 Distr Pwr: Remote Locomotive Air Brakes

To verify the brakes on the remote consist(s) are functioning as intended, observe the decrease and increase of the remote consist(s) brake cylinder pressure on the controlling locomotive's Distr Pwr screen. It is not necessary for a qualified person to be positioned at the remote consist(s) to observe brake pistons.

3.0 RSC (Safety Control System)

3.1 Locomotive Safety Control System and Test Procedure

Except as provided for in Item 3.2 of these instructions, every controlling locomotive must be equipped with an operative safety control system capable of initiating a full service brake application and removing all tractive effort in the event that the locomotive engineer becomes inattentive or incapacitated.

A controlling locomotive must be equipped with a reset safety control (RSC) except when in yard or designated service. A controlling locomotive in yard or designated service must be equipped with a RSC or a safety control foot pedal.

Test Procedure

Step	Description
1	Ensure the locomotive is protected from unintended movement.
2	Ensure the safety control valve or switch is cut-IN and sealed.
3	Initiate a penalty brake application by placing the automatic and independent brake handles in release position.
4	Ensure the audible alarm and warning lights (RSC) or warning whistle (safety control foot pedal) is functioning.
5	Ensure the PC, PCS, or Power Off indicator light illuminates.
6	Ensure equalizing reservoir pressure reduces to zero.
7	Recover Penalty brake application.

3.2 Movement with a Defective Safety Control System: Road Locomotives

A movement must not depart an initial terminal or regular crew change location with a defective safety control system on the controlling locomotive.

NOTE: The Safety Control System on a locomotive is considered defective, when the activation of the RSC fails to initiate a penalty brake application as required.

The safety control cock or switch must be cut-IN and sealed at all times, except for enroute malfunctions. Any practice or action which otherwise interferes with the normal and proper functioning of this equipment will be considered a dismissible offence.

NOTE: If a safety control system seal is found to be missing, but the safety control system is functioning properly, the locomotive may continue in service providing all of the following actions are performed:

- Check the Crew Information Form and with the Central Locomotive Specialist (CLS) to ensure that the safety control system has no known malfunctions.
- Test the Safety Control system as per Item 3.1.
- If the safety control system is functioning properly, record on the Crew Information Form and advise CLS that the Safety Control system seal is missing.

On enroute locomotives, the seal must be replaced upon arrival at a mechanical facility.

If the safety control system completely malfunctions while enroute (e.g., non-recoverable penalty brake application), then the locomotive engineer must:

Step	Description
1	Immediately notify the RTC and the Central Locomotive Specialist of the situation and record the defect on the Crew Information Form.
2	Cut out the Safety Control cock or switch.
3	Proceed to the first location where the controlling locomotive can be exchanged with another locomotive with an operative RSC.
4	In the event that a locomotive is not available, the movement may proceed to the next regular crew change location and must not proceed beyond that point until the safety control system has been repaired or the defective locomotive replaced.

3.3 Movement with a Defective Safety Control System: Yard Locomotives

In the event of a complete malfunction of the safety control system on a yard locomotive while in active service, the safety control system may be cut-out and the locomotive may be operated to a repair facility or to the regular tie-up track within that yard. The Central Locomotive Specialist must be advised.

3.4 Defective Locomotive Event Recorder

If it is determined by the Central Locomotive Specialist or other Mechanical Employee that the event recorder has failed on a controlling locomotive, be governed by items 3.2 and 3.3 (e.g., defective Safety Control Systems on road and yard locomotives).

NOTE: If the alarm on a RSC is operating erratically (alarm every 20 seconds), the event recorder speed sensor may be malfunctioning.

The CLS must be notified accordingly, however the train may proceed to the next locomotive facility where repairs can be made or locomotive replaced.

4.0 Locomotive and Yard Test Plant Air Pressure Settings

4.1 Brake Pipe Pressure

Standard brake pipe pressure with automatic brake handle in release position:

- for passenger service is 90 psi.
- for freight service is 90 psi.
- yard test plant is 75 psi.

Specific trains or territories may require brake pipe pressure to be set higher or lower than standard.

Note: beltpack (RCLS) locomotives may operate at 85 psi until a 90 psi software modification is complete).

4.2 Main Reservoir/Brake Pipe Pressure Differential

With the automatic brake handle in release position, main reservoir pressure must be at least 15 psi higher than locomotive brake pipe pressure.

4.3 Independent Brake Cylinder Pressure

With the independent brake handle in full application position, brake cylinder pressure must be set to the pressure posted in the locomotive cab.

4.4 Equalizing Reservoir / Brake Pipe Pressure

The maximum variance between equalizing reservoir and locomotive brake pipe pressure is 3 psi with the automatic brake handle in the release position.

4.5 Enroute Brake Pipe Pressure Requirements

When automatic brake handle is in the release position, other than during intended brake application and/or release activity, on….	
Conventional Trains	**Distr Pwr Trains**
If brake pipe air flow exceeds 60 CFM or brake pipe gradient (between lead locomotive and rear car) exceeds 15 psi	If combined air flow to the brake pipe exceeds 90 CFM and/or more than 60 CFM at any one locomotive consist on the train
Corrective action must be taken if the flow or gradient do not return to acceptable limits within a reasonable period of time. This may include stopping the train at the next available location and inspecting for leaks.	

5.0 Pumping Air

If main reservoir pressure cannot be maintained 15 psi above feed or regulating valve setting at low engine speed, air compressor output can be increased by:	
1	Place reverser handle in NEUTRAL.
2	Place generator field switch OFF.
3	Advance throttle to not exceed No. 4.
NOTE: On GE locomotives, leave the throttle in IDLE.	

5.1 Charging Time Predictor

During charging of the brake pipe on **conventional** trains, the following Flow / Gradient Predictor must be used to calculate if requirements will be met (15 psi gradient and no more than 60 cfm of air flow).

With the brake handle in Release, train should meet the flow/gradient requirements, when any one of the conditions below are met or exceeded:

1	SBU pressure increases from 65 psi to 70 psi in 10 minutes or less.
2	SBU pressure has reached 70 psi and AFM indicator shows 60 CFM or less (Calibrated).

If condition 1 or 2 cannot be met or Brake Pipe does not reach 65 psi within a reasonable amount of time and not exceeding 30 minutes after air was cut in, arrange to inspect the train for excessive leaks and/or reduce / distribute the power within the train on the advice of local management or the Operations Centre (OC).

5.2 Overcharged Conditions

When a train's air brake system is charged to a pressure higher than the prescribed standard for that train, the overcharge will be maintained to the train's destination, providing the brake pipe pressure is not higher than 110 psi.

An overcharged air brake system occurs when the storage reservoirs on the locomotive and/or cars are charged to a value higher than the feed or regulating valve setting on the controlling locomotive. This is indicated by the air brakes being applied on the train or portion thereof, when the automatic brake handle is in the RELEASE position on the controlling locomotive.

An overcharged brake system is most likely to occur in the following situations:

When adding one or more cars with an overcharged condition to a train.
When attaching locomotive to the opposite end of a train.
When changing the locomotive.
When picking up cars that were set off of a train operating with higher brake pipe pressure.

5.3 To eliminate an overcharge on a car(s):

A	Close the angle cock between the locomotive and the overcharged car(s).
B	Bleed the reservoirs on the overcharged car(s).
C	Cut the air in on the car(s).

5.4 To eliminate an overcharge on a train:

A	protect against undesired train movement.
B	place the automatic brake handle in RELEASE position.
C	using the feed/regulating valve, ensure equalizing reservoir pressure is adjusted to the required pressure.
D	place the automatic brake handle in EMERGENCY position. Wait at least 2 mins before recharging the train air brake system.
E	a pull-by inspection must always be made to ensure the overcharge has been eliminated.
F	repeat the procedure if the inspection reveals the overcharge has not been eliminated.

6.0 Train Brake Tests

NOTE: A freight train having received a No.1 or 1A brake test may only depart a terminal if:

a) the train line brake pipe pressure on the tail end of the train is within fifteen (15) psi of the locomotive brake pipe pressure, and,

b) air flow to the brake pipe does not exceed sixty (60) cubic feet per minute, as indicated by the flow indicator or brake pipe leakage does not exceed five (5) psi in sixty (60) seconds.

c) **Distr Pwr Trains Only** – combined air flow to the brake pipe does not exceed ninety (90) CFM and no more than 60 CFM at any one locomotive consist on the train, as indicated by the flow indicator. Brake pipe pressure must be within 15 psi of standard operating pressure.
Distr Pwr trains with air flow greater than 60 cfm must use the Air Flow Method only, (leakage test not allowed). (Also see Section 2 Item 2.1 – Maximum Distances)

6.1 Brake Test Overview

Follow the train air brake test procedure described in 6.2 and 6.3 to complete each of the brake tests outlined below. Please refer to the detailed instructions for each of these train air brake tests on the next pages.

Test	Item	Location	Performed by	Operative Brakes	Car Brakes Inspected
No 1	7.0	Safety inspection location	Certified Car Inspector	95%	All
No 1-A	8.0	Initial (not a safety inspection location) and / or En Route	Qualified Person(s)	85%	All or Cars added + rear car
Continuity	10.0	Initial or En route	Qualified Person(s)	95% or 85%	Last piece of equipment / air rising
Transfer	15.0	Prior to departure, the locomotive engineer, or RCLS operator must verify that there is sufficient braking effort to control the transfer, confirmed by a running test as per Item 12.0 as soon as possible. Note: Except where block signals provide protection, transfers must have air applied throughout the entire equipment consist and the last three cars, if applicable must be verified to have operative brakes. (Train Brake Status may be used)			
Note: if an emergency brake application occurs while performing any of the above brake tests, then consider the test unsuccessful. The brake test must be repeated until a service brake application applies properly (without going in emergency).					

6.2 Before performing a train brake test complete the following steps:

Step	Description
1	Properly position all cocks and valves.
2	Couple brake pipe air hoses.
3	Release hand brakes unless required because of grade.
4	Ensure the rear car is charged to within 15 psi of locomotive brake pipe pressure.
5	If using the Air Flow Method, the Air Flow Indicator(s) must be calibrated – Indicator(s) at or below 60 cfm (Total of all flows not to exceed 90 cfm on Distr Pwr Trains).

6.3 Train Brake Test Procedure: Air Flow Method

The Air Flow Method is the preferred Train Brake Test Method. To use this method, the controlling locomotive must:

- be equipped with an EPIC or CCB electronic brake controller or 26L or equivalent brake equipment,
- have an operative Air Flow Indicator.

Step	Description
1	When a signal is given to apply the brakes, make a full service brake pipe reduction.
2	When a signal is given to release the brakes, release the automatic brake.
3	Record the train brake test results on Crew Information Form / Train Brake Status.

6.4 Train Brake Test Procedure: Brake Pipe Leakage Method

Note: Use this method only if the Air Flow Method cannot be used.

Step	Description
1	When a signal is given to apply the brakes, make a 15 psi brake pipe reduction.
2	When exhaust ceases, wait 60 seconds.
3	Cut-out the automatic brake. Wait 60seconds.
4	Note brake pipe pressure. Wait 60 seconds.
5	Note brake pipe pressure again. Pressure drop must not have exceeded 5 psi.
6	Reduce equalizing reservoir pressure 3 psi below brake pipe pressure.
7	Cut-in the automatic brake.
8	Make a full service brake pipe reduction.
9	When a signal is given to release the brakes, release the automatic brake.
10	Report the train brake test results to the conductor or locomotive engineer.

6.5 Use of TIBS

On trains equipped with TIBS, the decrease and increase of rear car brake pipe pressure as displayed in the controlling locomotive cab, will provide an indication of the application and release of the air brake on the rear car and of continuity between the locomotive and the rear car.

6.6 Inspecting for Brake Release

To determine if the brakes are released, either a standing inspection, or a pull-by inspection at a speed not exceeding 5 MPH is acceptable. When a pull-by inspection is performed, radio communication with the locomotive engineer must be maintained. The locomotive engineer must be advised of the results of the inspection.

7.0 No 1 Brake Test

7.1 A No 1 Brake Test:

- is performed by a certified car inspector
  - where a train is made up or on cars added or interchanged at a safety inspection location,
  - and while enroute at any subsequent safety inspection location(s) designated for that train.
- verifies the integrity and continuity of the brake pipe.
- verifies piston travel and the condition of brake rigging on each car in the train.
- verifies the application and release of air brakes on each car in the train.

Exception: A No 1 brake test is not required on:

Trains operating over main tracks, between yards, up to a maximum of a thirty (30) mile radius, which are engaged exclusively in the setting off or lifting of equipment at industry(s), and/or the transfer of equipment between yards.

7.2 If a train is made up at other than a safety inspection location, a No 1 brake test will be performed at the first safety inspection location designated for that train.

7.3 At locations where a No 1 brake test has been performed, the results of the test may be obtained in writing, in person, or by radio from a person who has immediate access to the test results.

7.4 Perform the No 1 Brake Test following the procedures described in items 6.2 and 6.3.

8.0 No 1-A Brake Test

8.1 A No 1-A Brake Test:

- Is performed by a qualified person(s):
  - where a train is made up at other than a safety inspection location.
  - when an enroute train is extensively switched, except where solid blocks of 2 or more cars are remarshalled within the same train.
  - at an interchange location when Train Brake Status records are not available.
  - when cars which have not been previously tested are added to a train.
  - on trains operating over main tracks, between yards, up to a maximum of a thirty (30) mile radius, which are engaged exclusively in the setting off or lifting of equipment at industry(s), and/or the transfer of equipment between yards.
- verifies the integrity and continuity of the brake pipe.
- verifies the application and release of air brakes on each car in the train.

8.2 Perform the No 1-A Brake Test following the procedures described in items 6.2 and 6.3.

9.0 Cars Brake Tested Prior to Adding to a Train

9.1 A No 1A Brake Test is not required on blocks of cars lifted en-route that have:

- previously received a No.1 brake test; and/or
- previously received a No.1A brake test at that location within twenty-four (24) hours of the lift.

Note: In both circumstances the brake status information must be received.

9.2 Cars Brake Tested Prior to Adding to a Train

When it is required to perform a brake test on cars before adding them to the train and it is not possible to determine brake pipe pressure on the last car being added, the brake test may be performed when:

- the last car being added has had the air cut in for at least 5 minutes, AND
- it is verified that the Air Flow indicator is calibrated.

After the cars are placed on the train, **Continuity** must be established as per item 10.2 before proceeding.

10.0 Continuity Test

10.1 Continuity Test

- is performed by a qualified person(s) when:
  - solid block(s) of coupled cars which have received a No 1 or No 1A brake test are added to a train.
  - the controlling locomotive has been attached to a train which has received a No 1 or No 1A brake test.
  - the locomotive consist has been exchanged or altered.
  - the locomotive engineer has been changed.
  - controlling ends of a locomotive consist or a push-pull train operation have been changed.
- verifies the capability to transmit a signal between the leading locomotive, to the rear of the last piece of equipment on the train.

10.2 When the brake pipe has been coupled to cars equipped with an SBU or Remote Locomotive on the rear, it is only necessary to establish that the air is rising (minimum 3 psi rise) on the last piece of equipment, to confirm brake pipe continuity.

10.3 A locomotive engineer must perform a continuity test immediately if brake pipe continuity is suspect.

Except when cold weather conditions will effect brake pipe flow, a continuity test must be performed prior to leaving if:

- the train does not leave the terminal immediately upon completion of the brake test,
- stops are made and there is public access to the train,
- public crossings are blocked,

10.4 A continuity test is not required when the locomotive engineer is changed, provided **all** of the following conditions are met:

- Must be a direct handoff at the controlling locomotive. *(Does not apply to trains left unattended while waiting for the outgoing crew)*
- If a train must perform a lift or set-off at a crew change location, a continuity test is required, unless the lift or set-off has occurred and continuity confirmed prior to a direct handoff.
- The controlling locomotive must be equipped with operative dynamic brake.

10.5 Continuity Test Procedure:

Step	Description
1	Make at least a 15 psi brake pipe reduction and ensure that brake pipe pressure has decreased at the rear of the train.
2	Wait for the exhaust to cease.
Note	On Distributed Power trains, the remote brake valve/feed valve(s) must be cut out prior to releasing the automatic brake.
3	When ready to proceed, release the automatic brake.
4	Ensure that brake pipe pressure is increasing at the rear of the train.
5	Train may be started after the brakes release.
Note: When performing a crew change continuity test, the inbound engineer performs Steps 1, 2 and the note and the outgoing engineer performs steps 3, 4 and 5. Integrity must be confirmed.	

11.0 Brake Pipe Continuity Test (ECP Trains)

11.1 Although the ECP system has safeguards built in to protect continuity, the following test can be used to confirm brake pipe continuity through the train.

11.2 Continuity Test Procedure for ECP Trains:

Step	Description
1	Command a full service brake application (100% TBC) and note the slight drop in brake pipe pressure at the rear of the train. **Note:** On a Wired Distributed Power train, the Feed Valve(s) must be cut-out on the remote(s) prior to commanding the full service brake application.
2	When the main operating screen indicates that Train Brake Effort (TBE) reaches 85% or greater, then release the brake immediately (0% TBC).
3	Look for the rise of brake pipe pressure on the EOT.
4	On Wired Distributed Power trains feed valve(s) on the remote(s) can now be cut in.

12.0 Running Brake Test

12.1 In the event of a complete Dynamic Brake failure enroute or when adverse weather conditions require the conditioning of the brakes, a running brake test must be performed on all trains prior to descending grades 2% or greater and at locations specified in special instructions.

Examples of adverse weather conditions include but are not limited to the following;

- *Snow accumulations above the top of the rail*
- *Outside ambient temperature is -15^{o} Celsius or colder*
- *Freezing rain conditions*

A running brake test of passenger train brakes must be made after leaving any location where any standing train air brake test was made.

12.2 Running Brake Test Procedure

Step	Description
1	When the speed of the train permits, apply the train brakes with sufficient force to verify the brakes are operating properly.
2	The locomotive brakes should not be allowed to apply at this time.
3	If the brakes do not operate properly, immediately stop the train, determine and correct the cause of failure, then repeat the running brake test.

13.0 Work Equipment and Snow Plows

13.1 Following the appropriate train brake test, and before starting a snow plow operation, an emergency application of train brakes must be obtained from the operator's cab of the snow plow.

13.2 Snowplows, spreaders, air dumps or other work equipment requiring a supplementary source of air, must be connected to the locomotive main reservoir equalizing pipe.

14.0 Block Swaps

14.1 A maximum of two (2) per location, of solid coupled block(s) of 2 or more cars removed from a train may be added to another train, or CUT INTO the same train, with only a Continuity test, provided that:

Item	Condition
1	Each block of cars being added has: • received a No 1 brake test at a prior location, and • remained coupled together, and • been off air for less than 24 hours (48 hours with notification to TC) • train brake status information that includes: - date - location - number of cars previously tested with a No 1 brake test - car number and location of any car in the block with inoperative brakes
2	The conductor or locomotive engineer must: • receive the train brake status information for those cars being added (in writing or verbally), and • update the train brake status information on the Crew Information Form / Train Brake Status Form.

15.0 Transfer Movements

15.1 Transfer Brake Test

Brake tests are NOT required for transfers provided Operating Rule requirements are met.

16.0 Movement of Cars and Locomotives with Inoperative Brakes

16.1 Cars and locomotives with inoperative brakes may be moved in trains for the purpose of unloading or for repair if all applicable parts of this section are complied with.

Prior to departure, the conductor or locomotive engineer must be notified of any inoperative car or locomotive brakes, and their location.

Inoperative brake information must be recorded on the Crew Information Form / Train Brake Status Form, and on Form 1225.

16.2 To calculate the percentage of operative train brakes, include both locomotives and cars.

16.3 Safety Inspection Locations - 95 percent operative brakes

Item	Requirements and Exceptions
1	When a train is made up at a safety inspection location, it must have 95 percent operative train brakes.
	Exception: Trains destined for the USA must have 100 percent operative brakes when leaving the latter of origin or safety inspection location.
2	Cars permitted to depart from a safety inspection location with inoperative brakes, may be moved for loading and/or unloading while enroute for repair.
3	When cars are added to a train at a safety inspection location, the train must not depart unless a minimum of 95 percent of the brakes on those cars added are operative.
4	When it is impractical to comply with the 95 percent requirements, trains of 18 cars or less may leave a safety inspection location with no less than 85 percent operative brakes. Appropriate actions must be taken to ensure safe operation (e.g., reduce speed).
5	Cars or locomotives with brakes inoperative due to damage may be moved in a train with less than 95 percent operative brakes when authorized by a person in charge who will ensure that appropriate measures have been taken to move such equipment safely.

16.4 Locations other than Safety Inspection Locations - 85 percent operative brakes

Item	Requirements and Exceptions
1	A freight train must not be operated with less than 85 percent of train brakes operative, except as provided in item 2 below.
2	Cars or locomotives with brakes inoperative due to damage may be moved in a train with less than 85 percent operative brakes when authorized by a person in charge who will ensure that appropriate measures have been taken to move such equipment safely.
3	A passenger train must not be operated with less than 85 percent of train brakes operative, unless an appropriate reduction in train speed, as determined by the locomotive engineer, is made.

16.5 Locomotives with inoperative brakes:

Item	Requirements
1	The lead locomotive must have operative brakes at all times.
2	The air brake system of all trailing locomotives must be cut-IN so as to respond to the operation of the automatic brake and independent brake in the controlling locomotive, except when a locomotive with inoperative brakes is being moved for repair.
3	The locomotive engineer must be advised prior to departure when a locomotive in the consist has inoperative brakes.
4	When a locomotive in a consist has inoperative brakes, the locomotive engineer must take appropriate measures to ensure safety of movement.
5	No more than 2 locomotives with inoperative brakes may be handled in a locomotive consist. (They may be coupled together.)

16.6 Cars with inoperative brakes:

Item	Requirements
1	Cut-out the brakes on all cars or trucks, where appropriate. (Complete Form 1225.)
2	No more than 2 cars with inoperative brakes may be coupled together, except in the case of item 3 below.
3	Multi-platform articulated cars must not be operated with more than 2 consecutive control valves cut out. (typically 3 control valves on a 5 platform car).
4	The rear 3 cars (cars, equipment or locomotives) of a freight train must have operative brakes, except: - a 2 axle scale test car without brakes may be moved in a freight train provided it is placed ahead of the rear car of the train and it is coupled to cars with operative brakes. - other test cars (e.g. Track Evaluation Cars) may be moved at the rear of a freight train for test purposes, provided it is coupled to a car with operative brakes. **Note:** for the purpose of this instruction, each control valve of a articulated multi-platform car is considered as one car. (3 control valves on a 5 platform car = 3 cars). In accordance with company procedures, the person in charge may move cars or locomotives with inoperative brakes, due to damage enroute, at the rear of the train when no other option exists.
5	The rear car of a passenger train must have operative brakes on one truck.
6	Railway equipment which is designed without brakes may operate in a freight train.

17.0 Recording the Train Brake Status

17.1 Train Brake Status following No 1 or No 1A Brake Test

The results of a No 1 brake test, including pre-tested blocks of cars, will be recorded on a Train Brake Status form in a readily accessible computer file.

If assistance is required to retrieve Train Brake Status, contact the Central Locomotive Specialist at 1-800-308-6426.

Crews will receive the results of a No 1 brake test verbally or in writing and immediately record these results in Part 5 of the Crew Information Form / Train Brake Status (see example).

At locations where a train receives a No 1 or No 1A brake test, the conductor must record the following information on the Crew Information Form / Train Brake Status in the Grey Box: Date, Conductor or Carman's name, Train ID, Location, Number of cars on the train, "OK" or any exceptions.

17.2 Updating the Train Brake Status

Part 5 of the Crew Information Form / Train Brake Status must be updated as cars are lifted / setoff enroute indicating brake test information and car totals (see example).

Prior to arriving at each crew change point or terminal enroute, the conductor must update Part 5 of the Crew Information Form / Train Brake Status, (see example) indicating the Date, Conductor's Name, train ID, Name of Crew change point or Terminal, Number of cars on the train, "OK" or any exceptions noted.

The originating crew who has recorded the results of the No 1 or No 1A brake test, in the Grey Box, is also required to record brake status when the train arrives at the next crew change point or terminal. All other crews must ensure brake status is updated and recorded, as per example below, regardless if any changes have occurred.

The **original** and **subsequent** Crew Information Form / Train Brake Status Form(s) must be kept with the other documents (waybills, consist, etc.) while enroute. At locations where locomotives are changed off and/or sent to the shop, a copy of this form(s) must be left with the other documents (waybills, consist, etc.), not on the locomotives.

The conductor is responsible to ensure the proper handling of these documents. The conductor must make Train Brake Status available to the locomotive engineer prior to leaving a crew change point or terminal.

The **original** and **subsequent** Crew Information Form / Train Brake Status form(s) must remain with the train to destination. The Crew Information Form / Train Brake Status form(s) must be kept current and updated prior to delivery at the next crew change point or terminal. (i.e. when picking up and setting out cars enroute)

On arrival at the final destination the original and subsequent Crew Information Form / Train Brake Status form(s) must be submitted and retained for a period of thirty (30) days.

The requirement to record train brake status does not change any other reporting requirements. Crews are reminded of the requirements of GOI Section 5, item 16.0 "Reporting Detention or Defects" which requires the conductor to complete Form 1225 when repairs have been made enroute, including any air brakes which have been cut out.

Example of Part 5 of Crew Information Form / Train Brake Status

5. Train Brake Status: (GOI Sec. 13 - 17.0 or ABTHR Section 9)

(1) No 1 (No 1, No 1A, Class 1, Class 1A) brake test performed at Winnipeg (location) by Carman J. Footboard (conductor/carman)

at 0630 (time) Oct 19/12 (date) Number of cars tested 63 All "OK" ☑ or "cut-out" as listed below

	Date	Conductor	Station Name	Car Total	Equipment Lifted / Setoff enroute "Brake Test Results" Number of cars cut-out or all "OK" (Run Through)	Rear Car Pressure*
(2)	10/19	Spike	Brandon	63	OK	89
(3)	10/19	Plate	Oak Lake	78	15 Car Lift - No 1A Brake Test - All OK	--
	10/19	Plate	Broadview	78	OK	89
(4)	10/19	Jones	Regina	88	10 Car Lift - No 1 Brake Test - All OK	Carman Bridgeman
	10/19	Jones	Moose Jaw	88	OK	89
(5)	10/20	Hopper	Swift Current	88	10 Cars S/O - Brakes all OK	--
(6)	10/20	Hopper	Swift Current	78	OK	89
(7)	10/20	Gon	Dunmore	78	20 Cars S/O - Brakes all OK	--
(8)	10/20	Gon	Medicine Hat	58	OK	89
(9)	10/20	Flat	Medicine Hat	108	50 Car Lift - No 1A Brake Test - 1 C/O	--
	10/20	Flat	Alyth	108	1 Car C/O	89

Equipment Cut-Out and Location in train:

	Car #	Location	Car #	Location	Car #	Location
(*)	CP 601630	20 H/E				

1	Grey box where the results of the initial brake test are shown.
2	Normal change off where there are no changes to the original train.
3	When a lift is performed enroute. Note: car total includes the lift.
4	Lift enroute when cars have been tested by Mechanical.
5	When cars are s/o at the final terminal by the incoming conductor. Note: car total reflects arrival number.
6	Following the set-off (5), incoming conductor inputs the final train make-up prior to handoff to the outgoing crew. Note: car total now reflects the cars set-off.
7	When a set-off enroute occurs. Note: car total reflects arrival number.
8	Following the set-off, arrival at the crew change now reflects new car total.
9	Lift performed at the initial terminal. Note: car total includes the lift.
*	Example of a car that has been cut-out as indicated in (9).

17.3 Train Brake Status Lost Enroute

If the Crew Information Form / Train Brake Status is not available at a crew change point and the information cannot be obtained, then a No 1 or No 1A brake test must be performed before the train may proceed. This information must be recorded in the Grey Box.

The following Q & A's are provided to further clarify the instructions:

Q. I am on a train that does not have Crew Information Form / Train Brake Status. We have contacted our immediate supervisor and they have contacted the incoming conductor who has provided the necessary information. Is it acceptable for the supervisor to relay this information?

A. Yes, the information, including who provided it, must be noted on the Crew Information Form / Train Brake Status.

Q. I have entered the relayed information on to part 5 of a new Crew Information Form / Train Brake Status. Do I need the initial information from the No 1 brake test at the originating terminal to enter into the Grey Box?

A. No, provided the incoming conductor has confirmed that the initial brake test information was provided or the RTC / Locomotive Specialist confirms that it is available, a notation can be made in the Gray Box that the initial Crew Information Form / Train Brake Status is missing and the information can be obtained from the central locomotive specialist. The only exception is a train destined to the USA must have the Grey box information filled out, including the full name of the individual who performed the test (i.e.: initials are not acceptable and the name must be legible).

Q. I am on a train and have been informed that a No 1 brake test has been performed on the train, however there is no Train Brake Status information available on the train. What process do I follow in regards to receiving the information?

A. First contact the mechanical personnel or your immediate supervisor to provide the necessary information. If unavailable, then the central locomotive specialist would be contacted for the information. **Note:** The central locomotive specialist can only provide the information to the train at its original made up location as they cannot account for cars that may have been lifted or set off enroute.

Q. What are the procedures in regards to the Train Brake Status information when changing off with an incoming crew from another railway at interchange?

A. The Train Brake Status may be available in several forms. It can be provided on a separate Train Brake Status Form or a document similar to our CP Crew Information Form / Train Brake Status. In other situations, the information can be obtained from the other railways train consist. This process may differ from railway to railway and for that reason, your local supervisor can best advise as to the procedure required in your area. As per item 18.3, the Brake Status information must be transferred to CP's Crew Information Form / Train Brake Status and maintained and updated as required.

Q. If the Train Brake Status information in the Grey box is missing, however the previous crew(s) have entered the brake status information in the non-shaded area of Part 5, is it permissible to depart with this information?

A. Yes, it is permissible to depart. In this case you would contact the RTC or the Central Locomotive Specialist and confirm that the initial Brake Test information is available and make the notation in the Grey Box. As stated above the CLS will not provide the information of the initial test, as they cannot account for cars that may have been lifted or set off enroute, but they can confirm that the information is available.

Q. I am working on a train that will be required to make a lift or a set off enroute. Do I have to record the lifts and set offs and brake information on the Crew Information Form / Train Brake Status?

A. Yes, the information must be noted on the form as indicated in the example.

Q. I am working a Road Switcher that travels to a customer facility to drop off cars and lift cars on the return movement. We receive a No 1 brake test at our initial terminal from the car inspectors. Do I have to fill out a Crew Information Form / Train Brake Status?

A. Yes, the brake test information, including who provided it, must be noted on the form.

Q. In the situation above, we lift 10 cars from the customer facility and perform the No 1A brake test on the cars. Do I have to fill out a new Crew Information Form / Train Brake Status and fill in the brake test information?

A. Yes, a new form must be made out with the brake information. On arrival at the final terminal, both forms would be submitted and must be retained for 30 days.

Q. I am on a train that will be setting off 10 cars that will be block swapped to another train. The cars had received a No 1 brake test at the initial terminal. What must I do in regards to providing the information on the brake test status for these cars?

A. A copy of the Crew Information Form / Train Brake Status must be left for the crew that will be lifting the cars. The form must indicate the No 1 brake test information in the gray box and show the information that the cars have been set off at that location. (see example of cars set off at Swift Current).

18.0 Trains for Interchange

18.1 Entering the USA from Canada

Trains which are destined for the United States of America (USA) must have 100 percent operative brakes upon departure from the latter of the initial terminal or an enroute safety inspection location. No train may be operated into the USA at any time with less than 85 percent operative brakes. Cars destined for the USA with inoperative brakes or any other identified safety defects must not be moved past the next location where repairs of that type can reasonably be made.

A Crew Information Form / Train Brake Status, complete with train brake status information should be made available for train crews receiving trains from Canada.

Note: Distr Pwr trains with greater than 60 cfm are prohibited from operation in the USA. Crews must notify the RTC if the combined flows on a USA destined train exceed 60 cfm.

18.2 Entering Canada from the USA

When a train enters Canada from the USA and is accompanied with train brake status information which verifies that a prior initial terminal or 1000 mile brake test has been performed on that train, then a No 1 or No 1A brake test is not required. In this case, a Continuity test must be performed.

The train brake status information received at interchange must be transferred to CP's Crew Information Form / Train Brake Status and continue to be maintained and updated as required.

If the necessary train brake status information does not accompany the train, then a No 1 or No 1A brake test must be performed.

18.3 Trains Interchanging within Canada

When a train is received from another railway within Canada and is accompanied with train brake status information, then another No 1 or No 1A brake test is not required. In this case, a Continuity test must be performed.

The train brake status information received at interchange must be transferred to CP's Crew Information Form / Train Brake Status and continue to be maintained and updated as required.

If the necessary train brake status information does not accompany the train, then a No 1 or No 1A brake test must be performed.

A Crew Information Form / Train Brake Status, complete with train brake status information should be made available for train crews of other railways receiving trains from CP.

General Operating Instructions (GOI)

Section 4 – 10/14/2015

Hand Brakes – Leaving Equipment

TABLE OF CONTENTS

General Information / Definitions

IMPORTANT: Employee(s) securing equipment in accordance with these instructions must **confirm** with another employee, the manner in which the equipment has been secured.

The minimum number of hand brakes to be applied are indicated in Appendix A (Hand Brake Chart) for securing on Main Track, Sidings or High Risk Locations.

For securing on Non Main Track, sufficient hand brakes must be applied.

Note: In both circumstances hand brakes will be determined sufficient through testing of the effectiveness.

Location, grade or any other unusual conditions including weather situations such as high winds and temperature must be considered when securing equipment. When extreme weather situations emerge, previously secured equipment may require additional means of securement.

Special instructions may be issued for location specific areas that are subject to extreme weather events.

Definitions:

Equipment (including locomotives) is considered "unattended" when an employee is not in close enough proximity to take effective action to stop the unintentional moving of equipment.

*Locomotives equipped with an operational Stop Start System (i.e. AESS) with the ECS switch in the **"RUN"** position are considered as continuously running.*

In the application of this Section - Yards & Terminals are locations where railway personnel are on or about the property on a regular basis where they can observe the equipment.

Testing Hand Brake Effectiveness

To ensure a sufficient number of hand brakes are applied, release all air brakes and **allow or cause** the slack to adjust **or** apply sufficient tractive effort to provide force on the equipment. It must be apparent when the slack runs in or out, or when force is applied, that the hand brakes are sufficient to prevent that equipment from moving. This must be done before uncoupling or before leaving equipment unattended.

IMPORTANT: When air brakes are released to test effectiveness, allow sufficient time for the brakes to release.

Physical Securement or Mechanical Devices

In the application of these instructions, the following are considered as approved physical securement or mechanical devices.

- Hand Brakes
- Air brakes
- Derails
- Mechanical Emergency Devices
- Locomotive with an RSC with rollaway protection where air pressure is maintained
- Bowled terrain

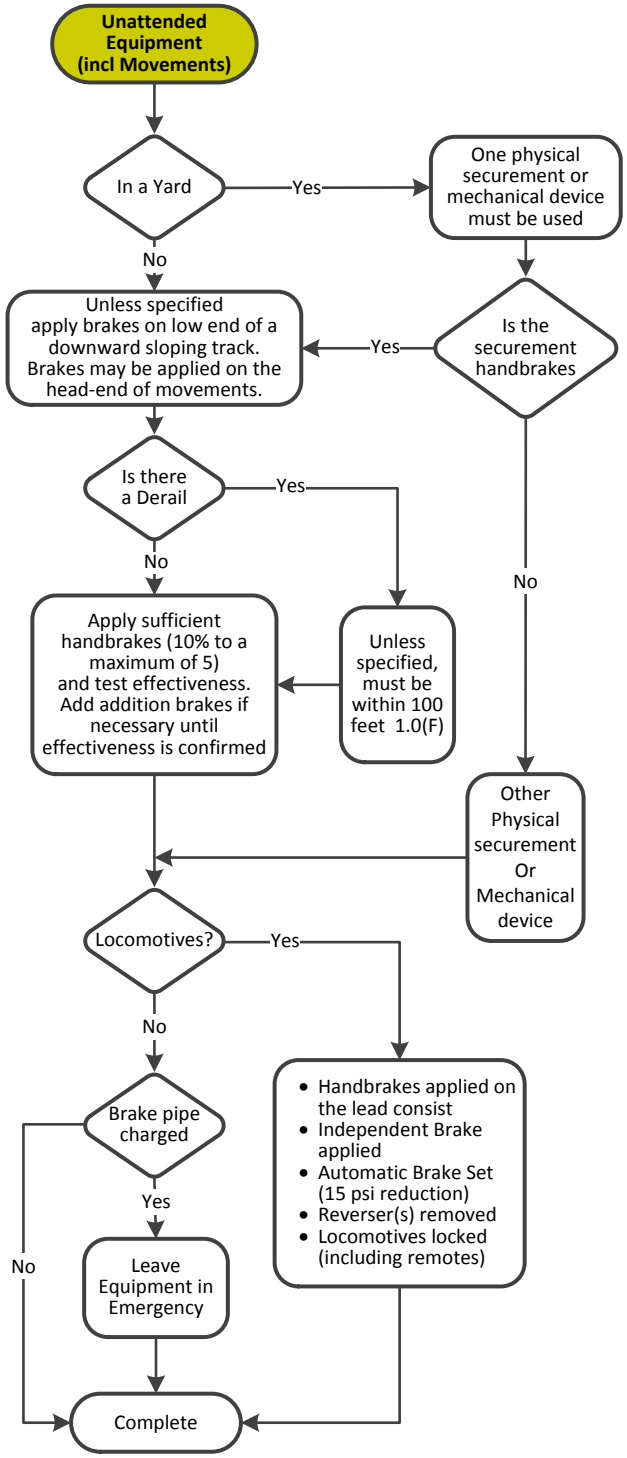
The following may also be used in a Yard;

- Retarder / Stop-block / Wheel Chocks / Skates

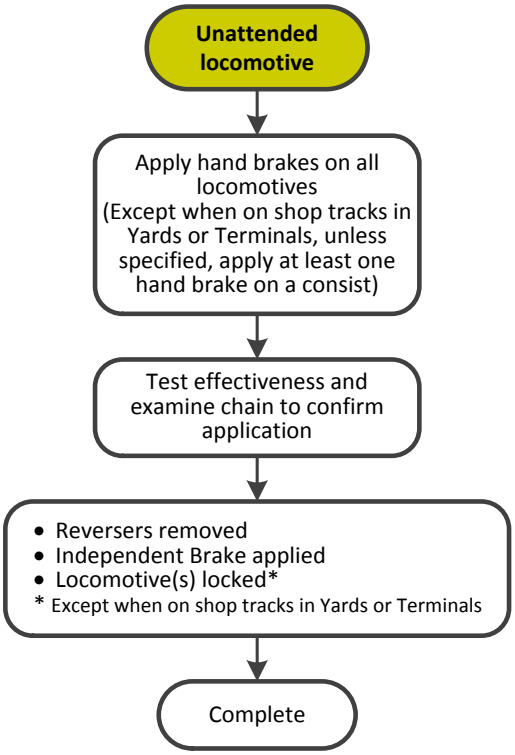
1.0 Leaving Equipment – Non Main Track

A	Equipment, as defined in this item, applies to rail cars and locomotives. Reference to hand brakes on locomotives includes those with electric parking brakes.
B	A single piece of equipment must ALWAYS be left with the hand brake applied and tested as effective.
C	Never leave a single piece of equipment with a defective hand brake by itself. It must be coupled to another piece of equipment with a hand brake and tested as effective.
D	Individual blocks of equipment must be secured with hand brakes on each block.
E	Unless otherwise specified, hand brakes must be applied on the equipment at the low end of a downward sloping track.
F	Unless otherwise specified in special instructions, when leaving equipment in a track equipped with a derail, it must be left within 100 feet of the derail. This does not include cars, which have been spotted for loading, unloading, repair, or cars being handled while switching. Operating Rules which govern proximity to public crossings at grade still apply.
G	Unless otherwise specified in the operating instructions, If the brake pipe is charged with air, then the equipment must be left in emergency unless coupled to an operating locomotive.
H	There may be situations where all handbrakes should be applied.

1.1 Unattended Equipment – Non Main Track



1.2 Unattended Locomotive – Non Main Track

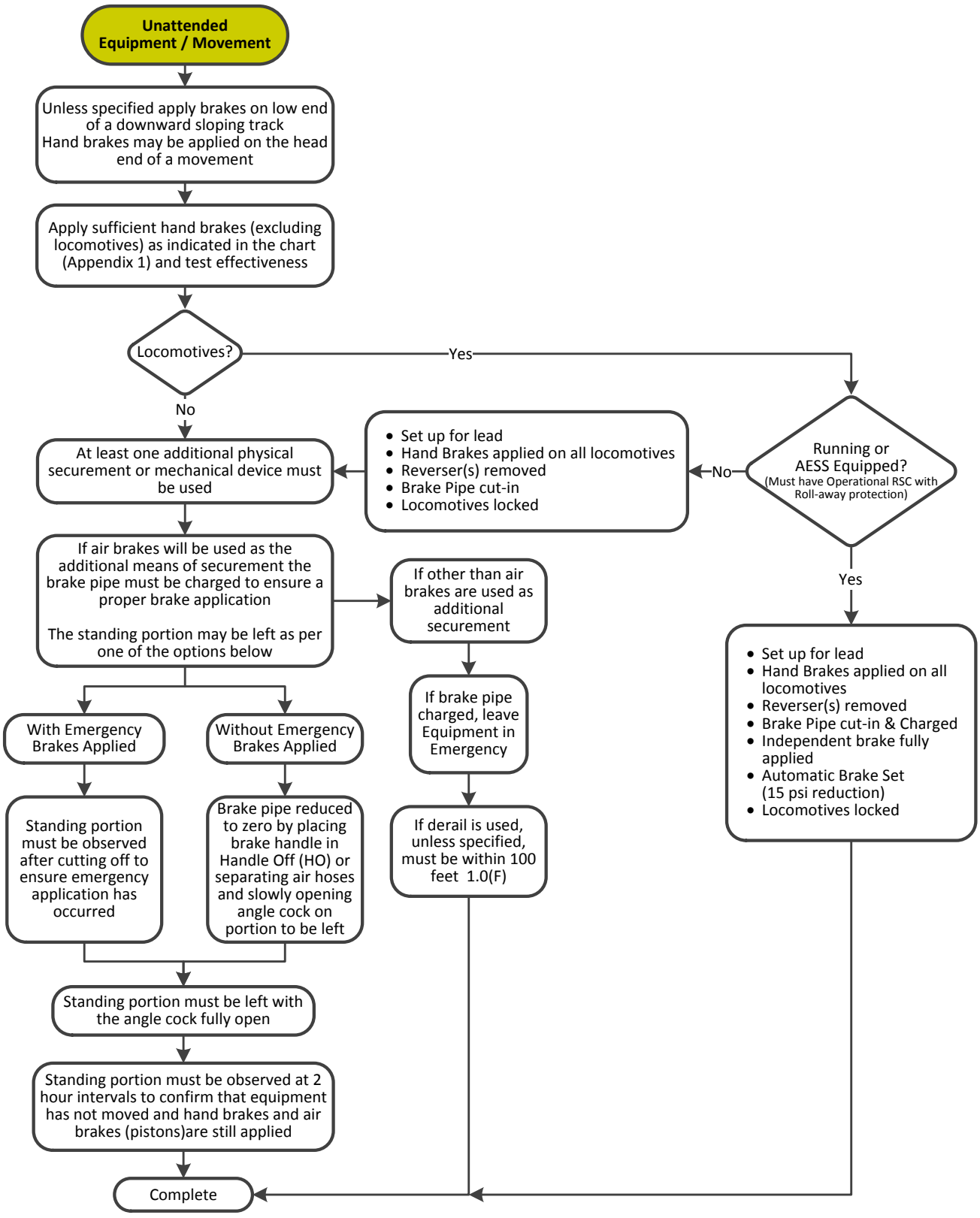


2.0 Leaving Equipment – Main Track / Sidings / High Risk Locations

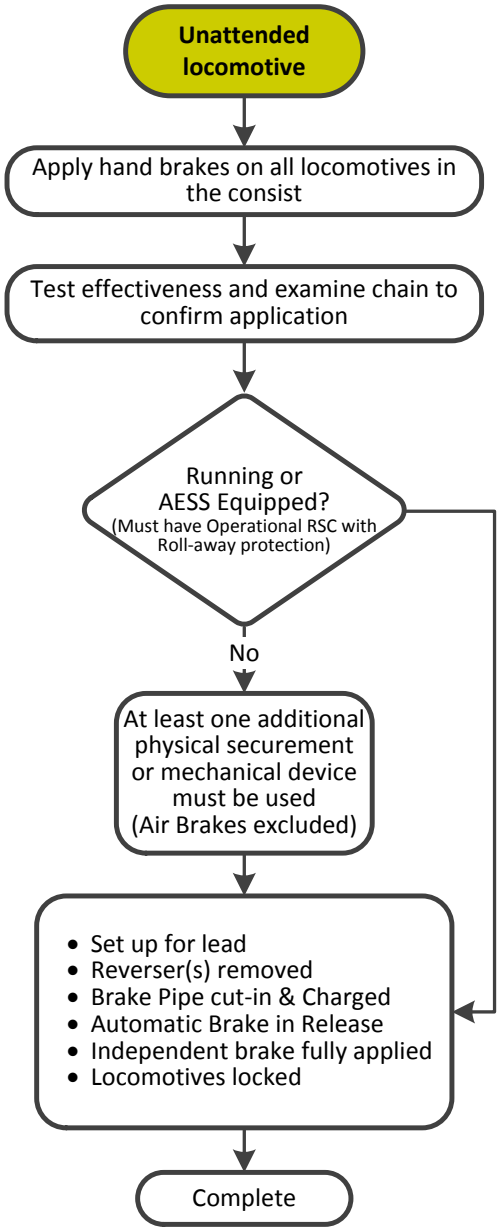
A	Equipment, as defined in this item, applies to rail cars and locomotives. Reference to hand brakes on locomotives includes those with electric parking brakes.
B	When equipment or movement are left unattended on tracks as indicated above, in addition to the securement requirements (Hand Brakes), at least one other physical securement or mechanical device as indicated on page 2, must be used.
C	High risk locations are determined by risk assessment and will be identified in summary bulletin, special instructions or time table.
D	A single piece of equipment must ALWAYS be left with the hand brake applied and tested as effective.
E	Never leave a single piece of equipment with a defective hand brake by itself. It must be coupled to another piece of equipment with a hand brake and tested as effective.
F	Individual blocks of equipment must be secured with hand brakes on each block.
G	When leaving equipment in a track equipped with a derail, unless otherwise indicated, it must be left within 100 feet of the derail. This does not include cars, which have been spotted for loading, unloading, repair, or cars being handled while switching. Operating Rules which govern proximity to public crossings at grade still apply.
H	There may be situations where all handbrakes should be applied.

Note: If equipment being left is not a movement, however locomotive(s) will be left as part of the equipment, then on the locomotive or one of the locomotives in the consist, the control stand must be set as a controlling locomotive and left as per Item 3.2 steps A&E.

2.1 Unattended Equipment or Movement – Main Track / Sidings / High Risk Locations



2.2 Unattended Locomotive – Main Track / Sidings / High Risk Locations



2.3 Leaving Equipment with air brakes – Supplemental Instruction

The following apply in the application of Item 2.1 when leaving equipment Unattended on Main Track / Sidings or High Risk Locations and using air brakes as the additional means of securement.

A) With Emergency Air Brakes Applied

The standing portion must be observed to ensure an Emergency brake has occurred after cutting off.

NOTE: On trains equipped with TIBS, the crew member must advise the locomotive engineer when the angle cock has been closed, and then the locomotive engineer must activate the TIBS emergency braking feature.

B) Without Emergency Air Brakes Applied

CAUTION: If a Distr Pwr Remote will be included in the portion of the train to be left standing, then the crew must confirm with each other that the remote(s) are in the SET-OUT mode prior to applying the provisions below. If the system is in a state of COMM loss, then the provisions of this item B do not apply.

This instruction is intended for leaving a portion of the train when there is a possibility that an emergency application may cause a stuck vent valve on equipment over 75 feet.

Prior to leaving the standing portion, the brake pipe must be reduced to "ZERO" at a rate that is no less than a service rate reduction, this is accomplished by two methods:

1) By placing the brake handle into the Handle Off position and waiting for the air to deplete from the train line. The SBU must be observed to ensure "ZERO Pressure".
2) By closing both angle cocks at the location where the cut will be made and separating the hoses and then slowly opening the angle cock on the portion to be left standing and letting the air fully deplete.

Note: On some locomotives, due to a built in feature, the brake pipe will only reduce to 10 - 11 psi.

TIBS emergency braking feature should not be tripped.

Once the air is fully depleted or stabilized (10 - 11 psi as indicated above), the standing portion ***must*** be left with the angle cock open.

3.0 Leaving Locomotive(s)

3.1 Changing off with another Locomotive Engineer - Coupled with/without equipment.

A	Complete CIF / Train Brake Status.
B	Remove reverser handle from cab of the locomotive.

3.2 Leaving locomotive(s) unattended

A	On the controlling locomotive or one of the locomotives left, the control stand must be set as follows: • Independent brake cut-IN and FULLY applied. • Automatic brake cut-IN and handle placed in the position required by operating instruction. • Engine Run ON, G/Field OFF, Control-F/Pump ON. • Engine Control Switch (ECS) must be left in the **"RUN"** position. • Reverser handles removed on all locomotives except when not equipped with hi idle protection and throttle-up is required as per Section 1 Item 10.0.
B	Apply handbrakes on locomotives as per items 1.0 (Non-Main Track) or 2.0 (Main / Siding or High Risk). Note: Remote locomotives in train are exempt from this requirement unless required for normal securement.
C	When required by operating instruction, test the effectiveness of the hand brakes and examine the hand brake system to ensure that the chain is in tension to the point of application.
D	If seperating locomotives, close the cocks on all air hoses between the locomotives to be separated, remove the jumper cable(s) and disconnect walkway safety chains. After seperation, secure all hoses in the receptacles / dummy couplings (if provided).
E	Turn off all unnecessary lights and close all doors and windows. At locations other than shop tracks in Yards or Terminals, the cab doors must be locked on all locomotives.
F	Where applicable, Automatic Reporting Unit (ARU) must be connected for monitoring of locomotive.
G	Complete a CIF / Train Brake Status if necessary.

4.0 Leaving a Standing Portion

The standing portion must be left with angle cock FULLY OPEN.

The angle cock may be subsequently closed only when:

- the angle cock is FULLY OPEN on opposite end of the equipment, OR
- a locomotive is coupled on opposite end of the equipment.

5.0 Minimum Hand Brake Requirements

The following instructions apply when it is not possible to test hand brake effectiveness. (i.e. Break-in-two)	
A	Unless additional hand brakes are otherwise specified in Time Table Subdivision Footnotes or Operating Instructions, hand brakes must be applied as per the chart in Appendix A. **Note:** Additional hand brakes must be applied if in the opinion of the crew, that those applied are not sufficient to prevent movement of equipment.
B	The standing portion must be secured with hand brakes as soon as possible.
C	Hand brakes may be applied near the head end of the standing portion, regardless of low end or high end of a particular grade.

6.0 Switching and Handling Equipment

A	After switching has been completed, and the equipment is being left, comply with the requirements specified in items 1.0 or 2.0.
B	While switching, when equipment is left standing without air brakes applied, always apply at least one hand brake. Increase the number of hand brakes as required until it is apparent that the number of hand brakes applied are sufficient to prevent the equipment from moving.
C	During switching, emergency air brake applications must not be relied upon to hold equipment stationary for short periods of time unless. **i)** there are at least 15 cars which are sufficiently charged with air AND **ii)** a crew member is in close enough proximity to safely apply hand brakes if unintended movement occurs.
D	After being coupled to, no equipment may be pushed or shoved until it is known that a proper coupling has been made. The slack must be taken or be seen to run out on all cars to be moved.
E	When it is required to remove equipment from a track, ensure that any equipment to be left standing is properly secured.
F	When equipment will be cut off in motion and controlled by hand brake(s), they must be tested to determine the hand brake(s) are operational before equipment is cut off.

G	Equipment cut-off in motion (flat switching): **i)** Do not uncouple or allow equipment to move under their own momentum onto standing equipment unless it is positively known that the number of hand brakes applied on the standing equipment are sufficient to prevent movement of all equipment. **ii)** In the application of the instruction above, do not rely on emergency air brake applications to prevent movement of the standing equipment (i.e., instead of hand brakes) unless you have complied with item 6.0(**C**) (e.g., there are at least 15 cars with emergency brakes applied etc.).

7.0 Handling Procedures – Hand Brakes

7.1 Hand Brake Application

A	Apply a hand brake with air brake released or brake cylinder bled off. Do not attempt to bleed a car off with SERVICE brake applications in effect as this can trigger an undesired release of all other cars.
B	It is not always practicable to apply hand brakes with the air brakes released (e.g., heavy grades with heavy cars or when providing 3 point protection). When an air brake application is required, it must be as light an application as possible to prevent movement while hand brakes are being applied.
C	When applying a hand brake, it must be applied fully.
D	Hand brakes must not be applied while equipment is being pulled or shoved.
E	Under winter conditions ensure braking surfaces are free of ice and snow.

7.2 Hand Brake Release

A	Hand brakes have the ability to provide far more brake shoe force than the air brakes; therefore to avoid damage to wheels, hand brakes must be FULLY RELEASED before moving equipment.
B	When releasing a hand brake, it may be determined that it is properly released by ensuring that the bell crank has dropped and that the vertical rod and chain are slack. **Note:** Do not depend on brake shoes being clear of the wheels as on many cars the hand brake applies on the "B" end only.
C	To prevent unintended movement of equipment, hand brakes must not be released until the air brake system is sufficiently charged, unless movement can be prevented with locomotive brakes.

7.3 Vented Brake Pipe Angle Cock

NOTE: Some locomotives are equipped with a "vented brake pipe angle cock". When closed, the vent will drain brake pipe pressure from the brake pipe and will not allow the standing portion to be placed in emergency.

- **IF** you are uncoupling immediately next to a locomotive equipped with a vented brake pipe angle cock,
- **BEFORE** instructing the crew member that it is OK to close the angle cock on the portion to be moved,
- **PLACE** the entire movement in **EMERGENCY** using the automatic brake valve.

This instruction applies on switching movements, on conventional trains and on Distr Pwr equipped trains; it applies if you are hanging on to the locomotive equipped with a vented brake pipe angle cock or uncoupling from it.

7.4 Wreck Damaged Equipment.

When hand brakes have been damaged due to derailment or mishap, it may be necessary to secure equipment with mechanical devices. These devices will be placed by Mechanical personnel and are designed for this purpose. In these cases, T&E employees should be governed by the officer in charge.

8.0 Spotting of Equipment Prohibited Sign

If equipment must be left between the Spotting of Equipment Prohibited Sign and the Road Crossing:

Prior to leaving equipment between the sign and the road crossing, a crew member must advise the RTC of the location and estimated distance between the equipment and the crossing.

Note: **At locations not equipped with signs**

A crew member must advise the RTC when equipment causing restricted sightlines is left at locations not equipped with a sign and be governed by instructions from the RTC.

Note: This instruction does not apply to equipment spotted for loading or unloading.

9.0 Notification of Persons Contacting Equipment

In the event that trespassers or emergency responders have been in contact with unattended equipment, the person responsible for the territory must make arrangements to have an employee verify the equipment remains secured without delay.

Employees, who witness a trespasser or emergency responder contacting unattended equipment, must report it to the RTC and if in a position to do so, verify that the equipment remains secure.

APPENDIX 1: Handbrake Chart

Minimum Required Number of Hand Brakes for Securing Equipment or Movements Left Unattended													
Total Tons:	**Average Grade is Equal To or Less Than**												
	0.2%	**0.4%**	**0.6%**	**0.8%**	**1.0%**	**1.2%**	**1.4%**	**1.6%**	**1.8%**	**2.0%**	**2.2%**	**2.4%**	**> 2.4**
0 - 2000	2	2	2	**4**	6	6	8	10	10	12	12	14	
> 2000 - 4000	2	2	4	**6**	8	12	14	16	18	20	22	26	
> 4000 - 6000	2	6	6	**10**	14	16	20	24	28	30	34	38	
> 6000 - 8000	4	6	8	**12**	18	22	26	32	36	42	46	52	
> 8000 - 10000	4	6	10	**16**	22	28	34	40	46	52	58	66	
> 10000 - 12000	4	8	12	**20**	26	34	40	48	56	64	72	80	
> 12000 - 14000	6	8	14	**22**	30	40	48	58	66	76	84	96	
> 14000 - 16000	6	10	16	**26**	36	46	56	66	76	88	98	110	
> 16000 - 18000	6	10	18	**28**	40	50	62	74	86	100	112	126	
> 18000 - 20000	8	12	20	**32**	44	58	70	84	98	112	128	146	
> 20000 - 22000	8	12	22	**36**	50	64	78	94	110	100% Hand Brakes			
> 22000 - 24000	8	12	24	**38**	54	70	86	104	122				
> 24000 - 26000	10	14	26	**42**	58	76	94	112	134				
> 26000 - 28000	10	14	28	**46**	64	82	104	124	148				
> 28000 - 30000	12	16	30	**50**	68	90	110	136	162				
> 30000	12	16	34	**52**	74	96	120	148	172				

In the application of the chart above, if the grade for a specific area is not provided or not listed in Appendix 2, then the minimum number of hand brakes to be applied prior to testing effectiveness will be as indicated in the column for 0.8% (shaded and bold numbers). When available, grades can also be found in local special instructions or track profiles.

APPENDIX 2: Hand Brake Grades

1.0 Grades

In the application of the hand brake chart in Section 4, the following tables list the grades that are 0.8% or greater. The Grade percentage shown is the maximum grade between the mileages shown and the direction indicates which way the grade is descending.

Pacific			
Subdivision	**Location**	**Grade (%)**	**Direction**
Byron Creek	10.9 – 0.0	1.70	Northward
Byron Creek	11.4 – 10.9	2.00	Northward
Cascade	0.1 – 1.9	1.00	Westward
Cascade	17.2 – 19.3	0.90	Westward
Cascade	21.0 – 22.6	0.80	Westward
Cascade	40.6 – 42.7	1.00	Westward
Columbia	8.9 – 14.2	1.30	Westward
Columbia	33.7 – 34.9	2.00	Westward
Columbia	43.8 – 40.2	1.40	Eastward
Columbia	46.9 – 44.1	4.10	Eastward
Cranbrook	1.8 – 17.7	1.20	Eastward
Cranbrook	54.0 – 53.0	1.10	Eastward
Cranbrook	54.4 – 60.2	1.00	Westward
Cranbrook	63.4 – 67.3	1.00	Westward
Cranbrook	96.2 – 105.2	1.00	Westward
Cranbrook	108.3 – 113.1	1.00	Eastward
Cranbrook	116.0 – 120.9	1.00	Westward
Fording River	33.5 – 31.3	1.80	Southward
Fording River	30.3 – 27.0	1.70	Southward
Fording River	20.9 – 12.7	1.80	Southward
Fording River	11.4 – 6.2	1.80	Southward
Fording River	11.6 – 8.5	1.80	Southward
Fording River	7.8 – 6.2	1.80	Southward
Fording River	2.5 – 0.5	1.70	Southward
Mountain	1.5 – 7.6	1.30	Westward
Mountain	17.0 – 21.1	2.20	Westward
Mountain	21.1 – 24.6	1.20	Westward
Mountain	24.6 – 27.3	1.70	Westward
Mountain	27.3 – 29.0	1.90	Westward
Mountain	29.0 – 33.8	2.10	Westward
Mountain	33.8 – 35.0	1.10	Westward
Mountain	36.0 – 36.5	0.80	Westward
Mountain – MacDonald Track	88.0 – 68.3	1.00	Eastward
Mountain – Connaught Track	76.4 – 68.4	2.40	Eastward
Mountain – Connaught Track	84.9 – 79.3	1.00	Eastward
Mountain – Connaught Track	85.6 – 87.8	2.30	Westward
Mountain	88.5 – 94.0	2.30	Westward
Mountain	94.0 – 95.9	1.20	Westward
Mountain	95.9 – 98.4	2.10	Westward
Mountain	98.4 – 102.5	1.80	Westward
Mountain	102.5 – 105.9	2.10	Westward
Mountain	105.9 – 110.2	1.00	Westward
Mountain	114.0 – 125.0	1.60	Westward
Shuswap North Track	5.0 – 1.9	1.40	Eastward
Shuswap North Track	8.0 – 5.9	1.00	Eastward
Shuswap South Track	6.1 – 1.9	1.00	Eastward
Shuswap	9.7 – 12.5	1.10	Westward
Shuswap	15.5 – 20.0	1.20	Westward
Shuswap	21.5 – 23.5	1.00	Westward
Shuswap North Track	79.4 – 70.6	1.00	Eastward
Shuswap South Track	79.4 – 70.9	1.50	Eastward
Shuswap	79.6 – 89.9	1.10	Westward
Thompson	32.4 – 34.7	1.00	Westward

Prairie			
Subdivision	**Location**	**Grade (%)**	**Direction**
Brechter	1.9 – 2.5	1.75	Northward
Brechter	3.7 – 5.0	2.00	Northward
Brechter	6.5 – 10.0	1.75	Northward
Brooks	5.4 – 0.5	1.30	Eastward
Crowsnest	62.0 – 58.0	1.10	Eastward
Crowsnest	71.9 – 65.5	1.10	Eastward
Crowsnest	79.0 – 75.0	1.00	Eastward
Crowsnest	86.0 – 83.0	1.40	Eastward
Expanse	21.0 – 25.3	1.00	Southward
Hardisty	126.6 – 130.6	1.00	Westward
Indian Head	79.0 – 83.0	1.00	Westward
Hoadley	36.9 – 36.3	2.00	Eastward
Laggan	79.0 – 74.5	0.90	Eastward
Laggan South Track	122.3 – 117.3	1.80	Eastward
Laggan North Track	122.3 – 116.0	1.00	Eastward
Laggan	123.6 – 136.6	2.20	Westward
Leduc	28.0 – 30.5	1.00	Northward
Lloydminster	66.8 – 73.9	1.00	Northward

Lloydminster	80.0 – 74.0	1.00	Southward
Maple Creek	140.6 – 146.0	1.30	Westward
Montana	1.8 – 3.4	1.00	Northward
Montana	14.6 – 17.0	1.20	Northward
Montana	25.1 – 27.3	1.00	Northward
Pecten	29.0 – 20.0	2.70	Northward
Pecten	20.0 – 16.0	1.50	Northward
Pecten	12.0 - 7.9	1.50	Northward
Pecten	5.5 - 1.3	1.50	Northward
Radville	84.6 – 81.4	1.30	Eastward
Red Deer	29.2 – 32.5	1.20	Northward
Red Deer	47.4 – 49.0	1.00	Northward
Red Deer	71.7 – 73.0	0.80	Northward
Red Deer	94.6 – 95.6	1.00	Southward
Shantz	12.7 – 9.3	1.80	Eastward
Shantz	7.2 – 9.2	1.50	Westward
Shantz	5.8 – 3.2	1.70	Eastward
Wetaskiwin	84.0 – 86.0	1.13	Westward
Wetaskiwin	87.5 – 90.5	1.00	Eastward
Weyburn	152.0 – 149.2	1.00	Northward

Central			
Subdivision	**Location**	**Grade (%)**	**Direction**
Bredenbury	3.6 – 0.0	1.61	Eastward
Bredenbury	53.0 – 56.0	1.13	Westward
Bredenbury	58.5 – 56.0	1.27	Eastward
Bredenbury	76.0 – 84.5	1.32	Westward
Bredenbury	89.0 – 84.5	1.38	Eastward
Heron Bay	35.0 – 34.0	1.10	Eastward
Heron Bay	69.6 – 68.1	1.00	Eastward
Heron Bay	76.9 – 72.3	1.00	Eastward
Heron Bay	76.9 – 80.1	1.00	Westward
Heron Bay	91.0 – 89.1	1.00	Eastward
Heron Bay	97.3 – 98.1	1.00	Westward
Heron Bay	109.0 – 105.4	1.30	Eastward
Kaministiquia	16.2 – 9.5	1.20	Eastward
Kaministiquia	40.0 – 33.4	1.10	Eastward
Minnedosa	73.6 – 64.7	1.40	Eastward
Minnedosa	75.6 – 77.4	1.30	Westward
Nemegos	4.5 – 6.9	1.10	Westward
Nemegos	10.3 – 8.0	1.00	Eastward
Nemegos	12.1 – 14.3	1.20	Westward
Nemegos	33.9 – 32.2	1.00	Eastward
Nemegos	44.1 – 41.9	1.00	Eastward
Nemegos	98.5 – 100.5	1.20	Westward

Nipigon	2.0 – 7.0	1.00	Westward
Nipigon	43.5 – 41.1	1.20	Eastward
Nipigon	63.0 – 64.3	0.90	Westward
Nipigon	101.0 – 94.7	1.20	Eastward
Nipigon	115.9 – 120.7	1.00	Westward
White River	12.0 – 11.2	1.40	Eastward
White River	12.0 – 14.2	1.40	Westward
White River	29.4 – 30.9	1.00	Westward
White River	36.3 – 40.7	1.10	Westward
White River	46.5 – 44.7	1.10	Eastward
White River	73.0 – 70.4	1.10	Eastward
White River	74.1 – 76.2	1.00	Westward
White River	90.5 – 89.2	0.90	Westward
White River	95.0 – 93.8	1.10	Eastward
White River	100.5 – 100.9	0.90	Westward
White River	105.5 – 103.6	1.20	Eastward
White River	100.5 – 107.8	0.90	Westward
White River	115.4 – 116.6	0.90	Westward
White River	119.6 – 117.6	1.20	Eastward
White River	121.5 – 123.3	1.00	Westward

Canada East			
Subdivision	**Location**	**Grade (%)**	**Direction**
Adirondack Outremont Spur	4.0 – 1.5	1.60	Southward
Belleville	29.7 – 28.9	0.80	Eastward
Belleville	176.5 – 177.0	0.80	Westward
Belleville	201.1 – 203.4	1.00	Westward
Belleville	206.3 – 208.8	0.80	Westward
Brockville	0.4 – 1.9	1.00	Southward
Brockville	27.0 – 27.8	1.10	Southward
Cartier	82.0 – 80.2	1.10	Eastward
Cartier	83.7 – 85.1	1.10	Westward
Cartier	110.5 – 97.8	1.40	Eastward
Galt	3.7 – 1.4	0.80	Eastward
Galt	16.3 – 15.0	1.00	Eastward
Galt	24.4 – 20.4	1.10	Eastward
Galt	38.5 – 32.7	1.10	Eastward
Galt	56.2 – 56.5	0.90	Westward
Galt	59.8 – 57.5	1.00	Eastward
Galt	69.5 – 70.0	0.80	Westward
Galt	73.1 – 71.6	1.00	Eastward
Hamilton	46.7 – 52.5	1.00	Northward
Hamilton	60.3 – 67.0	2.20	Southward
Havelock	177.0 – 173.4	1.00	Eastward

Havelock	172.2 – 166.3	1.00	Eastward
Havelock	140.1 – 127.5	1.10	Eastward
MacTier	11.9 – 10.7	1.10	Southward
MacTier	16.5 – 15.6	0.80	Southward
MacTier	20.7 – 18.7	0.80	Southward
MacTier	16.5 – 15.6	0.80	Southward
MacTier	34.3 – 36.4	0.80	Northward
Nephton	3.4 – 4.5	1.60	Northward
Nephton	6.3 – 4.5	2.00	Southward
Nephton	8.6 – 9.6	1.50	Northward
Nephton	14.7 – 12.9	1.50	Southward
Nephton	19.5 – 17.0	1.25	Southward
Parc	6.4 – 7.9	1.10	Westward
Parc	16.0 – 17.0	1.00	Westward
Waterloo	6.2 – 4.6	2.00	Southward
Waterloo	7.0 – 8.0	2.00	Northward
Waterloo	9.0 – 8.0	2.00	Southward
Windsor	3.1 – 1.0	1.00	Eastward

Section 5 – 10/14/2015

Train Inspections

Hot Box Detector Instructions

TABLE OF CONTENTS

TRAIN INSPECTIONS

1.0 Inspecting SPECIAL Dangerous Commodities

1.1 A train or transfer carrying one or more full carloads, containerloads or trailerloads of SPECIAL dangerous commodities MUST, within one mile of the location indicated by subdivision footnote at which this instruction applies,

- perform a pull-by or a standing inspection,
- from the front of the train to and including 8 axles behind the last full carload, containerload, or trailerload of a SPECIAL dangerous commodity.

2.0 Use of Portable Radios when Making Train Inspection

When portable radios are available they must be carried by crew members when making train inspections.

3.0 Mechanical Safety Inspections

3.1 Mechanical Safety Inspections will be performed by Certified Car Inspectors at those locations designated for that train, as specified in the Train Service Schedule CM422A.

At locations other than designated Safety Inspection Locations, where trains originate or cars are added to a train, the train crew or other qualified person must make a Pre-departure Inspection for those conditions listed in item 4.1.

4.0 Pre-Departure Inspection Procedures (by other than a certified car inspector)

4.1 Hazardous Conditions

At each location where a freight car is placed in a train and a Certified Car Inspector is not on duty for the purpose of inspecting freight cars, the freight car must, as a minimum requirement, be inspected for these hazardous conditions:

- Car body leaning or listing to the side,
- Car body sagging downward,
- Car body positioned improperly on the truck,
- Object dragging below the car body,
- Object extending from the side of the car body,
- Plug door open or any door out of guide,
- Broken or missing safety appliance (e.g. handhold, ladder, sill step),
- Insecure coupling,
- Brake that fails to release,
- Missing “end cap bolt” on a roller bearing,
- Overheated wheel or journal,
- Broken or cracked wheel,
- Any other apparent safety hazard likely to cause an accident or casualty before the train arrives at its destination,
- Lading leaking from a placarded dangerous goods car,
- Suspicious or dangerous objects, including Improvised Explosive Devices (IED’s),
- Obvious leakage or spillage from grain cars.

If carrying cars with dangerous goods, see Section 8, Dangerous Goods, item 1.1.

4.2 Performing the Pre-departure Inspection

- Inspect both sides of each car.
- Perform a standing inspection on both sides, or a standing inspection on one side, then a roll-by inspection on the other.
- The roll-by inspection must not exceed 5 MPH.

Note: A pre-departure inspection may be made before or after the car(s) is added to the train.

4.3 Hazardous Condition Found

If any hazardous condition is found during the pre-departure inspection, then:

- report it to the proper authority and be governed by instructions given.

Note: Before entering the USA, defective cars must be set off at a location capable of making repairs.

5.0 Train Inspection Intervals

5.1 No train may be operated in excess of 60 miles, or move past 2 consecutive non-operational hot box detectors without having been inspected on each side of the entire train. These inspections must be performed by:

(i) hot box detectors; or
(ii) pull-by inspection by crew members of the train; or
(iii) passing train inspection by:
- wayside employees, or
- crew members of other trains.

Note: Passing train inspections must be conducted by 2 employees on opposite sides of the train, within 1 train length of each other.

The inspection results must be conveyed to the train crew to be considered an inspection.

6.0 Inspecting Passing Trains

Unless relieved of the responsibility, employees are required to perform passing train inspections when crew changes occur.

Crews that will encounter on-duty hours of service issues, must contact the RTC and be governed by instructions received.

If all crew members will be vacating the cab of the locomotive to perform a passing train inspection, a sufficient brake application must be made to hold the train, unless locomotive brakes are sufficient to prevent movement.

7.0 Crew Change Pull-by Inspections

7.1 A crew change pull-by inspection must be performed (as per item 8.0), if the train meets ANY of the following three conditions:

a) train consist documents state:

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**********************************

PULL BY INSPECTION REQUIRED AT  CREW
CHANGE POINTS AS PER GOI SECTION 5
ITEM 7.1 APPLIES IN CANADA ONLY

**********************************
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b) it is known or suspected that the train contains loads prone to shifting

- Loads prone to shifting descriptions can be found in Section 7 Item 16.2(B).

c) the train contains one or more cars containing dangerous goods (including residue cars) for which an Emergency Response Assistance Plan (ERAP) is required as identified by consist header (a).

Note: For cars lifted enroute, Compressed Waybill and/or Shipping Document will indicate a ERAP/ERP number if applicable.

7.2 Notification of Crew Change Pull-by Inspection

If a pull-by inspection will be needed, but the train consist documents do NOT contain the warning described in item 7.1 a), then the incoming conductor must advise the:

- RTC,
- Responsible manager, (if applicable)
- outgoing crew (when a personal transfer occurs)

The need for a crew change pull-by inspection must be reported on the ***Crew Information Form***.

7.3 OTHER than Regular Crew-Change Points

When a crew change pull-by inspection is required under the provisions of item 7.1:

- If the relieving crew takes over control of the train directly from the relieved train crew, then no inspection is required.
- If the relieving crew does NOT take over control of the train directly from the relieved train crew, then a pull-by inspection (or combination standing pull-by inspection) is required.

7.4 Trains entering Canada from the USA

All trains entering Canada from the United States must receive a pull-by inspection at the first crew change location encountered in Canada.

Note: Trains that receive a pull-by inspection at border locations comply with this instruction.

8.0 Pull-by Inspection Procedure

8.1 Performing pull-by inspection (for other than meeting the purposes of the Section 3: *Air Brake Tests and Procedures)*

Both sides of the train must be inspected.

Position a crew member (or other qualified person) on each side of the track close to the moving train.

If only one crew member is available, then a standing inspection, or combination standing/pull-by inspection is permitted.

Movement must not exceed 15 MPH.

Inspect for defects and dangerous conditions.

Positioned employees must inspect for defects and dangerous conditions, including indications of.

- sticking brakes,
- skidded wheels,
- damaged or derailed equipment, and
- any apparent condition deemed unsafe for continued movement.

Inspection results at crew change points.

At crew changes, the outbound crew must be given the results of the pull-by inspection:

- verbally (in person, or by radio), or
- by the Crew Information Form (when the outbound crew does not take over control directly from the inbound crew).

If the outbound crew does not receive the inspection results, then an outbound pull-by inspection must be performed.

Note: All defects noted during a pull-by inspection must be reported on **Form 1225** and faxed to the **Car Planning Specialist: (403) 205-9127**

9.0 Inspection When Equipment is Stopped on a Bridge.

a) On a bridge without catwalks, where types of railway equipment permit, or where the bridge structure itself permits:
- crews may use these to gain access to the trouble area or traverse the bridge;
- employees must not put their personal safety in jeopardy;
- employees must not walk on tops of cars with running boards removed.

b) Car(s) stopped on a bridge requiring replacement of air hoses or knuckles may be pulled off the bridge with brakes applied provided:
- sufficient brakes on the remaining cars on the train can be released to permit movement without the use of excessive force.

c) Where car(s) stopped on a bridge have more serious defects, or where the train cannot be moved account insufficient brakes released;
- the RTC or Operating department must be contacted for assistance.

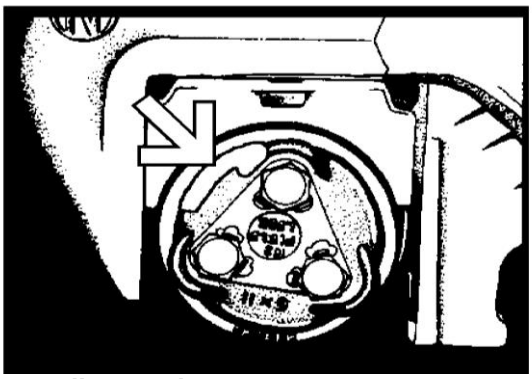
10.0 Defect Suspected - IMPORTANT

When, an overheated bearing or other defect is suspected by other than an HBD inspection:
- stop the train immediately, and
- make a close inspection.

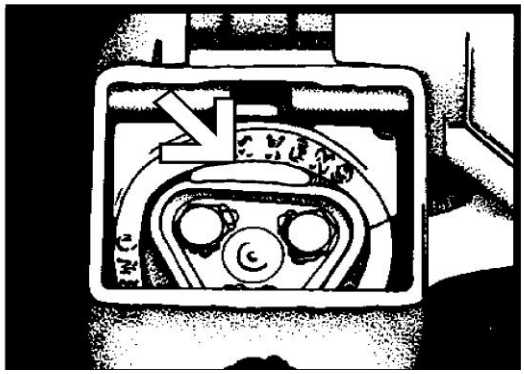
11.0 Overheated Bearings

11.1 Testing for Overheated Bearings

a) Roller bearings - apply a temperature indicating crayon to the face or side of the outer ring (cup) of the roller bearing and end bolts.

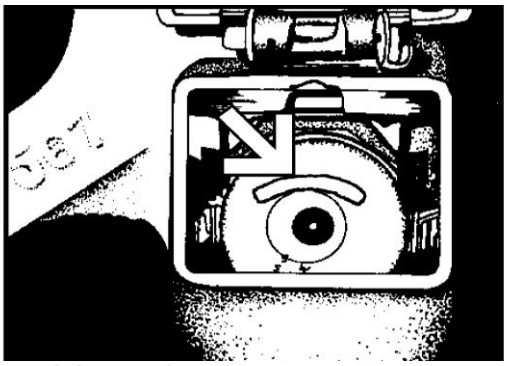


Roller Bearing



Roller Bearings Inserted in Friction Bearing Truck Side Frames

b) Plain bearing - open the journal box cover and apply a temperature indicating crayon to the end of the journal.



Plain Bearing

c) Check heat indicators if so equipped.

11.2 Bearing Inspection using the Back of the Bare Hand and Temperature Indicating Crayons (150ºF):

CAUTION: When using the back of the hand, **do not** physically touch the bearing housing if excessive heat is felt as your hand approaches the bearing housing or axle.

A	**Required Equipment:** • All crew members, other than locomotive engineers, of each movement must be in possession of a temperature indicating crayon (150ºF).
B	**Crayon Application:** • Use crayon as per illustrations in item 11.1 • Crayon may not melt at or below freezing.
C	**Crayon Results:** • Wax-like, shiny smear indicates overheated bearing. • Thin, coloured line indicates the metal is not overheated (i.e., metal is below the temperature indicated on the crayon).
D	**Inspection Procedure:** •Inspection for suspected overheating must include feeling the roller bearing housing using the **back of the bare hand** and use of the **temperature indicating crayon**. •When using the temperature crayon, the employee performing the duties **must mark the bearing housing and end bolt(s)** with sufficient force with the crayon to make an identifiable mark to indicate that it has been checked. (see second bullet 11.2 (c)). •In all cases, inspection must be as instructed by Section 5, item 24.0, which requires an inspection of 8 axles in both directions, both sides from a defect that is found and 16 axles in both direction, both sides if no **defect is found.**

11.3 Overheated Bearing Confirmed

If a bearing has overheated, then:

- set-out the car at the first available location, or location designated by the Time Table,
- complete ***Form 1225***, and notify the RTC.

12.0 Overheated, Hot, Skidded, and Shelled Wheel Defects

12.1 Overheated Wheels (Pre-departure Inspection/En route)

This applies to trains detecting hot wheels en route, or at any location where a freight car is to be placed in a train and a certified car inspector is not on duty to conduct inspections.

a) Safety Defect:
- Heat discoloration on any type of wheel which extends more than 4 inches from the rim into the plate, on both the front face and back face.

b) Actions to be taken:
- Set off car with safety defect at first available location;
- Do not place a car with a safety defect in the train;
- Complete ***Form 1225***, and notify RTC.

12.2 Hot Wheels (En route)

a) Detection/Description:
- Trains required to stop and inspect for a hot wheel condition (i.e. stopped at hot box detectors);
- Usually caused by sticking brakes or set hand brakes.

b) Safety Defect:
- Brakes that cannot be released.

c) Actions to be taken:

1	Check for sticking air brakes and set hand brakes. (Refer to item 13.0, Sticking Brakes, for cause and release of sticking brakes.)
2	If the brakes are successfully released, then perform a pull-by inspection of the car to ensure: • wheels are turning freely, and • all skids and shells are detected.
3	If the brakes cannot be released, then the car must be set off at the first available location.
4	Complete ***Form 1225***, and notify RTC.

12.3 Skidded and Shelled Wheels

a) Detection/Description:

- Detected by observing or being advised of pounding wheels.
- Skidded wheel - a wheel that has flat spots.
- Shelled wheel - a wheel tread defect where portions of the tread surface are missing.

b) Safety Defects:

- A skid measuring more than 2 ½ inches in length.
- Two adjoining skids each measuring more than 2 inches in length.
- A shell spot that is more than 1 ¼ inches in width and 1 ½ inches in length.

c) Actions to be taken:

1	If other than a UTO mandated inspection, proceed at SLOW SPEED to the first location where an inspection for skidded and shelled wheels can be made.
2	Closely inspect for skids and shell spots, measuring to determine if safety defects exist.
3	Check for sticking air brakes and/or set hand brakes. (Refer to item 13.0)
4	If the brakes are released, then perform a pull-by inspection of the car to ensure: • wheels are turning freely, and • all skids and shells are detected.
5	If any safety defects exist, then the car must be set off at the first available location.
6	Complete ***Form 1225***, and notify RTC.

12.4 Wheel Impact Load Detector (WILD) Sites

When wheels with excessive impact are measured by a WILD site, crews are governed by advice received from the RTC, rather than item 12.3 c) above.

13.0 Sticking Brakes

Sticking brakes refers to brake shoes that are against the wheel (applied position) when they should be clear of the wheel (released position).

13.1 Indications of sticking brakes:

a) A defect indicated by a Hot Box Detector System.
b) Brake cylinder piston in applied position.
c) Hand brake chain tight.
d) Noise of brake shoes against rotating wheels.
e) Odour of hot metal or burning oil.
f) Smoke, sparks or fire around wheels and brake shoes.
g) Sliding wheels.

13.2 Causes of sticking brakes:

a) An insufficient brake pipe reduction to ensure proper release.
b) Hand brake not fully released.
c) Retaining valve not in direct exhaust position.
d) Defective automatic slack adjuster.
e) Binding or fouled brake rigging.
f) Overcharged air brake systems.
g) Excessive brake pipe leakage.
h) Defective control valve.

13.3 To release a suspected sticking brake:

1	Ensure the hand brake is fully released.
2	Ensure the retainer is set to direct exhaust.
3	If the brake cylinder is in the applied position, then request the locomotive engineer to make a full service brake application and then release. • If the brakes release on the affected car, then do NOT cut out the car brakes. Proceed. • If the brakes do not release on the affected car, then cut out the car brakes and bleed the air system.
4	If the brake cylinder is in the release position, and the brake rigging indicates the brake is applied, then attempt to release by applying the hand brake fully and releasing several times. • If sticking continues the car must be set out at the nearest available point.

14.0 Cutting Out Car Air Brakes

Car air brakes must NOT be cut out except when:

a) Any portion of the rigging has failed.

b) There is a continual blow at the control valve exhaust or at the pressure retaining valve.

c) When pipes are broken beyond the branch pipe cut out cock.

Note: When a brake is cut out at the branch pipe, the combined auxiliary and emergency reservoirs must be completely drained.

15.0 Inspection Required Following an Emergency Brake Application While Moving

15.1 Passenger Trains Stopped by an Emergency Brake Application

Before the movement resumes:

- each car must be inspected to ensure all brakes are released,
- a pull-by inspection of the train must also be made - **without exception**.

15.2 All Other Trains Stopped by an Emergency Brake Application

a)	Complete a pull-by inspection (on at least one side of the train), watching in particular for: • skidded wheels, • applied brakes, and • evidence of derailment. If a pull-by inspection cannot be made due to terrain, proceed at SLOW speed to the first location where a pull-by inspection can be made.
b)	If there is evidence of derailed equipment or unusual train action, then stop the train immediately and determine the cause.
c)	Record, on the ***Crew Information Form***, the: • location the emergency brake application occurred, and • results of the pull-by inspection.

Exception: A pull-by inspection of the entire train is NOT required if ALL of the following conditions are met:

1) a pull-by inspection was performed for a previous emergency brake application and documented on the ***Crew Information Form***;

2) Train tonnage is:
   - less than 6,000 tons; or
   - 6,000 tons or more, and each car exceeds 100 gross tons.

3) speed at time of the emergency brake application was greater than 25 MPH;

4) the emergency brake application occurred within 15 seconds of initiating a service brake application;

5) no unusual slack action was noted during the stop;

6) when the brakes are released, the air flow indicator and rear car brake pipe pressure readings indicate no loss of air pressure; and

7) the train is NOT carrying SPECIAL dangerous commodities.
   - If conditions 1 through 6 have been met, **but** the train is carrying SPECIAL dangerous commodities, then complete a pull-by inspection from the leading locomotive to the last car containing SPECIAL dangerous commodities.

15.3 Employees Performing Emergency Brake Application Pull-by Inspection

This pull-by inspection may be made by:

- crew members of the train itself;
- crew members of a stopped train;
- other wayside employees.

The person making the inspection must have a portable radio and be informed of the situation.

16.0 Reporting Detention or Defects

16.1 ***Form 1225:*** "Report of Detention to Trains, Repairs to Cars En route, Air Brake Cut OUT, Disabled Cars Set Out and Hot Box Detector Report"

16.2 The conductor must complete ***Form 1225*** when:

- a train is stopped for unscheduled inspection,
- a train crew makes repairs en route to any car (e.g. replacing knuckles, air hoses, etc.),
- brakes are cut out,
- any hot box detector information is provided, except "No Alarms,"
- a hot box detector appears to be inoperative.

16.3 The conductor must complete all applicable parts of ***Form 1225***, including "Other Particulars."

- "Other Particulars" should include:
  - the specific location of the defect (e.g., B end, or A end),
  - reservoirs drained or brakes cut out at the branch pipe, and
  - details of inspection (e.g., whether a temperature indicating crayon was used).

16.4 ***Form 1225*** Information.

a) **Conductor** must:

- Transmit ***Form 1225*** information to the RTC verbally, at first opportunity:
  - car or engine number of the defective or suspected defective equipment;
  - condition found;
  - type of defective bearing (e.g., plain or roller);
  - action taken.
- Leave a copy on the train (for the relieving conductor at run-through terminals, the Mechanical Officer at final destination).
- Fax the original copy of Form 1225 to: **(403) 205–9127**

17.0 Crew Information Form / Train Brake Status

The ***Crew Information Form/Train Brake Status*** provides each relieving crew with information regarding the condition of the train, including:

- hot box detector information and details of inspections, including whether a defect was found;
- emergency brake application inspection report;
- results of inbound train inspection;
- location of all hand brakes applied;
- details of any brakes cut out;
- details of any defective cars being moved in the train (including actions taken to move them safely); and
- locomotive defects.
  Note: Locomotive defects must also be reported to the CLS (1-800-308-6426).

The form remains on the train for the information of train crew members until final destination where it must be submitted.

18.0 Steam Locomotive CP 2816

When a hot box detector broadcasts a hot box or hot wheel alarm(s) for any of the 7 axles of CP 2816, the alarm(s) may be disregarded providing that the locomotive is operating (under steam).

Exception: If more than **6 alarms** occur, then inspect the entire train as per item 23.2, Hot Box and item 23.3, Hot Wheel.

19.0 Wheel Impact Load Detectors (WILD)

19.1 Wheel Impact Load Detectors (WILD) measure excessive wheel impact on rail and identify defective cars using AEI car tag IDs.

When a defective car is identified, the RTC relays instructions to the crew (e.g., speed restriction, set off location).

WILD detectors are installed at HBDs and other standalone sites as follows.

Subdivision	Mileage
Mountain	47.80
Red Deer	22.80
Brooks	147.47
Crowsnest	19.20
Swift Current	30.90
Indian Head	103.40
Wilkie	52.35
Carberry	43.05
Kaministiquia	59.37
White River	124.80
Cartier	88.10
MacTier	25.46
Galt	42.72
Belleville	149.86
Lacolle	18.74

HOT BOX DETECTOR INSTRUCTIONS

20.0 HBD Talker Description

There are two models of HBD's in use on CP, the older systems will repeat the results message twice while the new model only announces the result message once, a DTMF code must be entered to have the HBD repeat the message. DTMF codes for each HBD will be indicated in the Time Table or by Special Instruction.

No Alarms – Final Results Messages

If there are no alarms the talker transmits a no alarm message immediately after the rear of the train passes the HBD.

Older Model HBD: After a two second pause, the message is repeated once, followed by "Message complete."

New model HBD: No automatic repeat and no post message. DTMF code may be used to repeat last message. Repeated message is preceded by the word "Repeat". ("Message complete" will not be announced on the repeat.)

Alarm Announcements While Passing HBD

As the train passes the HBD, the talker transmits a one second alert tone and announcement for each alarm. The following table summarizes the announcements.

Alarm Announcements while Passing HBD			
Situation	**Older Model HBD Announcement**	**New model HBD Announcement**	**Repeat**
Dragging Equipment	Tone + "dragging equipment"	Tone + "dragging equipment"	None
Hot Box	Tone + "hot box"	Tone + "hot box"	None
Hot Wheel	Tone + "hot wheel"	Tone + "hot wheel"	None
Dimensional Shipment	Tone only	Tone + "Dimensional Shipment"	None

The final results message lists defects sequentially, starting with the defect nearest the head-end. Location is given by axle number from the front of the train, including locomotive axles.

21.0 Procedures – Approaching and Passing Over HBDs

21.1 Approaching HBDs

When approaching a HBD…	
Locomotive Engineer	Must avoid **prolonged** use of train brakes where practicable, until the entire train passes the HBD. (This prevents false hot wheel and hot box alarms.)
Crew members	Must ensure the train radio is on the correct train standby channel.

21.2 Passing over HBDs

When the train reaches the HBD…	
Locomotive Engineer	**DMD** (Distance Measuring Device) – **Set the DMD as soon as the train reaches the HBD location**. (Distance helps identify defect location and identify when to expect the final results message. Axle count is unavailable until the rear of the train passes over the HBD.)
Crew members	**Radio** – Avoid using the radio system until after the final results message has been transmitted. (This prevents talking over a tone or announcement.)
	Verbal Communication – Confirm, while passing the HBD, any defects announced.

22.0 HBD Alarms and Procedures Summary

Note: If there was an announcement indicating “Hot box”, but the final results report “no alarms”, then resume speed and proceed without an inspection.

Note: If a Hot Box Detector is defective or temporarily out of service, the provisions of Section 8 Item 11.5(e) apply if operating a "Key Train".

Use this table to identify the appropriate HBD procedure for various events.

	Events	Procedure
A	Defect: **Dragging equipment** announced while passing HBD.	See item 23.1.
B	Defect: **Hot box** announced while passing HBD.	See item 23.2.
C	Defect: **Hot wheel** announced while passing HBD.	See item 23.3.
D	Defect: **alert tone only** while passing HBD.	If this is a dimensional shipment detector, then see item 23.4.
E	Final results message reports “**system not working.”**	a) If any **announcement** and/or **alert tones** were heard, then inspect the entire train following the procedures in items 23.1, 23.2, 23.3 and 23.4 as applicable. b) If **no** announcement and/or alert tones are heard, then inspect the train only if carrying SPECIAL dangerous and the HBD is noted by ** in the time table. See item 27.0.
F	Speed is **8 MPH or less** passing an operating HBD and final results message reports a **defect**.	**Inspect the entire train** following the procedures in items 23.1, 23.2, 23.3 and 23.4 as applicable.
G	Speed is **8 MPH or less** passing an operating HBD and final results message reports **NO defect**.	Inspect the train only if carrying SPECIAL dangerous and the HBD is noted by ** in the time table. See item 27.0.
H	Defect announced while passing the HBD, but message unclear or in doubt.	Reduce to **Slow Speed** and listen carefully to the final announcement.
I	Final results message reports defect, but the location is not heard or is in doubt.	Inspect the entire train following the procedures in items 23.1, 23.2, 23.3 and 23.4 as applicable.
J	No final results message received.	a) If any **announcement** and/or **alert tones** were heard, then inspect the entire train following the procedures in items 23.1, 23.2, 23.3 and 23.4 as applicable. b) If no announcement and/or alert tones are heard, then inspect the train only if carrying SPECIAL dangerous and the HBD is noted by ** in the time table. See item 27.0.
K	HBD withdrawn from service by GBO/DOB or by Operating Bulletin.	No inspection unless the train is carrying SPECIAL dangerous and the HBD is noted by ** in the time table. See item 27.0.
L	Incorrect axle count and the final results message reports No defects.	• No inspection unless the train is carrying SPECIAL dangerous and the HBD is noted by ** in the time table. See item 27.0. • See item 25.0, Incorrect Axle Count.

23.0 Alarm Procedures

23.1 Dragging Equipment

When an alert tone is followed by the announcement "dragging equipment"…	
Step	**Action**
1	Note the **DMD** reading.
2	**Stop** the train immediately using good train handling practices.
3	Perform a **stationary** train inspection. a) If the entire train **passes the HBD location before stopping**, then locate the defect using the axle count as per item 24.1. b) If the train is **stopped before the entire movement passes the HBD**, then locate the defect using the noted DMD distance as per item 24.2.
Note	**Do not pull ahead** to a crew member to perform the inspection, unless it is unsafe to walk back. If it is unsafe to walk back, then pull ahead not exceeding 10 MPH to inspect for defect. If the train must be pulled ahead over a **facing point switch**, do not exceed **5 MPH.**

23.2 Hot Box

When an alert tone is followed by the announcement "hot box"…	
Step	**Action**
1	Note the **DMD** reading.
2	Immediately reduce to **Slow Speed** using throttle modulation and dynamic brake, and without using the air brakes, if possible. • If a subsequent announcement states "dragging equipment" or the train will pass over a facing point switch, then **stop immediately** and follow the procedure for dragging equipment.
3	**Observe the train for defects.** If the defect is visible from the cab of the locomotive or there is an obvious indication of a derailment, then stop the train immediately and inspect. (See item 24.2, Locating Defects using Measured Distance.)
4	When the **rear of the train has passed the HBD** and the final results messages have been reported. • allow a crew member to detrain, and • pull the train ahead, **not exceeding 10 MPH**, to the defect. **Note:** If an inspection point is designated, then proceed, **not exceeding 10 MPH** (without stopping) to the inspection point.
Note	If the final results message reports more than **six alarms**, stop the train immediately and perform a stationary inspection (dragging equipment procedure applies). **Exception:** Provided there is no alert tone followed by a "dragging equipment" announcement or an uninspected portion of the train will not pass over a facing point switch, a pull-by inspection or combination standing/pull-by inspection is permitted at a speed **not exceeding 5 MPH**. During the pull-by portion, the back of the hand inspection (Item 11.2) should be used to test for overheated bearing(s). A stationary inspection must also be performed for any suspect defects found and at the location where the "hot box" announcement(s) was broadcast, based on DMD calculations.
Note	If the final results message reports "No Alarms" then resume speed and proceed without an inspection. (The final message corrects for inaccurate readings of converted plain bearing journals).
5	Perform a **stationary** inspection at the defect location. a) Locate the defect using the axle count as per item 24.1. b) See item 11.0, to test for overheated bearings.

23.3 Hot Wheel

When an alert tone is followed by the announcement "hot wheel"…	
Step	**Action**
1	Note the **DMD** reading.
2	Immediately reduce to **Slow Speed** using throttle modulation and dynamic brake, and without using the air brakes, if possible. • If a subsequent announcement states "dragging equipment" or "hot box," then follow the procedure for that alarm.
3	**Observe the train for defects**. If the defect is visible from the cab of the locomotive, then stop the train immediately and inspect. (See item 24.2, Locating Defects using Measured Distance.)
4	When the **rear of the train has passed the HBD** and the final results messages have been reported: • allow a crew member to detrain, and • pull the train ahead, **not exceeding 10 MPH**, to the hot wheel defect. **Exception**: If an **inspection point** is designated, then proceed to the inspection point, not exceeding Slow Speed and perform the inspection.
	Note: If the final results message reports more than **six alarms**, stop the train immediately and perform a stationary inspection. **Exception:** Provided there are no alert tones followed by a "hot box" or "dragging equipment" announcement, a pull-by inspection or combination standing/pull-by inspection is permitted at a speed not exceeding 5 MPH.
5	Perform an **inspection**. a) Locate the defect using the axle count as per item 24.1. b) To inspect for the hot wheels, see item 12.2, Hot Wheels (En route).

23.4 Dimensional Shipment

This instruction applies only to **HBDs equipped with dimensional shipment detectors**, as listed in the time table subdivision footnotes.

When an alert tone is heard <u>without</u> an announcement…	
Step	**Action**
1	Note the **DMD** reading.
2	Immediately reduce to **Slow Speed** using throttle modulation and dynamic brake, and without using the air brakes, if possible. • If a subsequent announcement states "dragging equipment" or "hot box," then follow the procedure for that alarm.
3	**Observe the train for defects.** If the defect is visible from the cab of the locomotive, then stop the train immediately and inspect. (See item 24.2, Locating Defects using Measured Distance.)
4	When the **rear of the train has passed the HBD** and the final results messages have been reported: • allow a crew member to detrain, and • pull the train ahead, **not exceeding 10 MPH**, to the dimensional shipment. **Exception**: If an **inspection point** is designated, then proceed to the inspection point, not exceeding Slow Speed and perform the inspection.
5	Perform an **inspection**, using axle count to locate the defect as per item 24.1.

24.0 Procedures for Locating Defects

24.1 Locating Defects using Axle Count

When available, use axle count to locate defects (rather than distance measured using the DMD).

Step	Action
1	Note the location of the defects stated in the final results message.
2	**Locate the defects** by counting the actual axles from the front of the train, beginning with the lead locomotive. Ensure cars and locomotives with other than four axles are **not** counted as having four axles.
3	**Inspect the train** in the specified location. • If a defect **is found** at or near the indicated location, then inspect both sides of the train for **8 axles in each direction** from the suspected defect. (This helps verify that the defect has been correctly identified.) • If a defect is **not found** at the indicated location, then inspect both sides of the train for **16 axles in each direction** from the indicated location.
4	If any part of the train passed the HBD at **8 mph or less**, then inspect the entire train for additional defects.
5	**Notify the RTC** of the inspection results and take appropriate action (e.g., make repairs, set off car, etc.).
6	Complete the **reporting requirements**. See: • item 16.0, Reporting Detention or Defects, and • item 17.0, Crew Information Form.
7	If the defect was a suspected **hot box** and **no defect was found**, see item 26.0, No Defect Found - Hot Box.
Note	Alarms from hot wheel detectors and dragging equipment detectors can only indicate the general vicinity of the alarm, rather than an exact location.

24.2 Locating Defects using Measured Distance

When axle count is unavailable, locate defects using DMD distance measured.

Step	Action
1	Determine the approximate location of the defect by using the: • noted **DMD** distance, and • **train consist information** (e.g., train length 2000 foot indicators, etc.)
2	**Inspect** the train at the measured location. • If a defect **is found** at or near the indicated location, then inspect both sides of the train for **8 axles in each direction** from the suspected defect. (This helps verify that the defect has been correctly identified.) • If a defect is **not found** at the indicated location, then inspect both sides of the train for **16 axles in each direction** from the indicated location.
3	Inspect the entire train for additional defects.
4	**Notify the RTC** of the inspection results and take appropriate action (e.g., make repairs, set off car, etc.).
5	Complete the **reporting requirements**. See: • item 16.0, Reporting Detention or Defects, and • item 17.0, Crew Information Form.
6	If the defect was a suspected **hot box** and **no defect was found**, see item 26.0, No Defect Found - Hot Box.

25.0 Incorrect Axle Count

When a HBD reports an incorrect Axle Count…	
Step	**Action**
1	Advise the RTC of the incorrect axle count and arrange to verify train consist information. • If the train is carrying an additional car or cars and any of these are dangerous goods cars, then arrange for a radio waybill (Section 8, item 3.9).
2	Use Form 125 (or any other appropriate form) to record the correct information.
3	If the train has **placarded cars**, then update the train consist to show the correct position of all placarded cars. (See Section 8, item 4.0.)
4	If the train has SPECIAL dangerous or is a Key Train, then see item 27.0.

26.0 No Defect Found - Hot Box

Whenever a car or engine is identified by an alarm for the defect "hot box" at the same axle location twice within 75 miles, and there is no apparent reason for the alarms, that car or engine must be set off at the designated set-off point.

Note: Also see Section 8 Item 11.5(d) "Key Trains".

Important: At crew-change points, leave the relieving crew a copy of ***Form 1225*** and ***Crew Information Form*** for any car or engine remaining on the train that was identified by a "hot box" alarm within 75 miles of the crew change point.

Exception: Business car CP 99 (Display Car) is equipped with a low slung generator that when operating, may trigger a false "Hot Box" alarm. Providing business car personnel perform a bearing temperature test and no excessive temperature is present, CP 99 is exempt from the requirement of Item 26.0.

26.1 Passing Occupied Service Equipment cars

In the event that a car or engine is identified by an "hot box" alarm and no defect is found. Such train or engine is restricted to a maximum of 10 MPH while passing occupied service equipment cars as identified by GBO, until passing the next operational detector with no "hot box" alarm.

27.0 SPECIAL Dangerous at Double Asterisk (**) HBD – Mandatory Inspection

HBD identified in the time table by a double asterisk (**) indicate mandatory inspection points for trains carrying SPECIAL dangerous commodities. **Note:** the HBD must report a complete and accurate inspection.

a) If a train carrying SPECIAL dangerous commodities passes a HBD identified with a double asterisk and:

- the HBD is withdrawn from service,
- the HBD reports "System Not Repeat Not Working" or is otherwise known to be inoperative,
- any part of the movement passes the HBD at 8 MPH or less,
- no message is received, or
- the HBD reports "No alarms", however indicates an incorrect axle count which cannot be verified by the RTC.

then inspect the train **within one mile** of the mileage shown in the subdivision footnotes or at the designated inspection location.

Note: In addition, the provisions of Section 8 Item 11.5 e) (30 MPH speed restriction) apply to "Key Trains" at these locations.

b) Perform the inspection:

- on both sides,
- from the front of the train to and including eight axles behind the last full carload, containerload, or trailerload of a SPECIAL dangerous commodity,
- at a speed not exceeding 5 MPH.

c) The inspection can be performed by:

- Mechanical department inspectors,
- Crews of standing movements,
- A pull-by inspection by crew members, or
- A standing inspection.

28.0 Defective HBDs

a) An HBD is considered defective when:
- transmits a message to "inspect the entire train".
- does not transmit any messages.
- transmits an improper message.
- transmits a message difficult to hear or understand.
- transmits the message "system not repeat not working".

The following are not considered as a defective HBD.
- inaccurate axle count, except in the application of Item 27.0 or if the count is exceedingly inaccurate.
- reports a defect, but upon train inspection there is no defect found.

b) RTC must be notified for any of the above conditions, include appropriate details such as:
- HBD location,
- defect axle number,
- suspect car number,
- train direction,
- side of train, and
- type of defect reported by the HBD.

29.0 Hot and Cold Weather Speed Zones

Note: Cold Weather Temperature Speeds do not apply to passenger trains.

a) During extreme hot and cold weather, trains are governed by specific speed restrictions. The speed restrictions / zones, and specific hot & cold temperature ranges are specified by Time Table instruction, Operating Bulletin and/or Summary Bulletin (SB).
- The HBD temperature announcement prior to the mileages stated, or as determined by thermometer, will govern speed until the next HBD transmission.

b) The conductor must:
1. Record the temperature on the Crew Information form (Other important information to subsequent crews section).
2. Advise the RTC when a Hot or Cold weather speed restriction goes into effect and when it is terminated.
3. Transfer this information to the relieving crew, when applicable.

29.1 Cold Weather Speed Exemption Zone (CWSEZ):

Based on WILD detector reports, trains may be exempt from Cold Weather Speed Restrictions when operating in a CWSEZ. The area between each WILD detector location, is classed as a CWSEZ.

To be exempt from the cold slow requirements within a zone, the following procedures and conditions apply:
• Conductor must advise the RTC as per paragraph (b) when cold slows are in effect. There are two temperature ranges that apply in determining if a train is exempt (-25 to -29 and -30 to -34). It is important that the RTC be advised of the temperature when reporting that a cold slow is in effect, as it will govern the exemption status.
• If operating within a CWSEZ, the RTC will advise the crew if they are exempt from the speed requirements as indicated.
Note: Prior to receiving exempt status for a CWSEZ, the Crew and the RTC must confirm with each other that no additional equipment has been added to the train since passing the WILD detector governing entrance into the CWSEZ. If equipment has been added to the train (including locomotives) after passing the WILD detector, the cold slow exemption does not apply.
• In the event that the next available temperature readout indicates that the train is operating under a different temperature range, the RTC must be advised as the exempt status may change.
• The speed exemption will only apply to the specific zone being operated in. When the train passes the next WILD detector, if the cold slow is still in effect, the crew must check with the RTC to confirm if the train is still exempt. Note: After passing a WILD detector, it can take up to 10 minutes (4 mins is the average) for the system to process the train and results to be available. If the RTC is unavailable or the information is not yet accessible, the cold slow must be applied until the information is available.
• When applicable, exempt status must be transferred to relieving crews. If in doubt, the crew must obtain the current temperature and confirm with the RTC if exempt status still applies

Note: Cold Weather Speed Exemptions do not apply when temperature is –35 or colder.

General Operating Instructions (GOI)

Section 6 – 10/14/2015

TIBS Instructions

TABLE OF CONTENTS

1.0 Trains Operating With Train Information Braking Systems (TIBS)

1.1 When the term “display unit” is used in these instructions, it refers to HOT, CLU, IDU, CDU, IFD, ICE or FIRE

1.2 Integrated Function Display (IFD), Integrated Cab Electronics (ICE) and Functionally Integrated Railroad Electronics (FIRE)

The IFD is the operator’s screen on GE AC locomotives; ICE or FIRE are the operator’s screen on EMD locomotives.

The integrated displays use a HOT device located in the electronics alcove or high voltage cabinet of the locomotive.

The HOT devices come in two colours, Black for normal operations and Orange for those equipped with a SBU repeater feature (See Item 9.0).

1.3 Disconnecting Head-End Display Unit

When disconnecting the display unit, place the radio circuit breaker in the OFF position and then disconnect the twist lock connector.

Once the twist lock connector is removed, it is to be placed in the dummy receptacle (where provided) and the display unit keyed to indicate the test ID code of 00000.

Note: To disconnect the display unit on 9000 series locomotives, the circuit breaker marked ETU is to be placed and remain in the OFF position.

2.0 TIBS ARMING & DISARMING

2.1 ARMING of TIBS is to be performed as follows:

1	Enter the ID Code of the SBU assigned to the train into the display unit.
2	When the test button on the SBU is pressed, the display unit will sound an audible alert and display “ARM NOW” for five seconds.
3	To ARM the display unit, the COMM TEST button must be pressed within the five second interval in which the “ARM NOW” display is shown. This will cause the display unit to indicate “ARMED.”
Pressing the button in advance of the “ARM NOW”, will cause an audible alarm and the display will flash “NOT ARMED.” The display will revert to normal, with a “U” displayed in the COMM field, or the NOT ARMED indicator will be illuminated. Locomotives equipped with an IFD will display “EOT EMERG STATUS DISABLED.”	

2.2 Once TIBS is armed, if the display unit ID code is changed from that to which the system is armed, the display or light will flash NOT ARMD. After a brief period the system will revert to normal display accompanied by “U” or “NOT ARMED” light as a reminder that the display unit is not armed to the ID code entered therein. Locomotives equipped with an IFD will display “EOT EMERG STATUS DISABLED.”

2.3 IFD Arming Procedure

A	There are **two** varieties of IFD.
	Check EOT Status window. If it displays “Armed” you must disarm it before arming to a new SBU ID (See Disarm Procedure). If it does not display “Armed,” continue with the arming process.
	Select “EOT Setup” Screen
	CP GE AC 4400 Locomotives
	• Use Arrow keys to enter new EOT Code. • Press F6 ‘Enter Code.’
	CP GE EVO Locomotives
	• Press F3 ‘Modify ID Code’. • Use 0-9 keys to enter new EOT code. • Press F7 ‘Accept’.
	Note: On all CP GE AC’s, the % battery used indicator is not functional. It will show *** or an incorrect percentage.
B	• Personnel at end of train is instructed to press button on the SBU. • EOT Status flashes “Arm Now.” F7 flashes ‘Arm Two Way.’ • **Press F7 immediately.** You have only 3 seconds to do this. • If successful, EOT Status window reads ‘Armed.’ • ‘Rear’ indicates air pressure at end of train.
	Note: The EOT Comm Test window does not update when armed and so may indicate ‘failed.’ You must press the Comm Test button to get the corrected indication.

2.4 Disarming SBU (TIBS)

After the locomotives are cut-off from a train which has arrived at its terminating location, the locomotive engineer must disarm the TIBS emergency feature as follows:

On a GE ACs…
press **EOT Setup, Request Disarm** and **Disarm Two-Way.**
On EMD (Fire Screen)
press **EOT IDENT**, **EOT 00000,** and **UNARM TWO WAY.**
On locomotives…
with HOT, set the display unit to SBU test code **00000** and press the **COMM/ARM** button to disarm the SBU.
On locomotives…
with Invensys HOT (Q3467), press the Menu button once, and the display will show Enter EOT# nnnnn. Press the CLEAR/NO button to clear the EOT number and then press the ENTER/YES button to accept.

3.0 Operation - Sense and Braking Unit (SBU)

3.1 SBU Model 6695

Test Button Operation
Note: The test button must be pressed and held until the display shows the feature desired.
Menu Items …
1 - PRESSURE
Releasing the test button when the word “PRESSURE” appears allows you to read the brake pipe pressure.
2 - ARM
ARMING: Releasing the test button when the word “ARM” appears will start the “ARMING” sequence.
3 - TEST
Releasing the test button when the word “TEST” appears will start a self-test. The SBU display will scroll the following items during the test.
Display
CANADIAN PACIFIC RAILWAY - DIGITAIR REV 5
BATTERY OK##
BATTERY LO##
BATTERY WEAK
BATTERY REPLACE
SELF TEST GOOD
PRESSURE P ###
4 - PHOTOCELL
Releasing the button when the word “PHOTOCELL” will test the HVM operation. Pressing the test button again ends the test.
5 - LITE
Releasing the button when the word “LITE” appears will activate the HVM, which will continue to flash with no air pressure and light present. THIS FEATURE IS NOT USED ON CP. If selected by mistake, lay the SBU gently on its side to deactivate.
During pre-installation testing of the Model 6695 at locations not equipped with an air supply and/or test CLU/IDU, the following pre-installation tests must be performed: • Install fully charged batteries. • Depress the test button and release when the display indicates “TEST” and observe the test procedure. • Ensure the display indicates “Self Test Good” and does not indicate “Battery LO##,” “Battery WEAK##,” or “Battery REPLACE.”
Enhanced train consists will indicate when a train is equipped with a Model 6695 SBU.

3.2 SBU Model ATX – Air Turbine

The *TrainLink®* ATX …is equipped with an air turbine generator that operates over a pressure range of about 50 to 125 psi*. It will operate in the same environmental conditions as a standard EOT (SBU).

They also have a built-in battery *for backup purposes* when the air supply is cut off, which can keep the SBU operating for up to 12 hours on full charge.

***Note: The *TrainLink®* ATX (Air Turbine) EOTs (SBUs) should not be routinely operated at pressures greater than 100 psi, since this may significantly shorten the projected lifespan of the unit.**

Air must be applied to the EOT (SBU) for startup. When air is present on the EOT (SBU), the alternator supplies electrical power and charges the back-up battery.

Note: Upon power up of the ATX SBU, the read out information is different than the existing equipment.

The *TRAINLINK®* ATX will scroll through the following displays on each button press:

- "**WRE**" Wabtec Railway Electronics.
- "**EOT**" and then "**ATX**" are displayed.
- "**VERS**" X.XX where X.XX is the EOT (SBU) software version.
- "**PSI**" where XX is the brake pipe pressure.
- "**VGEN**" where XX is the Air Generator voltage.
- "**V**" where XX.X is the battery voltage.
- "**IBAT**" where X.XX is charging current or "**NIBA**" where X.XX battery sourcing current.

To shutdown the ATX EOT press and hold the test button for 3-5 seconds (pressure must be zero for this feature to be active). The unit will also shutdown automatically when tilted horizontally for 5 minutes.

3.3 ATX Operation in Winter

In normal operating conditions the ATX SBUs can recharge their backup battery, however the battery's recharging capability diminishes as the temperature drops further below freezing and at extreme cold temperatures below -15C (5F) the SBU will not be able to recharge its backup battery.

It is important that in freezing temperatures below -10C (14F) ATX SBUs are not operated for an extended duration when *the air supply is cut off*; otherwise this would deplete the backup battery and generate "low battery" alarms. The ATX SBU must then be sent to a Radio Shop or Car Shop for recharging on the ATX chargers.

In horizontal or tilted position ATX SBUs shut down automatically in 5 minutes without air pressure. In upright position attached to a car's coupler -- but with no air supply -- it will **not** shut down automatically, it will continue to operate until the backup battery is depleted.

Therefore, **in cold temperatures below -10C** ATX SBUs on the coupler should not operate for more than an hour when the air supply is cut off. If conditions permit, the ATX SBU must be shut down manually by holding the TEST button for 5 seconds. The SBU will turn on automatically when the air pressure resumes.

4.0 Operation of Highly Visible Marker (HVM)

The OFF/ON status of the HVM is indicated on the display unit in the locomotive cab.

4.1 Manual HVM Light Test

To perform a manual test on the HVM during daylight hours, activate the SBU and cover the photo-electric cell. This test will only be performed at the location where the SBU is initially installed on the train.

4.2 Automatic HVM Light Test

The HVM will self-test when a train has been standing for at least 30 seconds, and then starts moving. During daylight hours, a marker light ON indication will appear briefly on the display unit. During darkness, the photo-electric cell will keep the HVM activated continuously.

- If the marker light ON indication does not appear with first movement, the HVM may be defective.
- If the replace battery indication is displayed, the batteries may be too weak to turn the light on.

5.0 Operation of IDU

5.1 POWER ON SEQUENCE

When the power is first applied, a series of self-diagnostic tests will cause displays as follows: DIGITAIR, 6650 J20, and **** ****

5.2 All characters will remain displayed until receipt of a message bearing the same ID code.

5.3 The buttons on the IDU labelled **C** and **D** have no application on CP. The button marked **P** is used to adjust the brightness of the display panel.

5.4 In addition to continuously displaying information relevant to the rear of the train, the IDU provides audible warnings for: LOW PRESSUE, NO AIR, LOSS OF COMUNICATION, BATTER STATUS, FAILURE OF THE EMERGENCY VALVE, HVM STATUS CHANGES and ARMING STATUS.

6.0 Operation of Model 6656 HOT

6.1 The CDU is provided with a **VIEW** Key and a **SET** Key.

VIEW Key:	Used to select available functions.
SET Key:	Used to set parameters of functions selected with the **VIEW** key.
When **ID** function is selected:	Pressing the **SET** key once will activate SET ID mode and enable entry of a new ID code.
When **SET** key a second time:	It will cause the CDU to store the new ID and the alphanumeric display will indicate STORING.

6.2 Functions which may be selected with the **VIEW** key are:

- VOLUME
- LAMPTEST
- BLANK
- return to previous stored ID code

6.3 Using the **SET** Key

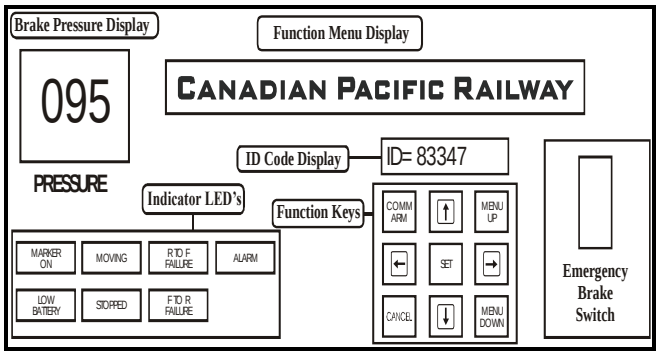
Used in **SET ID** mode:

- a flashing digit is displayed in leftmost position of the Numeric Display;
- the **ODOM** Key and **DIM** Key take on the arrow functions;
- to change the value on the Numeric Display, use the Arrow Keys **[→←]** or **[↑↓]** to select and change the digit(s);
- when the desired ID code has been entered, press the SET Key again to store it.
- to cancel, or return to original ID code selection, press VIEW key. CANCEL will be displayed accompanied by an audible tone.
- Used to adjust volume of the SONALERT audible tone. Each press of the SET Key will change the volume.
- Used in LAMPTEST mode: Verifies operation of all Front Panel Display LEDs.
- Used in BLANK mode: Extinguishes all displays except pressure.

6.4 Using the **DIM** Key adjusts brightness of the Front Panel Display LEDs.

6.5 It is essential that the ID code entered into the display unit matches that of the SBU installed on the train, thereby preventing display of erroneous information.

7.0 Operation of Model 6696 HOT



7.1 Functions which may be selected with "MENU UP" or "MENU DOWN" are:

- Change ID
- Change train length
- Odometer
- TL Distance
- Measured mile
- Disarm
- Change loudness
- Change brightness
- Self test

7.2 Changing ID Code

1 To change the ID code:	Press the **MENU UP** or **MENU DOWN** key until the function menu display reads "change ID #####". The ID code is changed by using the **[→]**or **[←]** keys to select digits to be modified. The current active digit flashes. Use the **[↑]** or **[↓]** keys to increment or decrement the selected active digit.
2 Once the ID code has been selected:	Press the **SET** key to store the new ID code.
3 Function menu display will read:	"Saving..." followed by "Press **SET** to change to One-Way" followed by "New ID #####" Do not press **SET** while is displaying "Press SET to change One-Way". This will time-out after 2 seconds. **Note:** The one-way option has been disabled. If a CDU is found that still has this menu choice available, please tag it bad order with a note describing the problem.
4 The alarm indicator will flash ON accompanied by 5 beeps from the sonalert and "ID Code Display" will show:	"ID = #####" alternating with "NOT ARMED".
5 The locomotive engineer then alerts the employee at the rear of the train via voice radio to proceed with arming.	The employee at the rear of the train momentarily presses the **TEST** button on the SBU.
6 When the CDU receives the request to arm message, it prompts the locomotive engineer for a response. The function menu display reads:	"PRESS COMM/ARM TO ARM" for five seconds accompanied by beeps from the sonalert.
7 If the locomotive engineer presses the **SET** key during the 5 second window, the system will arm and the CDU will then briefly display:	"SYSTEM IS NOW ARMED" The NOT ARMED alarm indication will turn off.
8 If the **SET** key is not pressed during the 5 second window, or if the SBU doesn't respond as described above, the function menu display will briefly show:	"ARMING FAILED". <u>In this case, the process must be repeated from Step 5 above.</u>

7.3 Entering the Train Length

1 To view the current train length or enter a new one.	Press the **MENU UP** or **MENU DOWN** key until the function menu display reads: "Change train length ##### ft"
2 Use the [→] or [←] key to select the digit(s) to be modified. Use the [↑] or [↓] to increment or decrement the selected active digit.	
3 Once the desired train length has been selected:	Press the **SET** key to store the new value.

7.4 Using the Train Length Distance Function

1 To use the Train Length Function:	Press the **MENU UP** or **MENU DOWN** key until the function menu display reads: "TL Distance press **SET**". As the lead locomotive passes the initial starting point, press **SET** and the displayed length will decrement accordingly. The display will always indicate the distance to go before the end of the train is clear of the point to be passed.
2 Press **CANCEL** key to reset the train distance function.	

7.5 Measuring Distance Travelled Using the Odometer

1 To use the Odometer:	Press the **MENU UP** or **MENU DOWN** key until the function menu display reads: "Odometer press **SET**".
2 To measure distance:	Press the **SET** key. The function menu display reads: "Odometer 00000 ft". The 5-digit count is initially set to zero and, as train moves, it begins to count the distance.
3 Press the CANCEL key to reset the odometer function.	

7.6 Calibrating the Odometer Using a Measured Mile

Calibration of the Odometer is used to compensate for locomotive wheel wear and differences in wheel diameter from one locomotive to another. The allowable range of locomotive wheel diameters is 34.00 inches through 46.00 inches. The CDU default is 38.1 inches.

1 To calibrate using a measured mile:	Press the **MENU UP** or **MENU DOWN** key until the function menu display reads: "Measured Mile press **SET**". When the zero mile marker is passed: Press the **SET** key to begin the measurement. The function menu display reads: "Press **SET** at End of Mile ##### ft".
2 When the one mile marker is reached:	Press the **SET** key a second time to mark the end of the mile and to calculate the new wheel size.
3 If the measurement is such that the calculated wheel size falls within the permitted range, the calibration passes and the sonalert will beep once to indicate that the measurement is completed.	For example: If the function menu display reads: "4954 ft, corrected to 5280 ft".
4 However, if the measurement is such that the calculated wheel size falls outside of the permitted range, the calibration fails, the sonalert will beep once.	Function menu display reads: Measured Mile FAILED".

7.7 Change Display Panel Brightness

Using menu item "Change Brightness" adjust the display brightness using **[↑]** or **[↓]** keys, accept setting with the **SET** key.

7.8 Change Loudness Sonalert

Using menu item "Change Loudness" adjust the beep loudness using **[↑] or [↓]** keys, accept setting with the **SET** key.

8.0 Operation of Invensys HOT Model Q3467

8.1 Functions which may be selected with "MENU" button are:

- Enter EOT#
- Change brightness
- Change beeper volume
- Current wheel size
- HOT serial number
- Return to normal display

8.2 Entering EOT

1 To enter EOT #:	Press the **MENU** button until the function menu display reads “Enter EOT#*****. Enter the EOT number and then press the ENTER/YES button on the numeric keypad. The Q3467 will display the EOT number entered and "DISARMED" in the 16-character display. The “EMERG DISABLED” indicator should be illuminated.
2 Comm Test:	Once the EOT marker number is entered, a COMM test can then be performed by pressing the COMM TEST/ARM button. The Q3467 HOT will transmit a COMM test message to the EOT. Results (COMM TEST PASS or COMM TEST FAIL) are displayed on the 16-character alpha-numeric display. EOT status information regarding rear pressure, marker light, and EOT motion will be displayed. **Note:** It is recommended that a successful COMM test should be completed before attempting to arm the Q3467 to an EOT device.
3 Arming to an EOT:	Once a successful COMM test is completed, the EOT system can be armed for 2-way operation. The arming sequence is initiated from the EOT device by pressing the arming button on the EOT. When the EOT transmits a request to arm message, the Q3467 HOT device will display "xxxxx * ARM NOW *" (xxxxx is the EOT number) on the alpha-numeric display. Press the COMM TEST/ARM button on the front panel of the Q3467 to arm the HOT system. When armed, the HOT will display "xxxxx * ARMED *". The "EMERG ENABLED" indicator on the front panel of the Q3467 HOT will be illuminated.

8.3 Measuring Distance Using the Odometer

1 To use the Odometer:	Push the COUNT/HOLD/DONE button on the front panel of the Q3467 HOT. The acceleration/odometer indicator should display "0". The odometer will increment, indicating the total distance traveled in feet. If a reverse move is made while in the odometer mode, the counter will decrement the distance.
2 To stop the counter:	Push the COUNT/HOLD/DONE button on the front panel. This will stop the counter.
3 To return to the acceleration mode:	Push the COUNT/HOLD/DONE button on the front panel.

8.4 Acceleration Mode

To use the Accelerometer:	When not in the odometer mode, the display will indicate acceleration / deceleration.

8.5 Disarming

To disarm, press the Menu button once, and the status display will show Enter EOT# nnnnn (where nnnnn is the current EOT number entered). Press the CLEAR/NO button to clear the EOT number and then press the ENTER/YES button to accept.

9.0 CLU (HOT) Repeater Device

9.1 The Quantum Engineering Q3442 CLU or Head Of Train (HOT) device incorporates "in-train" repeater and standard CLU functions in one enclosure. The mode of operation is selected via a two position switch located on the front of the unit. The Q3442 can be used as a Head-of-Train device or as a Repeater device on a remote locomotive to ensure communications between a Head-of-Train device and an End-of-Train device.

9.2 To use as a normal CLU device on a lead locomotive, ensure that the toggle switch is in the "HOT" position. The device will perform the same as our current CLU's and no difference will be noted on the display screen of the locomotive.

9.3 To use as a repeater on a remote, once the device is installed (same as a normal CLU), place the toggle switch in the "REPEATER" position and on the remote locomotive screen, enter the SBU number that will be used on the train. There is no arming required or comm check needed on the remote, all that is needed is to enter the SBU number.
Once the lead locomotive is armed to the SBU, the repeater will monitor messages from the lead locomotive and the SBU and repeat them. There is no indication on the lead locomotive that the device is operational, if the device fails, the only indication would likely be a noticeable increase in communication losses with the SBU.

10.0 Emergency Braking Feature

To activate the emergency braking feature of the SBU, lift the red safety cover located on the display unit or control stand and move the EMERGENCY toggle switch upwards.

11.0 Communications Test

If communications problems are suspected, continuity may be tested by pressing the COMM TEST button. When the button is pressed a "+" or "reply pending light" will appear briefly. Disappearance of either of these indications verifies continuity of communications. Locomotives equipped with an IFD will display COMM TEST PASSED.

If the "+" symbol, or "reply pending light" remain displayed, the COMM TEST button must be pressed three times in rapid succession. If this fails to overcome the problem the train should be moved one train length and the test repeated.

Model 6696 CDU

If communications problems are suspected, continuity may be tested by pressing the "COMM ARM" button. When the button is pressed a **"WAITING FOR REPLY"** message is briefly displayed on the "Function Menu Display," followed with brief message **"COMM TEST OK."**

If the "Function Menu Display" reads **"COMM TEST FAILED"** for 2 seconds, the "COMM ARM" button must be pressed three times in rapid succession. If this fails to overcome the problem the train should be moved one train length and the test repeated.

Note: A manual COMM TEST must be performed at run through locations to verify TIBS is operating as intended.

12.0 Alarms

12.1 The display unit automatically detects and displays alarms accompanied by an audible alarm for the following conditions:

- Rear-to-Front Communications Failure
- Front-to-Rear Communications Failure

  Note: After a brief interval, the display will revert to normal pressure display, or accompanied by a; ← or F→ R **NO COMM**, and remain until continuity is restored.

- EMERGENCY Valve Circuit Failure

  Note: The display will then revert to displaying normal readings, accompanied by either a V or a steady VALV FAIL light.

  If any VALV FAIL alarms are experienced, EMERGENCY BRAKING FEATURE must be considered inoperative. Employees will be governed by instructions included in item 18.0.

- No air
- Telemetry battery weak
- Replace telemetry battery
- Replace HVM battery
- Low pressure
- Not armed
- Service, NO DATA or I/O ERR - Any one of these displays indicates that the display unit is faulty and requires servicing by qualified personnel.

12.2 On locomotives equipped with an IFD, possible alarm displays are:

EOT COMM	Will light YELLOW when a condition of Front to Rear or Rear to Front communication failure exists; REAR pressure display will show ***(RED).
EOT EMERG STATUS DISABLED	Locomotive engineer take note, another alarm indicator may be lit.
EOT BATT	Will light yellow if SBU battery is weak. Will light red if SBU battery is dead; REAR pressure display will show ***(RED).
EOT VALVE	Will light yellow if SBU Valve Circuit fails; REAR pressure display will show ***(RED).
REAR	Last car pressure will display WHITE if over 45 psi or RED if below 45 psi.

13.0 Pre-Testing of TIBS Components:

a) To facilitate testing, an air supply and a test HOT / SBU will be required for separate testing of each component.

- HOT test must confirm the lead locomotive can initiate an emergency signal to an SBU by use of the TIBS emergency feature (toggle switch).
- SBU test must confirm that an emergency application signal initiated from a test HOT or the assigned locomotive will cause an emergency application on the last piece of equipment on the train via the SBU that is assigned to that train.

b) Upon successful completion of the above tests, train crew must be notified of the results.

c) Provided the tests have passed on the components, once communication is confirmed by a successful COMM TEST between the lead locomotive and the SBU on the train, no further SBU test will be required at that location.

14.0 Pre-installation Testing of SBU:

The following pre-installation test must be performed to verify the SBU is operating as intended prior to installing on a train.

a) Install fully charged batteries (if required).

b) Depress the test button and observe the power up sequence of the SBU.

Note: Successful performance of the above is verification that the SBU is operating as intended. Arming and TIBS tests must be performed as required by operation instructions.

15.0 Pre-Departure Testing of TIBS

If the components have not been pre-tested as per item 13.0, the following must be performed when the locomotive is attached to the train with the assigned SBU installed.

15.1 Pre-departure testing of TIBS will only be performed at the location where the components of TIBS are initially installed on the train. Once a pre-departure test of TIBS has been performed, such test will not be repeated unless one of the components has been changed out.

15.2 Pre-departure testing of TIBS will be performed by train crews and/or other qualified personnel. At locations where this test is performed prior to the train crew coming on duty, the fact that the equipment has been tested shall be documented on the Train Brake Status form and the crew must record this information on the Crew Information form. At locations where the crew performs the test, the crew must record this information on the Crew Information form (see example of form filled in).

Pre-departure test procedures for TIBS shall be conducted as follows:	
A	The head-end crew or other qualified person, must enter the ID Code of the SBU assigned to that train into the display unit.
B	When the air pressure has been applied to the SBU it must be verified that pressure is shown on the display unit.
C	Depress the SBU test button and confirm that pressure is displayed in the viewing window.

D	As soon as the display unit indicates ARM NOW, the person performing the test shall depress the COMM TEST button or ARM 2-WAY switch and verify the display ARMED is given, indicating the display unit is authorized to the SBU assigned to that train.
E	Instruct person on the locomotive to perform a COMM TEST in accordance with item 11.0.
F	After the brake-pipe has been charged to not less than 48 psi., close the angle cock on the lead end of the rear car and verify that the display unit shows pressure.
	Note: It is acceptable to leave rear car angle cock open, but for next step **(G)**, verify emergency brake application propagates from SBU through to leading locomotive.
G	Instruct the person performing the test to activate the emergency feature and verify that the SBU initiates an emergency brake application on the rear car and that the display unit indicates 0 psi.
H	The EOT (SBU) pressure must remain at **0 PSI** for at least **30** seconds before the emergency valve will close and allow the EOT to recover. Failure to do this will result in a "**VALVFAIL**" message at the LCU (IDU). After creating the emergency brake application and all air is exhausted from the brake pipe, the solenoid valve on the SBU will reset (30 Seconds) and air may be reapplied. Open the angle cock on the rear car and confirm that the pressure is again being displayed on the display unit.
Note: If a brake application is in effect to hold the train, prior to the angle cock being opened, the engineer must reduce brake pipe pressure to 55 psi (equivalent of a 35 psi reduction) to prevent the possible release of the train brakes. **CAUTION:** If the brake application was applied in a state of false gradient, a undesired release may occur when the air is cut in.	
I	Perform the required brake test.
J	At run-through points, pre-departure testing consisting of a COMM TEST, will be made by the outbound crew to verify TIBS is operating as intended.

Example:

Train	Lead Locomotive	Date	TIBS/TE Remote - Emergency Brake Feature
# 401-09	# CP 9510	25 / 12 / 03 DD MM YY	SBU/Remote# 88893 tested by Carman Jones (PLEASE PRINT) at 10:10 time Toronto location

15.3 Pre-departure testing of TIBS on trains with Remote Locomotive on Extreme Rear of Train (If equipped).

See Section 2 Item 12.7.

16.0 Installation of Display Unit

During installation of the Display Unit, the radio circuit breaker must be placed in the OFF position until such time all power and antenna connections have been made.

17.0 Shop Track Tests of DIGITAIR Display Unit

17.1 It must be known that the display unit is operating as intended prior to departure from diesel shops. Test SBUs bearing the test ID code of 00000, are located in diesel shops at major terminals.

Note: On locomotives equipped with an IFD, do not attempt shop track 00000 test.

17.2 To test the display unit, the following series of functions must be performed in the following order:

A	Enter the test ID Code 00000.
B	Place the radio circuit breaker in the OFF position.
C	Place the radio circuit breaker in the ON position.
D	Observe the following sequence of displays; • DIGITAIR • 6650 JXX (e.g.: J20) • **** **** displayed with all screens lit (or three dashes - - - in the pressure field.) **Note:** Prior to transmitting a COMM TEST command, if the Display Unit displays other than listed above, it is indication that another Display Unit is being tested. If this should occur, you must wait for the display to indicate NO AIR prior to transmitting a command from the equipment you are testing.
E	Perform a COMM TEST which will cause the test SBU to be activated and transmit a series of displays and alarms.
F	Once the COMM TEST is initiated, observe the Display Unit, noting that displays and alarms appear in the following order: • ARMED • pressure display of 125 psi and HVM light ON indication • pressure display of 100 psi.

G	The EMERGENCY BRAKING FEATURE must be activated immediately upon display of 100 psi. This will cause the following displays: • a * in the COMM Field and 100 psi. (or reply pending light and 100 psi.) - LOW PRES - 0 psi Brake Pipe Pressure - NO AIR
	Note: Once the display of NO AIR is given, the display unit is to be considered operating as intended. When departing the shop track the ID CODE of the SBU assigned to that train must be entered.

17.3 On trains which originate at locations not equipped with test SBUs, the following test sequence must be performed, to confirm the Display Unit is operating as intended.

A	Set and ARM the display unit to ID Code 00000.
B	Place the radio circuit breaker in the OFF position.
C	Place the radio circuit breaker in the ON position.
D	Observe the following sequence of displays: • DIGITAIR • 6650 JXX (e.g.: J20) • **** **** display with all screens lit (or three dashes - - - in the pressure field.) **Note:** Once the locomotive(s) are on the train, the Display Unit must be ARMED in accordance with items 2.0 and 15.0. At run-through points, a COMM TEST must be performed to verify the TIBS is operating as intended.

18.0 Definitions & Operating Procedures in Event of TIBS Failure

18.1 Scheduled Crew Change Location

A train must not depart a scheduled crew change location if:

A	The display unit fails to display brake pipe pressure.
B	The emergency braking feature is inoperative.
C	The HVM is inoperative. (If so equipped)
D	The batteries are known to be weak.
E	The distance measuring device (DMD) is inoperative.

18.2 Enroute

Note: In this instruction, the words "inoperative enroute" or "TIBS fail" also include situations where an SBU falls off the rear car or is stolen and cannot be recovered or reinstalled.

If **TIBS** fails to display **BRAKE PIPE PRESSURE** and/or the **EMERGENCY BRAKING FEATURE** becomes inoperative enroute, trains ***must*** be governed as follows:

A	Should TIBS fail and the standard locomotive gauges and Air Flow Indicator indicate no loss of air pressure, the train may proceed at a speed not exceeding **25 MPH** until the equipment resumes normal operation or to the next regular crew change point.
B	Should TIBS fail and the standard locomotive gauges and Air Flow Indicator indicate a loss of air pressure, the train crew is required to perform a Continuity Brake test. After completion of the Continuity test, the train may proceed at a speed not exceeding **25 MPH** until the equipment resumes normal operation or to the next regular crew change point. **Note:** If a successful Continuity test cannot be performed, the train must not proceed except to clear the main track, until the TIBS is repaired, resumes normal operation or a Continuity test is successfully completed. Such movements shall be made only after appropriate measures have been taken to ensure safety of movement and then only to the nearest location where the main track may be cleared.
C	Train crews must not pick up cars enroute while the display unit is failing to display brake pipe pressure.
D	**Do not** commence the descent of a mountain grade **(greater than 1.8 percent)**.
E	**Do not** move from a stop on a mountain grade unless High Pressure Retainers are applied on at least 50 percent of the loaded cars.
	Note: The intent of paragraphs (**D**) and (**E**) above are for those occasions when TIBS has failed. Paragraphs **(D)** and **(E)** do not apply at locations where it is normal to lose communication with the SBU.

18.3 For the purpose of Items 18.1 and 18.2, the EMERGENCY BRAKING FEATURE must be considered inoperative under the following circumstances:

A	The display of **"VALV FAIL"** or a **"V"** in the valve field or the IFD displays EOT VALVE.
B	A successful COMM TEST cannot be performed in accordance with item 11.0.
C	The display unit indicates a Front to Rear communications failure or the IFD displays EOT COMM.
D	The display unit indicates NOT ARMED.
E	During pre-departure testing of TIBS (items 15.1 or 15.2), activation of TIBS emergency feature will not cause an emergency brake application on the rear car.
Note: If at *any time* during the trip the display unit indicates **"VALV FAIL"**, or a **"V"** in the valve field or the IFD displays **"EOT VALVE"**, movement is restricted to a speed not exceeding **25 MPH** until the SBU has been replaced or repaired.	

18.4 Train crews must immediately notify the RTC of any equipment defects or damage. Conductors must complete Train Information Braking Systems-Exception Report (Form 1225) and turn same in with Form 125 and FAX TIBS exception report to 403 260-5841.

18.5 In the event of a failure of the highly visible marker (HVM), the train will be operated to the next regular crew change location, and be governed by the instruction outlined in item 18.1.

19.0 Distance Measuring Device (DMD)

19.1 The DMD enables the head-end train crew to determine the location of the rear car of the train in relation to any given reference point at which the counter is activated.

Note: When entering the train length into the DMD, the actual train length must be used. Should the train length change enroute, due to a pick-up or set-off, crews are responsible to ensure the train length entered into the DMD is adjusted accordingly and such information passed on to succeeding train crews.

19.2 Signs marking out accurate measured miles, are erected on each side of each regular scheduled crew change location, to permit train crews on an outbound train to verify accuracy of the DMD. To verify calibration of the DMD, a crew member will activate the DMD at the designated start of the measured mile ("0" indication sign), and deactivate the DMD at the end of the measured mile ("1" indication sign). Any discrepancies noted in the calibration test must be compensated for by adjusting the train length entered.

To calculate the adjusted train length to compensate for a measured mile discrepancy, use the following formula:

DMD Readout ÷ 5280 X Train Length = Compensated Train Length.

Example: Your train length as indicated on your train documents is 7500 feet. When you perform the measured mile test, the DMD reading shows 5340 feet (difference of 60 ft).

5340 ÷ 5280 = 1.01 X 7500 = 7575

To compensate for the DMD difference, you enter 7575 feet for your train length.

Note: Should the DMD become inoperative at any time, the crew must use their discretion and travel extra distance to satisfy themselves the train has cleared any point of restriction and be governed by instructions in item 18.1.

20.0 Transportation (Deadheading) of SBUs

20.1 The following applies to the transportation (deadheading) of SBUs on trains, between terminals on CP property.

Note: This does not apply to normal handling while in terminals/yards or local operations.

Numerous CP locomotives are equipped with special SBU brackets for the purpose of transporting SBUs.

- Locomotive SBU holders are the preferred means to transport SBU's. If holders are not available, the locomotive car body or cab may be used, provided the SBU(s) are secured and must not present an obstruction or tripping hazard.
- SBUs must **not be interchanged or sent offline in these holder/brackets** on CP locomotives.

Note: For the purpose of this instruction, trains operating in directional run zones on CN track are not considered as interchanged or offline.

SBU Bracket on a GE Locomotive

SBU Bracket on a GE Locomotive Fuel Tank

End of Train Setup for TIBS EMD Fire Screen

	Action	Result is
	LEFT SCREEN	
1	Ensure left screen displays menu with **EOT ID** option.	
2	Press **EOT ID**.	**End of train identification** menu displayed.
3	Press **CHANGE EOT ID**	
4	Enter SBU # by pressing the keys below the spaces or existing digits.	
5	Press **ENTER**	IDENT updated on **Right** Screen.
6	Press **COMM TEST**	**"Comm Test Passed"** indicates test successful.
SBU Test button pressed by another employee.		"ARM EOT" key is displayed.
7	Press **ARM EOT** within **2-5 seconds** after the key displayed.	"EM Enabled" is displayed on **Right** screen.
8	Press **EXIT**.	Returns to Main Menu.
9	Comply with remainder of, item 17.2 (steps **F & G**).	

End of Train Setup for TIBS GE ACs

	Action	Result is
	LEFT SCREEN	
1	Ensure left screen displays operational menu with **EOT ID** option.	
2	Press **EOT ID**.	**EOT keys displayed.**.
3	Enter SBU # by pressing the keys below the spaces or existing digits.	
4	Press **ENTER IDENT**	IDENT updated on **Right** Screen.
	SBU Test button pressed by another employee.	"ARM EOT" key is displayed.
5	Press **COMM TEST**	**"Comm Test Passed"** indicates test successful.
6	Press **ARM EOT** within **2-5 seconds** after the key displayed.	"EM Enabled" is displayed on **Right** screen.
7	Press **EXIT**.	Returns to Operational Menu.
8	Comply with remainder of, item 17.2 (steps **F & G**).	

Section 7 – 10/14/2015

Train Area Marshalling Equipment Handling

Train Area Marshalling

TRAIN AREA MARSHALLING (TrAM)

1.0 Train Area Marshalling (TrAM) Overview

1.1 Introduction

Train Area Marshalling (TrAM) is CP's system of train marshalling instructions.

TrAM enables CP to operate:

- Heavier trains, and
- Distributed Power trains with a mix of different car types, both loaded and empty.

The TrAM marshalling rules are computer supported.

1.2 TrAM Scope

The Train Area Marshalling instructions include the following:

- Trailing tonnage limits for specific types of car equipment. These limits vary depending on the type of car, length of the car, length of adjacent car, weight of the car (content plus tare), and curvature and grade of the track over which the car will operate.
- Placement of cars with cushioned drawbars.
- Placement of remote locomotive consists.
- Restrictions on the use on dynamic brake.
- Restrictions on placement of light cars on certain ascending grades.

1.3 TrAM Areas

For the purposes of train marshalling, the CP network has been divided into six areas: TrAM Areas 1 to 6.

Specific marshalling instructions apply to each area. Therefore, the relatively restrictive marshalling instructions that apply to trains operating on mountain grades, for instance, do not apply to trains operating in areas of lower grades and curvatures.

Area Descriptions

The TrAM areas are defined by their combination of grade and curvature.

On some subdivisions, the TrAM area differs depending on direction or track.

TrAM areas are indicated in Time Tables.

1.4 Train Consist Enhancement

The train consist provides detailed marshalling messages under the heading Train Area Marshalling Messages. See item 3.0 for an overview of the marshalling messages and Appendix 1 of this section for a list of messages with descriptions.

2.0 Definitions

2.1 General Definitions

a) **Ascending Grade Weight Zone** – Applies to Mixed and Light Bulk trains and restricts car or platform weight on the extreme head end. See Item 8.0.

b) **Cars or Platforms** – When used together, it means conventional car(s) or platforms. “Cars or platforms” is usually used with a number, such as "10 cars or platforms.” Conventional cars count as one. Multi-platform cars count by the number of platforms (i.e., a five-pack counts as five).

c) **Container Slot** – Space for a container on a platform of an intermodal car. Intermodal cars have more slots than platforms. Double stack cars have bottom slots and top slots.

d) **Cushioned Drawbar** – Designed to dampen the car coupling and in-train forces by using a hydraulic-style car impact cushioning system with longer travel than typical drawbars. Cars that often have cushioned drawbars include:

- multi-level automobile cars,
- automobile parts boxcars,
- centrebeam lumber cars,
- intermodal flat cars (greater than 80 feet in length and capable of holding two FEUs),
- flat cars used to ship loads prone to shifting.

Cars that **do not** have cushioned drawbars include:

- covered hopper cars,
- hopper cars,
- gondolas,
- tank cars.

e) **Extreme Head End** – First car or cars on the train immediately next to the lead locomotive consist.

f) **Extreme Rear of Train** – Last car or cars on the train with no other cars trailing except an operating caboose or “crew transportation car.” Cannot be ahead of a remote locomotive consist.

g) **FEU** – Stands for "Forty-foot Equivalent Unit." It refers to a container 40 feet long, or its equivalent. Equivalent means two TEUs, or a single container 40 feet or longer (for example, 45 feet, 48 feet, or 53 feet).

h) **Maximum Trailing Car Tonnage** – The trailing car tonnage that a car can safely handle in a train. It depends on the type and weight of the car. The maximum trailing car tonnage usually varies by TrAM area.

i) **Outside Length** – The distance between pulling faces of couplers. It is not stencilled on the car, but can be found on the train consist documents.

j) **Platform** – Loading area of a car. Conventional cars have one platform. Multi-platform cars typically have 2 to 5 platforms. Intermodal platforms have container slots.

k) **Remote Zone** – Applies only to Mixed Distr Pwr trains. The Remote Zone restricts car types, and car or platform weights immediately ahead of the remote locomotive consist. See item 7.5.

l) **TEU** – Stands for "Twenty-foot Equivalent Unit." One twenty-foot long container is one TEU.

m) **Threshold Tonnage** – Maximum train tonnage that can be handled without the possibility of causing a maximum trailing car tonnage violation. Threshold tonnage applies to Mixed Conventional trains and differs by TrAM area. (See item 6.4.)

n) **Trailing Car Tonnage** – Applies to Mixed trains. On a Mixed Conventional train, the trailing car tonnage is the total weight of all the other cars following that car in the train. On a Mixed Distributed Power train, the trailing car tonnage of cars located ahead of one or more remote locomotive consists is determined by a computer calculation that depends on the position of the remote locomotive consists in the train. The trailing car tonnage of cars located behind the last remote locomotive consist is determined in the same manner as it is for conventional trains.

o) **TrAM Check –** Computer assisted verification of train area marshalling. When there is a marshalling violation, the crew receives instructions on how to correct or avoid the violation.

p) **Train** – In these instructions, the term Train can apply to Trains / Transfers or Engines handling equipment.

2.2 Car Type Definitions

a) **Multi-platform Car** – Any car with two or more platforms.

b) **Articulated Car** – A car with two or more platforms sharing common inboard trucks.

c) **Articulated Double Stack Car** – Articulated intermodal container car with 2 or more platforms. They have deep wells that permit double-stacking (i.e., have bottom container slots and top container slots).

d) **Spine Car** – Articulated intermodal container car with 2 or more platforms. These cars do not have deep wells to permit double stacking (i.e., single-stack, with bottom container slots only).

e) **Solid Drawbar Connected Car** – A car with two or more platforms that do not share common in-board trucks. Platforms are connected by solid drawbars.

f) **Solid Drawbar Connected Double Stack Car** – a solid drawbar connected intermodal car capable of handling double stacked containers (i.e., have bottom container slots and top container slots).

g) **Long-Runner Car** – a solid drawbar connected intermodal car capable of handling up to either three or four trailers. This diagram shows how a long runner car that can handle a maximum of three trailers would be loaded.

h) **Conventional Car** – Any freight car equipped with two trucks and a standard or cushioned drawbar at each end.

2.3 Train Types

a) **Conventional Train** – a train in which all operating locomotives are located at the head end of the train. Maximum train length not to exceed 10'000 feet (excluding Locomotives). Exception: Trains with solid intermodal equipment may operate to a maximum length of 12,000 feet.

Note 1: Maximum tonnage on **Mixed** Conventional trains must not exceed 15,000 tons.

Note 2: Unit crude oil trains, which are recognized by TrAM as Mixed, due to the presence of buffer car(s), are not restricted to 15,000 tons.

b) **Distributed Power (Distr Pwr) (DP) Train** – A train in which operating locomotives are located at the head end of the train, AND in up to 3 additional positions throughout the train. All locomotives are controlled from the head end locomotive consist.

Note: For the purposes of train area marshalling, a train operating with Distr Pwr equipment powered up, but with all operating locomotives at the head end of the train, is considered to be a conventional train. See Section 2, item 2.0 a).

All CP trains are further classified as one of the train types in the following table.

The train type is assigned by the computer and listed in Part 1 - Train Information of the Train Area Marshalling Messages. Each train type is defined in the table below.

Train Type[1, 2,4] (Conventional or Distr Pwr)	**ALL cars on the train meet these conditions**	
	Weight	**Length**
Heavy Bulk	• at least 100 tons (contents plus tare)	• 65 feet or less (outside length)
Light Bulk	• less than 45 tons (contents plus tare)	• 65 feet or less (outside length)
Heavy Uniform[3]	• at least 45 tons (contents plus tare) for each car or platform • maximum weight difference between cars or platforms is 20 tons	• maximum length difference between cars or platforms is 10 feet
Mixed	Any train that does **not** qualify as one of the types of Bulk or Uniform Trains listed above.	

Notes:

1. If a Bulk or Uniform Train lifts even one car that does not meet the weight and length conditions in the definition, then the train is considered a Mixed Train.
2. When a train meets the definition for both Bulk and Uniform train types, the computer assigns the "Bulk" type to the train.
3. Heavy Uniform trains may have multi-platform cars, other Bulk and Uniform train types can only have conventional cars.
4. Distributed Power trains will be identified in the Train Type line by the addition of the words DISTRIBUTED POWER followed by LEAD + # (# will indicate the number of remote locations)

   e.g.: `TRAIN TYPE – HEAVY BULK – DISTRIBUTED POWER – LEAD + 2`

3.0 Train Area Marshalling Messages

Because the train marshalling instructions are complex, the TrAM rules are computer checked against the actual train consist. Train Area Marshalling Messages are printed on the train consist after the Dangerous Commodity Marshalling Messages.

The main parts of the Train Area Marshalling Messages are:

- Part 1 – Train Information: Provides essential information about the train, such as train type.
- Part 2 – Caution Messages: Provides warnings and information, and sometimes an instruction for the crew (e.g., "obtain OC authority"), but not marshalling violations.
- Part 3 – Marshalling Violations: Lists marshalling violations that must be corrected before the train can proceed. This part is divided into marshalling messages that apply to **all** areas ("`***** ALL AREAS *****`"), and marshalling messages that are **specific** for each TrAM area (e.g.,"`***** AREA 1 *****`"). These "specific" messages are listed for TrAM Areas 1 to 6 on all train consists regardless of the TrAM areas in which the train actually operates. Train crews must ensure there are no marshalling violations applicable to the TrAM area(s) in which they will operate.

  Example: This train is marshalled correctly to operate in TrAM Areas 1, 2 and 3, because there are "no violations that apply to all areas," and no area "specific violations" in TrAM Areas 1, 2 and 3. However, this train has "specific violations" that apply to Areas 4, 5 and 6. These marshalling violations would need to be corrected before the train operates in Area 4, 5 or 6.

```
PART 3 – MARSHALLING VIOLATIONS
***** ALL AREAS *****
NO VIOLATIONS THAT APPLY TO ALL AREAS
PASSES REMOTE ZONE MARSHALLING
CD RULE 1 - NO CUSHIONED DRAWBAR RESTRICTIONS
***** AREA  1 *****
NO SPECIFIC VIOLATIONS FOR THIS AREA
***** AREA  2 *****
NO SPECIFIC VIOLATIONS FOR THIS AREA
***** AREA  3 *****
NO SPECIFIC VIOLATIONS FOR THIS AREA
***** AREA  4 *****
MAXIMUM TRAILING CAR TONNAGE EXCEEDED ON                          02 CARS
ETTX908301 ETTX803330
***** AREA  5 *****
MAXIMUM TRAILING CAR TONNAGE EXCEEDED ON                          02 CARS
ETTX908301 ETTX803330
*****          END TRAIN AREA MARSHALLING MESSAGES          *****
```

Appendix 1 provides a complete list of messages that may appear in the Train Area Marshalling Messages portion of the train consist.

4.0 Verifying Train Area Marshalling

4.1 Major Yards, Terminals, and Crew Change Locations

Marshalling Requirement

Supervisors in Major Yards and Terminals are responsible for listing and marshalling trains according to TrAM rules, including tonnage distribution and Remote Zone protection on Distr Pwr trains, and cushioned drawbar rules.

Trains should be marshalled to meet the most restrictive TrAM requirements to the next marshalling point.

Verifying Train Marshalling at a Major Yard or Terminal

Train crews must ensure there are no marshalling violations applicable to the TrAM area(s) in which they will operate the train.

Use the following table to help verify train marshalling.

Step	Action
1	Use the train consist to check: • Consist header messages • Car information messages • Train statistics messages • Dangerous Commodity marshalling messages • Train Area Marshalling Messages: - Part 1 – Train Information - Part 2 – Caution Messages - Part 3 – Marshalling Violations
2	If there are no marshalling violations, then **proceed,** but comply with any applicable Train Area Marshalling Caution messages. If there are any marshalling violations that apply to your train on your route, then notify the responsible yard or terminal staff and request instructions.

Verifying Train Marshalling at a Crew Change Location

Pre-departure checks at regular and relief crew change locations should include all of the checks summarized in the table above.

When the make-up of a train has changed without new documents being generated, also check:

- Crew Information Form under “Other information important to subsequent crews,”
- train consist, and
- Form 125 or appropriate Conductor Report.

If there are any marshalling violations applicable to the TrAM area(s) in which you will operate the train, notify the RTC and request instructions.

If marshalling information is incomplete or missing, and you are unable to determine whether marshalling is correct for the TrAM area(s) in which you will operate the train, then notify the RTC and request a TrAM check.

4.2 En Route Lifts and Setoffs

TrAM check requirements for en route lifts and setoffs (including operating locomotives) are shown in the following table:

Type of Train	Conventional Train	Distr Pwr Train
Heavy Bulk	• Not required for setoff or lift of operating locomotives. • Not required for setoff of cars. • Not required for lift of cars if it is known that cars being lifted meet requirements of a Heavy Bulk train, otherwise requirements for a Mixed Conventional train apply.	Required *
*** Note:** When lifting a Heavy Bulk train from customer tracks at origin, where exact order of cars may not be known in advance, crew will be instructed where to place the remote locomotive consist(s) in the train, based on number of cars from head end or rear of train. When remote locomotives are placed in train in accordance with these instructions, train will be considered to have passed a TrAM check, with no restriction on the use of dynamic brake.		
Light Bulk	• Not required for setoff or lift of operating locomotives. • Not required for setoff of cars. • Not required for lift of cars if it is known that cars being lifted meet requirements of a Light Bulk train, otherwise requirements for a Mixed Conventional train apply. • Crews remain responsible to ensure that AGWZ rules concerning trains with more than 24 equivalent driving axles are complied with (see item 8.2).	Required
Heavy Uniform	• Not required for setoff or lift of operating locomotives. • Not required for setoff of cars. • Requirements for a Mixed Conventional train apply when lifting cars.	Required
Mixed	• Not required for setoff or lift of operating locomotives. • Not required for setoff or lift of cars, if it is known that total train weight after setoff or lift does not exceed threshold tonnage for the TrAM area in which the train is being operated (see item 6.4). • Train must also comply with item 5.3 with respect to Cushioned Drawbar cars on train. Note that item 5.3 may require a TrAM check to be obtained even if not otherwise required by this item. • If TrAM check not received, train crews are responsible to ensure that no long car/short car violations occur (see item 6.2). • Crews remain responsible to ensure that AGWZ rules concerning trains with more than 24 equivalent driving axles are complied with (see item 8.2)	Required

4.3 Documenting Equipment Lifts and Setoffs

The following table summarizes crew documentation after lifting or setting off en route.

Lift or Setoff	Documentation
Planned lift or setoff	Leave updated documents with train.
Unplanned lift or setoff, including bad order setoff	Document on the Crew Information Form under "Other information important to subsequent crews," noting whether train required a TrAM check (see item 4.2), and if so whether it passed the TrAM check and AGWZ Rules (if applicable) after lift or setoff.
Locomotives	When lifting, setting off, or isolating lead or remote locomotives, or cutting traction motors in or out, document on the Crew Information Form, Part 1. If remote locomotives were lifted, set off or isolated, document whether train received a TrAM check and if so whether it passed the TrAM check.

4.4 En route Train Area Marshalling Violations

In the event a TrAM marshalling violation is discovered while a train is en route, the train must be stopped and OC contacted. The OC will provide instructions to the crew on how to remarshall the train to remove the marshalling violation, and, if the train is able to be moved before the marshalling violation is corrected, what restrictions will apply to movement of the train. When stopping, consideration must be given to prevent blocking of crossings, siding switches, etc.

Note: If authority is received from the OC to move a train with a marshalling violation, it may only be moved to the first location where the marshalling violation can be corrected.

5.0 Cushioned Drawbar (CD) Rules

5.1 Where cushioned drawbar rules apply

Cushioned drawbar rules apply in all TrAM Areas.

5.2 Cushioned Drawbar Rules

All trains are subject to one of three cushioned drawbar rules, as shown below. The computer system checks each train consist to determine which rule applies.

CD Rule 1: Train may operate with no restrictions related to cushioned drawbars. The following Train Area Marshalling Message will appear on train consist:

```
CD RULE 1 - NO CUSHIONED DRAWBAR RESTRICTIONS
```

CD Rule 2: Under certain train make-up conditions, trains handling cushioned drawbars will be speed restricted at specific locations. The locations of speed restrictions will be shown in time table footnotes. Train crews are responsible to apply cushioned drawbar speed restrictions when these are applicable. The following Train Area Marshalling Message will appear on train consist when cushioned drawbar speed restrictions apply:

```
CD RULE 2 - CUSHIONED DRAWBAR SPEED RESTRICTIONS APPLY
```

CD Rule 3: Train has a prohibited configuration of cushioned drawbar cars, and/or the last remote locomotive consist on a Distr Pwr train does not comply with marshalling rules. The train must be remarshalled or reduced before proceeding. One or more of the following Train Area Marshalling Messages will appear on train consist:

```
CD RULE 3 - CUSHIONED DRAWBAR CARS EXCEED MAXIMUM - REDUCE
CD RULE 3 - INSUFFICIENT CD CARS NEAR REAR OF TRAIN - REMARSHALL
CD RULE 3 - REMOTE LOCO INCORRECTLY PLACED FOR OVER 40 CD CARS
```

5.3 Application of Cushioned Drawbar Rules

The following tables summarize the application of the cushioned drawbar rules based on the number of cushioned drawbar cars on the train and train weight. The first table may be used when lifting cars on a conventional train and no new train consist is available. (See item 4.2)

When a table entry indicates:

- CD Rule 1 or CD Rule 2; or
- CD Rule 2 or CD Rule 3,

may apply, it is the distribution of cushioned drawbar cars on the train that determines which of the two rules will apply. This distribution is computer checked against complex rules that take into consideration the weight and location of cars with and without cushioned drawbar in the train. As a general rule, the fewer non-cushioned drawbar cars that are located at or near the rear of the train, the more likely the less restrictive of the two rules will apply.

Conventional Trains		
Number of cars with Cushioned Drawbars	**Train Weight**	**Application of Cushioned Drawbar Rules**
0 to 30	Any weight	CD Rule 1 applies.
31 to 80	5000 tons or less	If it is known that train is in this category, and train consist not available, a TrAM check for cushioned drawbars is not required.
	Over 5000 tons	Either CD Rule 1 or CD Rule 2 applies, as indicated on train consist. If it is known that train is in this category and no train consist available, CD Rule 2 will apply unless a TrAM check received indicating that CD Rule 1 applies.
81 to 120	Any weight	Either CD Rule 2 or CD Rule 3 applies, as indicated on train consist. If train may be in this category and no train consist available, a TrAM check must be received before proceeding. **Exception:** If all cars are equipped with cushioned drawbars, CD Rule 2 applies and TrAM check for cushioned drawbars is not required.
Over 120	Any weight	CD Rule 3 applies

Distributed Power Trains		
Number of cars with Cushioned Drawbars	**Train Weight**	**Application of Cushioned Drawbar Rules**
0 to 40	Any weight	CD Rule 1 applies.
41 to 80	6000 tons or less	Either CD Rule 1 or CD Rule 3 applies, as indicated on train consist.
	Over 6000 tons	CD Rule 1, CD Rule 2 or Rule 3 may apply, as indicated on train consist.
81 to 120	Any weight	Either CD Rule 2 or CD Rule 3 applies, as indicated on train consist.
Over 120	Any weight	CD Rule 3 applies

Note: Distributed Power trains require a TrAM check – see item 4.2.

6.0 Mixed Train Instructions – Conventional and Distributed Power

These instructions apply to Mixed Conventional and Mixed Distributed Power Trains ONLY.

6.1 Marshalling Heavy and Light Cars or Blocks

To reduce undesirable track/train dynamics in Mixed trains, apply the following marshalling instructions, subject to destination blocking.

Heavy Cars and Blocks

- Marshall heavy cars as close as possible to the head end.
- Do **not** marshall heavy blocks of cars to the rear of train unless blocks of cars ahead are equally as heavy.

Light Cars and Blocks

- Marshall light cars or blocks as close as possible to the rear, unless the cars behind are also relatively light.

Notes:

1. The Train Area Marshalling Messages **do not** indicate whether train marshalling fulfills the intent of this item.
2. Destination blocking does not take precedence over TrAM marshalling violations that are shown on the train consist.

6.2 Short Car Coupled to Long Car (32/65 Rule and 41/80 Rule)

A car with an outside length less than 32 feet must not be coupled to a car or platform greater than 65 feet in outside length.

A car with an outside length less than 41 feet (other than operating cabooses or “crew transportation cars”) must not be coupled to a car or platform greater than 80 feet in outside length.

When either of these rules is violated, a message appears in the “All Areas” portion of Part 3 – Marshalling Violations of the train consist.

Exception: Cranes coupled to Idler cars are exempt from this item, and any short car/long car violation message in Part 3 related to the crane/idler combination does not apply.

All speed restrictions shown in item 18.1 continue to apply.

6.3 Maximum Trailing Car Tonnage for Cars Greater than 65 Feet in Outside Length

On Mixed trains there is a maximum trailing car tonnage for all cars greater than 65 feet in outside length. The maximum trailing car tonnage varies by TrAM area, by car type, and weight. Part 3 of the Train Area Marshalling Messages lists, by TrAM area, cars that have more than the allowable maximum trailing car tonnage. (See example in item 3.0.)

A train cannot be operated in a TrAM area in which maximum trailing car tonnage violations are listed. Cars must be re-marshalled or set off before the train may proceed in that TrAM area.

6.4 Threshold Tonnage

When the train tonnage is lighter than the threshold tonnage, maximum trailing car tonnage violations will **not** occur. Threshold tonnages vary by TrAM area and are listed in the following table and apply to Conventional Trains only.

TrAM Area	Threshold Tonnage
	Conventional Trains
1	9550 tons
2	8000 tons
3	4200 tons
4	6000 tons
5	2800 tons

7.0 Distributed Power Train Instructions – All Train Types

See Section 2, Distributed Power, for additional instructions not covered by Section 7.

Note: For the purposes of TrAM, conventional train instructions apply when operating with all locomotives on the head end as described in Section 2, Item 2.0 a).

7.1 Lead and Remote Locomotive Consist Combinations

TrAM supports Distributed Power operations with up to 3 remote locations through the train. The permitted combinations of **operating** lead and remote locomotives is based on equivalent driving axles.

A consist message in Part 3 – Marshalling Violations displays "Locomotive capacity exceeds maximum" followed by the location (i.e. Lead / Remote 1) when the number of operating locomotives in either the lead or remote locomotive consists exceeds the number permitted. The violation can be corrected by isolating or removing locomotives.

Note: Due to the risk of high in-train forces, if there is a locomotive failure on any remote consist, the RTC must be notified and a TrAM check performed

The table in GOI Section 1 Appendix 4 is used to determine equivalent driving axles.

Maximum Driving Axles – Distr Pwr Trains			
Train Type	**Lead Consist**	**In Train Remote(s)**	**Remote (extreme rear)**
All train types	24*****	24	12
Note: Crews must manually ensure that the maximum driving axles do not exceed 24 on the lead consist. ***** Unless otherwise provided by Section 1 Item 4.6.			

7.2 Remote Locomotive Consist Placement

The placement of the remote locomotive consist(s) depends on the distance (in feet and number of cars or platforms) between the lead and remote locomotive consist(s) as well as the percentage of total train weight behind the remote locomotive(s).

Standard examples for the distribution of remote locomotives in a Heavy Bulk train that minimize in-train forces will be provided for locations where remote locomotives are normally added to Heavy Bulk trains. This does not eliminate the requirement for a TrAM check.

7.3 Maximum Distance between Lead and furthest Remote Locomotive Consist

Maximum distance	14,000 feet[1]
Note: 1. Distr Pwr trains with a remote in excess of 10'000 feet must operate in multiple remote configurations, i.e. must have a minimum of two remote positions.	
Important: If all remotes on a Distr Pwr train fail or are put in the Isolate / Idle mode, the train is considered a conventional train and maximum train lengths must not exceed distances as per item 2.3. A Tram Check is required to confirm marshalling requirements are met.	

Note: The maximum distance requirement is based on the ability to perform a comm loss idle down of the remotes when the train is operating in a state of "Comm Loss" as indicated in Section 2 Item 5.0. It is not based on radio communication.

7.4 Dynamic Brake

The TrAM system will determine the maximum allowable dynamic brake force on distributed power trains. When use of Dynamic Brake is not restricted, the following TrAM message will appear in Part 1:

```
DYNAMIC BRAKE NOT RESTRICTED
```

When use of Dynamic Brake is restricted, instead of cutting out dynamic brakes, locomotive engineers will be directed by TrAM message to restrict dynamic brake force to nnn in thousands of pounds as per the effort indicator on the locomotive display. In such case, the following TrAM message will appear in Part 2:

```
DYNAMIC BRAKE RESTRICTED – DO NOT EXCEED nnn KLBS RETARDING FORCE
```

7.5 Remote Zone – Mixed Distributed Power Trains ONLY

These rules apply to Mixed Distributed Power Trains ONLY.

On Mixed Distributed Power trains, the cars immediately ahead of the remote locomotive consist(s) form the Remote Zones.

The TrAM system will analyze the equipment ahead of each remote location to verify that the train passes Remote Zone Rules.

For a Mixed Distr Pwr train, in Part 3 of the Train Area Marshalling Messages on the train consist there will be a message that indicates one of the following:

- that train passes remote zone marshalling, or
- that specific cars have failed remote zone marshalling, or
- that remote zone rules do not apply. (See Exception below)

Cars that fail remote zone marshalling must be remarshalled or set off before train proceeds.

Note: Empty crude oil trains with buffer cars will generate failed remote zone marshalling messages. Provided the loaded buffer cars are next to the locomotives, max 1 buffer car on each side of the remote(s), the remote zone marshalling violation can be disregarded.

Exception: The Remote Zone rules do **not** apply to a Mixed Distr Pwr train when **both** of the following conditions are met:

a) All cars on the train, except cars on the extreme head end, meet the conditions of a Light Bulk train. (The "extreme head end" in this case includes all cars up to and including the car furthest from the head end that does not meet the conditions of a Light Bulk train, as the case may be.)

b) The number of cars or platforms on the "extreme head end" as defined in paragraph a) does not exceed 10% of the total number of cars or platforms between the lead and first remote locomotive consist.

7.6 Buff and Draft Forces on Distributed Power Trains

With multiple remote locomotives in a train, the total tonnage of a train will be divided between each locomotive grouping. Depending on the tonnage in each section of train (between locomotive groups), locomotives could be generating draft (pulling), buff (pushing) or a combination of both forces.

TrAM will calculate each section of train tonnage based on the Haulage Factor of all locomotives on the train and the tonnage of that portion of the train.

When draft or buff forces are exceeded, TrAM messages will appear in Part 3:

```
DRAFT FORCES EXCEED MAXIMUM LEAD REMOTE 1 REMOTE 2 REMOTE 3
BUFF FORCES EXCEED MAXIMUM REMOTE 1 REMOTE 2 REMOTE 3
```

8.0 Ascending Grade Weight Zone (AGWZ) Rules

8.1 In TrAM Areas 4 and 5, the combination of severe ascending grades and curvature can create undesirable in-train forces that affect all lighter weight cars under certain operating conditions. These are referred to as Ascending Grade Weight Zones.

8.2 Certain train types operating in Ascending Grade Weight Zones must comply with the following additional marshalling restrictions. Heavy Bulk trains are not affected by the Ascending Grade Weight Zone Rules.

<table>
<tr><th colspan="4">Conventional Trains</th></tr>
<tr><th rowspan="2">Train Type</th><th rowspan="2">Less Than 24 Equivalent Driving Axles[2] - Any Tonnage</th><th colspan="2">24 or More Equivalent Driving Axles[2/3]</th></tr>
<tr><th>Not more than Threshold Tonnage (item 6.4)</th><th>Greater than Threshold Tonnage (item 6.4)</th></tr>
<tr><td>• Light Bulk</td><td colspan="2" rowspan="3">Ascending Grade Weight Zone restrictions do not apply</td><td>Prohibited</td></tr>
<tr><td>• Mixed</td><td rowspan="2">Cars or platforms on extreme head end must pass minimum weight requirement shown in item 8.3</td></tr>
<tr><td>• Heavy Uniform[1]</td></tr>
<tr><th colspan="4">Distributed Power Trains</th></tr>
<tr><td colspan="4">If maximum Buff and Draft forces are not exceeded anywhere on the train, the train complies with AGWZ Rules. Excessive Buff and Draft forces, if applicable, are shown in Part 3 of TrAM Messages.</td></tr>
</table>

Note 1: Crews are responsible to ensure that Heavy Uniform Conventional trains do not operate in an AGWZ in violation of these requirements.
There will NOT be any TrAM message concerning AGWZ for these types of trains.

Note 2: See GOI Section 1, Appendix 4 for equivalent driving axle counts.

Note 3: Cutting out Traction Motors on Locomotives to reduce Equivalent Driving Axles below 24 does not meet the requirement of this instruction, train must be remarshalled or Distr Power used.

8.3 Cars or platforms on the extreme head end of Mixed Conventional trains affected by Ascending Grade Weight Zone Rules (see item 8.2) are restricted as follows:

TrAM Area	Extreme head end of Train[1]
4	First 10 cars or platforms must each have a minimum weight of 60 tons
5	First 12 cars or platforms must each have a minimum weight of 75 tons **OR** First 15 cars or platforms must each have a minimum weight of 60 tons
Note 1: When an articulated or solid drawbar connected car extends beyond the first 10, 12 or 15 cars or platforms as required in this table, the minimum weight rules apply to each platform on that car.	

8.4 TrAM Messages and Crew Responsibility

Part 3 of the Train Area Marshalling Messages, Areas 4 and 5, will indicate, for Mixed Conventional trains only, whether or not the cars or platforms on the extreme head end of the train meet the minimum weight requirements for operation with over 24 equivalent driving axles in an Ascending Grade Weight Zone.

When operating in an Ascending Grade Weight Zone, crews are responsible to ensure that the number of equivalent driving axles on their train does not cause a violation of the Ascending Grade Weight Zone Rules. TrAM messages do NOT state if the train is operating with too many equivalent driving axles for that train configuration in an Ascending Grade Weight Zone.

9.0 This item number is reserved for future TrAM instructions

10.0 This item number is reserved for future TrAM instructions

11.0 This item number is reserved for future TrAM instructions

12.0 This item number is reserved for future TrAM instructions

SPEED RESTRICTIONS

Refer also to operating bulletins and subdivision footnotes under the heading “EQUIPMENT RESTRICTIONS.”

DEFINITION:

“Authorized Freight Train Speed or Freight Train Speed” is defined as the lowest of the following speeds:

- maximum subdivision speed for that train;
- permanent speed restriction;
- temporary speed restriction account track condition.

13.0 Speed Restrictions

Use the following table to identify speed restrictions for various kinds of loads and equipment.

Speed Restrictions for Various Equipment			
	Equipment Type	**Must NOT Exceed…**	**Additional Information**
A.	**Business Car Train**	50 MPH	See item 22.1. Speed may be increased upon authorization from the manager in charge of the train.
	Passenger Equipment	Passenger Train Speed as indicated in Time Table	Unless otherwise advised or restricted by operating agreement, applies to Passenger Train equipment (other than CP Business cars) such as GO, Via, AMT, Amtrak, West Coast Express, Rocky Mountaineer..etc.
B.	**Business Cars handled on Freight Trains**	50 MPH	See item 21.2. Freight train speed not exceeding 50 MPH (notification provided on consist)
C.	**Empty Bulkhead flats**:	45 MPH	When required - Notification provided on consist as well as when these cars are lifted en route.
D.	**Cranes**, **Combination crane-pile drivers**, and other similar equipment.		See item 18.1.
E.	**CWR** and **Strings of Bolted Rail**		See item 26.0.
F.	**Gondola** cars – empty	50 MPH	Notification provided on consist as well as when these cars are lifted en route.

Continued on next page…

Speed Restrictions for Various Equipment			
	Equipment Type	**Must NOT Exceed…**	**Additional Information-**
G.	**Freight Trains**	50 MPH	Restriction applies when: • the gross weight of the train including locomotives exceeds 4000 tons; AND • weight per operative brake is 115 tons or greater. • Part 1 of the Train Area Marshalling Messages displays weight per operative brake. **Note:** This item does not apply on the CN Yale Subdivisions.
H.	**Occupied Service Equipment**	35 MPH	Except as outlined in item 20.4.
I.	**Scale Test Cars**		See item 17.1.
J.	**Snowplows** and **Spreaders** handled deadhead **Note:** When operating, speed will be at the direction of the Track Maintenance Supervisor but not exceeding authorized freight train speed.	35 MPH, handled in direction of travel.	If it is not possible to handle the snowplow or spreader in the direction of travel, then the train speed must not exceed 25 MPH.
K.	**TEC** (Track Evaluation Cars)		For TEC equipment, see item 23.2.

HEAVY CARS AND LOADS

Refer also to operating bulletins and subdivision footnotes under the heading “EQUIPMENT RESTRICTIONS.”

Also see item 15.0 for switching, loading, and spotting restrictions; and see item 16.0 for marshalling restrictions.

14.0 Heavy Cars and Loads – Authority Required

Note: See Section 10 item 2.2 d) for overloaded cars.

14.1 Cars Exceeding Maximum Standard Weight

A Protection Notice or authority from the Superintendent - OC must be obtained for the following cars:

- car (less than 42 feet) exceeding 268,000 pounds
- car (42 feet or longer) exceeding 286,000 pounds.

SWITCHING, SPOTTING and LOADING

15.0 Switching, Spotting, and Loading

15.1 Coupling Cars Safely

Maximum coupling speed is 4 MPH (unless otherwise restricted). To prevent damage to equipment and lading, couple while moving at the slowest speed possible and with only enough force necessary to complete the coupling. When possible, couplings should be made on straight track to prevent by-passed couplers and possible derailment.

Do not attempt to couple a car or locomotive to another piece of equipment, unless the couplers are in line with each other. When it is necessary to adjust a mismatched coupler, follow procedures as outlined in the Safety Rule Book.

15.2 Switching Restrictions and Precautions

Use the following table to identify switching restrictions and precautions.

Refer to Section 8, Dangerous Goods, and Section 10, Dimensional Traffic, for additional restrictions.

	Equipment	Switching Restrictions and Precautions
A	**Service Equipment**	See item 20.0.
B	Cars **over 65 feet** (outside length), including Multi-level autos	Whether loaded or empty: • Shove fully clear of adjacent tracks before being uncoupled. In addition, loaded multi-level automobile cars should not be hung onto during switching.
C	**Multi-platform** cars	a) When loaded or empty: • Do **not** cut off in motion. • Do **not** allow to be struck by a car moving under its own momentum.
D	**Two axle** scale test cars	See item 17.0.
E	**TEC** (Track Evaluation Car)	See item 23.0.
F	• **Transformers** • **Circuit Breakers** • **Traction Motors** • **Wheelsets**	Always switch with locomotive attached.
G	**CWR or Strings of bolted rail**	See item 26.0.
H	**Trailers or Containers**	Trailers and containers should not be: • cut off in motion; or • struck by a car moving under its own momentum. Caution: If these actions cannot be avoided, then ensure the movement, and following movements, are properly controlled.
I	**Bridge girders, pipe, poles, or similar lading**	When loaded on three or more flat or gondola cars: • Do not cut off in motion.
J	**Prone to shifting and subject to damage**	Use extreme care when switching commodities subject to damage, especially when cars are partly loaded or unloaded. (E.g., shed, team, or industrial tracks)

MARSHALLING EQUIPMENT AND LOADS

16.0 Marshalling Restrictions

These marshalling restrictions describe where particular loads and equipment may be placed in a train. See item 13.0 for speed restrictions and item 15.0 for switching, loading and spotting restrictions.

Note: These Marshalling Restrictions are in addition to Train Area Marshalling (TrAM).

16.1 Marshalling Restrictions – Equipment

Use the following tables to identify marshalling restrictions for various kinds of equipment.

Marshalling Restrictions – Equipment		
	Equipment Type	**Instructions to Marshall in FREIGHT TRAINS**
A	**Multi-Level Autos** – LOADED	Marshalling loaded multi-level autos: • Do NOT place immediately behind open top cars containing coal, sand, gravel, sulphur, or similar commodities. • Separate from these open top cars by at least 1 closed type car, when practicable.
B	**Snowplows** and **Spreaders** handled deadhead	a) Marshall at the extreme rear of train. b) Run in the direction of travel. • If not possible to run in the direction of travel: ▪ wings must remain properly secured; ▪ snow must not pack behind wings during movement; ▪ must be turned at first available wye or turntable. c) Do not marshall "nose / nose" account limited clearance on curves. d) See Speed Restriction Chart, item 13.0.
C	**Cranes, Combination crane-pile drivers,** and other similar equipment.	See item 18.0.
D	**Scale Test Cars**	See items 17.4 and 17.5.
E	**Service Equipment**	See item 20.0.
F	**Mechanical Test Car 66**	a) When marshalled in the front half of a train, or in the lead consist, the locomotives allowed ahead of car 66 are a maximum of: • 2 DC, **or** • 1 AC. **Note:** When marshalled at the direction of Mechanical in the lead locomotive consist, with only one AC locomotive operating ahead of Car 66, a TrAM check not required as per item 4.2. b) When marshalled in the remote consist in any position only one AC locomotive is allowed ahead of car 66. c) Do **not** handle as last car on a train, unless a special adapter is available to mount an SBU.
G	**TEC Equipment**	See item 23.0.
H	**Caboose/Riding Platform**, and **Crew Transportation Car 422988** (Occupied or Unoccupied)	Trailing car tonnage must **not** exceed 2500 tons. **Note:** Train Area Marshalling messages do **not** indicate when trailing car tonnage exceeds this maximum. This item also applies to Cabooses that have been modified for use by other departments.
I	**Business cars**	See item 21.0.

Marshalling Restrictions – Equipment		
	Equipment Type	**Instructions to Marshall in FREIGHT TRAINS**
J	*****BAD ORDER*****	A train receiving this Car Movement Restriction Message (CMRM) on any of the following documents: • **Work Order,** • **Car Handling Report**, • **Outbound Wheel Report** or • **Tonnage Profile** Indicates car(s) have Mechanical defect(s) and subject car(s) must not be lifted or moved ***unless*** instructions are received from the **RTC** that car(s) are safe to travel, these instructions may or may not include Restrictions or Special Handling information. In some cases, a **Mechanical** employee may provide the required handling instructions directly to the crew. In all instances, the train crew must record the handling information received, on the Crew Information form.
K	**B/O, SAFE TO TRAVEL**	A train receiving this Car Movement Restriction Message (CMRM) has a Bad Order car that has been deemed safe to travel by Mechanical, and can/must be handled on the train, in accordance with the CMR Messages received.
L	**Intermodal Equipment**	When intermodal equipment is added to the head end of a train, *(unless the entire train is made up of empty intermodal platforms)*, the first 10 platforms/cars must have all slots filled with FEU (single stack) **loaded** containers or 2 FEU (double stacked) empty or combination empty/loaded containers. If only one locomotive will be operational on the head end, then the requirement for platforms/cars is reduced to 5. **Note:** This instruction does not supersede the Ascending Grade Weight Zone (AGWZ) requirements in TrAM Areas 4 & 5.

16.2 Marshalling Restrictions – Loads

Use the following table to identify marshalling restrictions for various kinds of loads. When handling placarded cars, see also Section 8, item 6.0, Marshalling.

Marshalling Restrictions – Loads		
	Load Type	**Instructions**
A	**CWR**, or Strings of **bolted rail**	See item 26.0.
B	**Loads prone to shifting** (E.g., pipe, timber, poles, metal rods, including rail on flat cars or other similar material) Other similar material would include: Coil steel not covered and/or not protected by end or special bulkheads. Marshalling restrictions apply when lading is both: a) in an open: - top car, or - container in the end position on the car; and b) **not** protected by end bulkheads extending to top of lading. Also applies to gondolas with removable end bulkheads **Note:** These loads are **not** prone to shifting: • machinery / vehicles loaded on flat cars that are equipped with special tie-down devices; • bulkhead flats loaded with banded or packaged lumber that does not extend above the bulkhead by more than 50 percent. • Freight car wheels loaded on special flat cars or in containers specially designed for transporting wheels.	Must be marshalled as follows: Separate loads prone to shifting from occupied: • cabooses, • service equipment cars, and • passenger cars, by at least **two** cars of any type, **or** by **one**: • full sized steel box car, • car loaded with one or more containers, or • bulkhead type car the ends of which extend above the load being protected against. Separate loads prone to shifting from: • a locomotive, by at least **one** car of any type. **Note:** Unit pipe trains are restricted to a maximum of 5000 feet, excluding locomotives. Non-unit pipe shipments on conventional trains greater than 5000 feet in length, are restricted to a maximum of 30 loads of pipe.
C	**Special loads requiring observation**	Marshall as close as possible to the leading locomotive. Notification that a special load is in the train is given by: • train consist or protection notice (as per GOI Section 10 Item 5.7), or • Operations Center.
D	**Transformers**, or **Circuit breakers**	Marshall at head-end of the train, no more than 15 car lengths (approximately 600 feet) from the locomotive, when practicable.

SPECIFIC EQUIPMENT AND LOAD INSTRUCTIONS

Refer also to operating bulletins and subdivision footnotes under the heading "EQUIPMENT RESTRICTIONS."

The equipment in this section have detailed instructions for their switching, marshalling and handling.

17.0 Scale Test Cars

17.1 Speed Restrictions

Use the following table to identify speed restrictions for scale test cars.

Unless otherwise indicated, all car numbers are prefixed with the initials CANX.		
Car Type	**Car Numbers**	**Maximum authorized speed when handling scale test car(s) is:**
Two-axle	420926, 420928, 420939, 420941 52104, 52108, 52109, 52257, 52258, 52264, 52274, 52277	30MPH
Short, four-axle	420927, 420934, 420936, 420938, 420944 CN 52283	50 MPH
Unrestricted	420942, 420940, 420943 61300, 61302 MNWX 333	Authorized freight train speed

17.2 Permission for Movement

Before placing a scale test car in a train, the Chief Train Dispatcher must give permission.

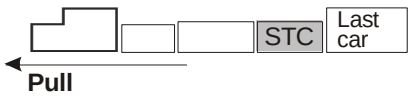
17.3 Switching Two-axle Scale Test Cars (STC)

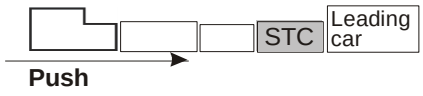
a) Do not hump.

b) Adjacent car(s) must **not** be longer than 55 feet outside length.

c) When pulling, marshall two-axle scale test car immediately in front of the last car in the direction of travel, unless handling only scale test car(s). Last car must not exceed 40 tons gross weight.

d) When pushing, marshall two-axle scale test car immediately behind the leading car in the direction of travel, unless handling only scale test car(s). Leading car must not exceed 40 tons gross weight.





17.4 Marshalling Two-axle Scale Test Cars

a) Marshall immediately ahead of the rear car. (Maximum rear car weight is 40 gross tons.)

b) Adjacent car(s) must have an outside length of 55 feet or less, and must have operative brakes.

c) Only one two-axle test car may be handled per train.

17.5 Marshalling Short Four-axle Scale Test Cars

Maximum length of adjacent car(s) is 80 feet (outside length).

17.6 Note: When a two axle or short four-axle scale test car listed in item 17.1 is marshalled incorrectly, Part 3 of the Train Area Marshalling Messages on the train consist displays:
"XX nnnnnn SCALE TEST CAR MARSHALLED INCORRECTLY."

18.0 Cranes, Combination Crane-Pile Drivers, and High-Rail Cranes

18.1 Speed Restrictions

Use the following table to identify speed restrictions for cranes, combination crane-pile drivers, and hi-rail cranes.

<table>
<tr><th colspan="4">Crane Speed Restrictions</th></tr>
<tr><th>Tons Capacity</th><th>Series</th><th colspan="2">Unless otherwise specified in Time Table Footnotes, Maximum Authorized Speed is:</th></tr>
<tr><td>40</td><td>414233</td><td colspan="2">35 MPH</td></tr>
<tr><td>40/50</td><td>414232</td><td colspan="2">45 MPH</td></tr>
<tr><td>150</td><td>414400</td><td colspan="2">25 MPH</td></tr>
<tr><td>250</td><td>414502 and 414503</td><td colspan="2">35 MPH</td></tr>
<tr><td rowspan="6">150/250</td><td rowspan="6">CN 50416
CN 50108</td><td colspan="2">Boom trailing</td></tr>
<tr><td colspan="2">35 MPH</td></tr>
<tr><td>Through all turnouts</td><td>5 MPH</td></tr>
<tr><td colspan="2">Boom NOT trailing</td></tr>
<tr><td colspan="2">20 MPH</td></tr>
<tr><td>Through all turnouts</td><td>5 MPH</td></tr>
<tr><td colspan="4">Combination Crane-Pile Driver Speed Restrictions</td></tr>
<tr><td>30</td><td>414212 to 414214,
SOO 751209</td><td colspan="2">25 MPH</td></tr>
<tr><td>40/50</td><td>414216 to 414222 incl.</td><td colspan="2">45 MPH</td></tr>
<tr><td colspan="4">Self-Propelled Hi-Rail Crane Speed Restrictions</td></tr>
<tr><td rowspan="8">100
110
130</td><td rowspan="8">414030
414032 and 414033
414041 to 404043 incl.</td><td colspan="2">Forward Direction</td></tr>
<tr><td colspan="2">25 MPH</td></tr>
<tr><td>Through all turnouts</td><td>5 MPH</td></tr>
<tr><td colspan="2">Reverse Direction</td></tr>
<tr><td colspan="2">15 MPH</td></tr>
<tr><td>Through all turnouts</td><td>5 MPH</td></tr>
</table>

18.2 Marshalling Restrictions

a) **Trailing car tonnage**: Marshall cranes, combination crane-pile drives, or other similar equipment (except crane CP 414232, and combination crane-pile drivers CP 414216 to 414222 inclusive), such that:

- Trailing car tonnage behind this equipment does **not** exceed 3000 tons.

  Note: Train Area Marshalling messages do **not** indicate when the maximum trailing car tonnage is exceeded.

b) **Direction of Travel:** When marked by arrows to indicate the direction of travel, marshall the equipment to move in this direction. On wrecking cranes, where no direction of travel is indicated, boom may be trailing or facing the direction of travel.

c) **Separation**:

- Except crane CP 414232, and combination crane-pile drivers CP 414216 to 414222 inclusive, separate from
  - the leading locomotive by at least one car, but not by more than 500 feet; or
  - an occupied operating caboose by only one car.
- Cranes up to 150 tons capacity, and Combination Crane-Pile Drivers:
  - Also separate by at least two cars from car(s) heavier than 220,000 pounds gross weight (or lesser weight where restricted by subdivision footnote).
  - Cars used for separation must have an outside length of at least 44 feet.
- Cranes of 200 to 250 tons capacity:
  - Also separate by at least one car from cars heavier than 142,000 pounds (or lesser weight where restricted by subdivision footnote) shall be marshalled closer than the second car from each piece of this equipment.
  - Cars used for separation must have an outside length of at least 44 feet.

d) **Marshalling Exceptions:** When Mechanical Services personnel supervise and accompany the movement, the equipment may be marshalled:

- anywhere in the train, provided it is separated from occupied equipment by at least one car.
- opposite the direction of travel indicated by an arrow.

18.3 Permission and Protection Notice

a) Before placing a crane, combination crane-pile driver, or high-rail crane in a train, get permission from the responsible Manager (Chief RTC Calgary / Montreal). The Responsible Manager then ensures:

- connecting service areas, conductors, locomotive engineers and all concerned with a movement are given complete instructions regulating the movement.
- combination crane-pile driver CP 414219 and cranes CN 50108 and CN 50416 are accompanied by a protection notice when moved. (These are dimensional shipments.)

b) Before handling foreign cranes (except self-propelled hi-rail cranes), get permission from the Railway Line Clearance Bureau. (The movement may require a protection notice.)

- In an emergency, the Chief RTC in consultation with Mechanical may authorize movement in a regular train consist.

19.0 Service Equipment Cars – Person in Charge Responsibilities

19.1 Notification

a) The person in charge of service equipment cars who arranges for their movement, must inform the Chief RTC:
- if any of the cars will be "occupied";
- of any subsequent change in this status.

b) **The RTC or person in charge of the cars must advise the crew if cars are occupied.**

20.0 Service Equipment Cars – Train Crew Responsibilities

20.1 Definition

Service Equipment:

- Cars used to house employees at work sites;
- Material cars used to:
  - transport maintenance-of-way equipment, or
- Auxiliaries.

20.2 Speed Restrictions

A train handling occupied service equipment must not exceed 35 MPH, except as specified in item 20.4 below.

20.3 Switching Restrictions

The following instructions apply when switching service equipment cars.

a) Do **not** couple to or move "occupied" service equipment cars, unless authorized by the person in charge.

b) Do **not** cut off in motion.

c) Do **not** cut off other cars in motion towards these cars.

d) Before coupling to or moving service equipment:

1. Stop between 12 and 6 feet from the cars to be coupled or moved. (**CAUTION**: Ensure coupler heads are properly aligned.)
2. Notify persons in or about the cars.
3. Check cars to ensure all cables, hoses, temporary ladders etc., have been removed.
4. After receiving the proper signal, couple carefully to avoid shock.

20.4 Marshalling Restrictions

a) **Location:**
- Freight train: marshall at the rear of a freight train.
- Where track configurations require extreme care in set-off movements, may be marshalled:
  - directly behind the lead locomotive consist;
  - at **speed not exceeding 20 MPH**;
  - for distance not exceeding 20 miles.

Note: These location restrictions do not apply to flangers, snow plows, spreaders and test cars are exempted from this item.

b) **Maximum number of cars -** A train handling:
- 30 OR LESS occupied service equipment cars, is restricted to 60 cars in total.
- MORE THAN 30 occupied service equipment cars is restricted to:
  - 80 cars total, and
  - service equipment cars only.
- Unoccupied service equipment cars are restricted to 80 cars in total.

21.0 Business Equipment

21.1 List of Business Equipment

Name	Car #	Car Type	Air Brake	Max Speed MPH
CP1	**1**	Theatre	1 pipe	60
CP2	**2**	Business	1 pipe	60
Assiniboine	**70**	Business	1 pipe	50
Killarney	**71**	Business	1 pipe	50
Mount Royal	**73**	Business	1 pipe	50
Mount Stephen	**74**	Business	1 pipe	50
Van Horne	**77**	Business	1 pipe	50
Royal Wentworth	**78**	Business	1 pipe	50
NR Crump	**79**	Business	1 pipe	50
Strathcona	**82**	Business	1 pipe	50
Lacombe	**83**	Business	1 pipe	50
Craigellachie	**84**	Business	1 pipe	50
Banffshire	**85**	Business	1 pipe	50
APU	**95**	Power	1 pipe	50
APU	**96**	Power	1 pipe	60*
CP	**99**	Display	1 pipe	60*
CP	**100**	Baggage	1 pipe	60*
Dominion	**101**	Coach	1 pipe	60*
Smokey Smith	**102**	Coach	1 pipe	60*
CP	**103**	Business	1 pipe	50
CP	**104**	Coach	1 pipe	50
HD Bowen	**110**	Sleeper	1 pipe	60*
CP	**29114**	Tool Car	1 pipe	60*
CP	**42901**	Stage Car	1 pipe	60*
CP	**401750**	Stage Car	1 pipe	60*

Locomotives	Type
CP 2816	Steam
CP 35508	Steam Tender
CP 1401	A-Unit (PTC Equipped)
CP 1900	B-Unit (Non DB equipped)
CP 4106	A-Unit
CP 4107	A-Unit

***Note:** If the cars indicated are operated in passenger or excursion train service, then passenger speed is permitted on CP track only, not exceeding maximum authorized speed as indicated.

21.2 Marshalling Business Cars in Freight Trains (Occupied or Unoccupied)

Business Cars handled on Freight Trains, must be marshalled as follows:

A	• On trains equipped with a Tail End Remote (TER), Business cars are to be marshalled immediately behind the TER. **Note:** cars equipped with a 2 pipe air brake system must have the brake pipe and main reservoir pipes properly coupled.
	• On Conventional trains, Business cars may be handled on the head end provided the total weight of the train, including the business cars, does not exceed 3500 tons.
	• On Conventional trains where the train weight will exceed 3500 tons, business cars that:
	  • do **not** have a 2 pipe air brake system must be marshalled at the extreme rear of a freight train, or immediately ahead of operating caboose(s) (where provided).
	  • have a 2 pipe air brake system must be marshalled at the rear of the train to comply with Section 3 item 16.0 (movement of cars with inoperative brakes). (That is, there must be at least 3 cars with operative brakes at the rear, and no more than 2 cars with inoperative brakes can be coupled together). The brakes on these cars are considered inoperative when handled on a freight train with only the brake pipe coupled.

B	APU cars 95 & 96 may be marshalled within a train provided trailing tonnage does not exceed 3500 tons.
C	Business cars must not be coupled to cars equipped with shelf couplers.
D	See item 13.0, Speed Restrictions and Item 21.1, Maximum Authorized Speed.

Note: Single pipe brake system Business cars as indicated in item 21.1, may be equipped with a secondary bypass line to allow for use with a 2 pipe air brake system if necessary.

22.0 Business Car Trains

22.1 Speed Restrictions

On ALL tracks (including CN) do not operate a Business Car Train or any train handling cars listed in item 21.1 at a speed greater than time table freight train speed not exceeding maximum speed indicated in item 21.1.

Note: these speed restrictions only apply to CP business cars listed and do not apply to foreign business cars unless otherwise directed.

22.2 Protection

When an occupied Business Car Train (e.g., RCP Train) is placed in sidings, back tracks or other tracks, the person in charge (conductor or company officer) must arrange the following:

a) GBO or DOB protection against other train movements reading as follows:
   - "Occupied passenger equipment placed in (track) at (location) must not be coupled to or moved, unless authorized by (employee in charge - name and telephone number).
   - Do not exceed 30 MPH while passing occupied service equipment cars.

b) Lock the switches of the occupied track(s) (e.g. sidings, back tracks or other track) with special locks.

22.3 Air Brakes

a) To ensure brakes apply throughout the train, make an initial air brake application of at least 10 psi. (**Note**: Business car brake cylinder pressure was substantially reduced to prevent wheel slides caused by the new high friction composition brake shoes.)

b) When conditioning brake shoes in the winter, also keep this reduced brake cylinder pressure in mind.

c) Standard Brake Pipe Pressure is 90 psi. Brake Cylinder Pressures are as follows:

Reduction	BC pressure
10 psi	12 psi
Full Service	32 psi
Emergency	38 psi

d) **CAUTION**: Business car air brakes are set for direct release, **not** graduated release. Do **not** attempt a graduated release, because some business cars are still equipped with freight train brakes.

22.4 Train Air Brake Test

a) Before performing a train air brake test:
   - If equipped with a 2 pipe system, supply main reservoir pressure to all cars in the train.
   - Verify there is sufficient main reservoir pipe on the rear car.
     i) At a **safety inspection locations** verify with car department personnel that a permanent or portable gauge on rear car indicates main reservoir pressure is at least 105 psi, **OR**
     ii) At **other locations**, where a gauge is not available, verify by completing the following steps:
        1. Firmly grasp the main reservoir hose on the rear car.
        2. CAREFULLY crack open the trailing main reservoir valve.
        3. Listen for the sound of pressurized air.
        4. Close the valve.

b) Complete the brake test as per Section 3, items 6.2 and 6.3.

c) At crew change points, the outgoing crew may confirm the integrity of the main reservoir air with the incoming crew.

22.5 Uncoupling/Coupling – 2 pipe systems

a) Before uncoupling from cars with a 2 pipe air brake system, close the main reservoir pipe valves on the locomotive and car.
   - Do not part the main reservoir hoses by hand.
   - In regard to brake pipe angle cocks, comply with Section 4, item 2.0 (Uncoupling and Leaving a Portion of a Train Standing with Emergency Air Brakes Applied).

b) When coupling or uncoupling one business car from another, handle main reservoir pipe and brake pipe as per items 22.5 a) and 22.4, above.
   - If there are electric cables, communication cables, or other compressed air connections between the cars, be governed by instructions from the person in charge (e.g., train manager, road manager, or Mechanical Services employee).

23.0 Track Evaluation Cars (TEC)

TEC cars: 60 / 63 / 64 / 65 / 68 / 424993 & 424994

23.1 Equipment Description

Air Brakes and Hand Brakes

a) Hand brakes are located on the vestibule ends of cars 63, 64, and 65.

b) Hand brakes on cars 68, 424993 and 424994 are located on the "B" end of the cars.

- Car 68 does **not** have a vestibule.

c) The instrumented truck of car 64 has a valve that applies brakes during an emergency application, but not during a service application. This is considered operative brakes in the application of air brake rules.

Additional Information

a) TV/Video cameras are mounted on the forward end of the dedicated locomotive to allow the TEC operators to see up-coming track appliances.

b) An intercom system located in the cab of the dedicated locomotive connects the Locomotive Engineer with the TEC staff when testing.

c) Cars 63 and 64 have a protective skirt installed over the gauge measuring beam, which extends to the top of the rail. This approved installation creates no risk to the movement of these cars, or to the public.

d) 424993 is equipped with a Gauge Restraint Measurement System (GRMS). This assembly applies the test loads of the measurement system to the track during a "gauge stress measurement test." TEC staff retract the assembly when not required.

23.2 Speed Restrictions

a) When used as the lead locomotive, the ditch lights and pilots at the rear end of locomotives 8217 and 8218 allow for reverse operation at track speed.

b) Unless otherwise restricted by TEC staff, it is permissible to operate at time table speed, but not exceeding **60 MPH**. TEC car 64 is restricted to a maximum of **50 MPH** while testing.

c) On CNR Yale and Ashcroft Subs, the TEC train is permitted to operate at Express Speed when testing or when running light. TEC staff will advise train crew when the following restrictions apply:

d) When car 63 or 64 is testing in reverse direction with locomotive pushing, speed must not exceed **25 MPH**. With locomotive leading, test speed will be track speed.

e) During a "gauge stress measurement test" (GRMS), speed must not exceed **50 MPH**.

23.3 Switching TEC Cars

a) Handle with extreme care to avoid damage.

b) Do not pass over tracks with a hump or inert retarders.

c) Do not uncouple TEC cars and TEC locomotives without permission from TEC staff.

23.4 Handling TECs

a) Handle with extreme care to avoid damage. (Cars 63 and 64 are equipped with shock sensors.)

b) Do not uncouple TEC cars and TEC locomotives without permission from TEC staff.

c) Handle as "occupied passenger equipment" (Section 1, item 44.0). (This includes switching and train handling, when running light or deadheading, with or without the TEC staff aboard).

d) When testing, cars 63 and 64 should have the "A" end (with viewing window) trailing, unless authorized by the TEC staff to facilitate handling.

23.5 Marshalling TEC Equipment on Freight Trains

Do **not** handle on freight trains, except under special circumstances when authorized by the TEC staff.

a) when so authorized, marshal directly behind the trailing locomotive.

24.0 Brake Pipe Run-around Hose

24.1 Notification of Run-around Hose

a) When a brake pipe run-around hose is applied to a car, the Mechanical Services employee in charge must notify the crew and arrange to have an appropriate message generated on the train consist advising train crews that a brake pipe run-around hose is applied to that car.

For example, the message would say:

```
**********************************
 CAUTION-TEMP BRAKE PIPE
 RUN-AROUND HOSE
**********************************
```

b) When a brake pipe run-around hose is applied that protects more than one car, the Mechanical Services employee in charge must:

- Arrange to have an appropriate message generated on the train consist advising train crews that the applicable car(s) cannot be uncoupled from adjacent car(s) account run-around hose applied.

  For example, the message would say:

```
**********************************
CAUTION-TEMP BRAKE PIPE
RUN-AROUND HOSE
MARRIED TO CP123456
**********************************
```

24.2 Conductor Record Keeping

The conductor must record this information on the Crew Information Form for the outbound train crew and at the car's or cars destination, advise the Supervisor responsible.

24.3 Handling Restrictions

Car(s) with brake pipe run-around hose:

- are captive to CP and must not interchange with another railway;
- must not leave Canada.

24.4 Destination or Repair Point - Car Setoff

1. Before uncoupling brake pipe run-around hose gladhands, ensure the brake pipe pressure is 0 psi.
   - Trains equipped with an SBU - The locomotive engineer must activate the TIBS emergency feature as per Section 4 item 2.1 (a).
   - Trains **not** equipped with an SBU - The locomotive engineer must make an emergency brake application using the automatic brake valve.
2. Part brake pipe glad hands by hand. It is prohibited to "pull the pin" and allow the hoses to part by car/locomotive movement.
3. After hoses are parted, attach any excess length of run-around hose securely to the car body.
4. Advise the responsible supervisor that the brake pipe run-around hose is no longer in use.

25.0 Container Traffic - Electric Power Cable Strung Between Cars

25.1 Consist Warning Message – Bad Order Setoff

The train consist displays warning advising train crews that the applicable cars cannot be uncoupled from each other account electric supply cable connecting car to car.

For example, if there were 3 cars involved (e.g. DTTX 1, DTTX 2, DTTX 3) the warning would list each car. For example:

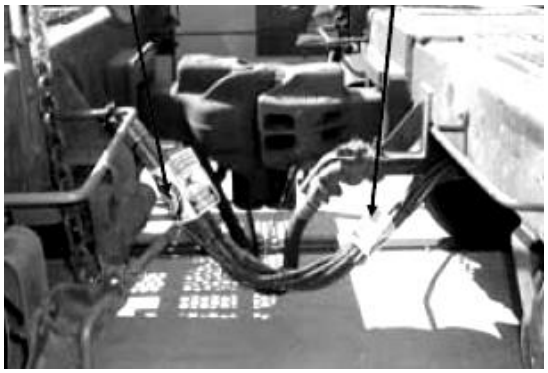
```
************************************
WARNING DO NOT UNCOUPLE FROM CAR
DTTX 1, DTTX 2, DTTX 3
ACCOUNT ELECTRIC CABLE CONNECTIONS
************************************
```

To set off a bad order en route, set off the bad order plus all cars connected to it with electric power cables. It is not possible to set off one of these cars from the set. Ensure the RTC is advised as per Section 5, item 16.0.

25.2 Appearance of Cables and Affixed Warning Signs

To alert all employees that electrical cables are connected and that cars should not be uncoupled until cables are removed, warning tags will be applied to the electrical cable(s) between the cars.

Electrical Cable Strung between Cars with affixed warning signs:



26.0 Handling Continuous Welded Rail (CWR) including Strings of Bolted Rail

26.1 Speed Restrictions – Strings Longer than 150 Feet

a) **Less than 16 strings -** Cars containing fewer than 16 strings of CWR or bolted rail may be moved in regular trains, or special trains, without speed restrictions providing:

- CWR equipment is used;
- the train consist includes a buffer car at each end of the rail (unless cars are equipped with end doors that are secured shut to prevent rails from shifting) ; and
- each string is secured.

b) **16 Strings or more -**The following speed restrictions apply:

Track Type	Maximum Authorized Speed
Tangent track	40 MPH
Through turnouts	10 MPH
Through curves less than 8 degrees	30 MPH
Through curves 8 degrees or over*	15 MPH
***Curves 8 degrees or over** are located between the following locations as indicated in the charts below:	

Prairie Region (Alberta)			
Brechter Sub			
Mile 0.0	and	Mile 1.0	
Cardston Spur			
Mile 0.0	and	Mile 0.1	
Crowsnest Sub			
Mile 97.6	and	Mile 101.1	
Laggan Sub			
Mile 122.7	and	Mile 136.5	
Mile 122.6	and	Mile 123.2	South Track
Pecten Sub			
Mile 25.8	and	Mile 26.4	
Shantz Sub			
Mile 0.0	and	Mile 0.1	
Stirling Spur			
Mile 84.1	and	Mile 84.3	

East Region (Montreal)			
Farnham Connection Sub			
Mile 1.1	and	Mile 1.4	

Central Region (Northern Ontario)			
Heron Bay Sub			
Mile 72.4	and	Mile 74.1	
Mile 81.5	and	Mile 81.6	
Mile 101.4	and	Mile 101.8	
Nemegos Sub			
Mile 13.5	and	Mile 13.7	
Nipigon Sub			
Mile 4.5	and	Mile 4.7	
Mile 27.6	and	Mile 27.8	

Pacific Region (BC Interior)			
Columbia Sub			
Mile 1.0	and	Mile 1.4	
Mile 8.2	and	Mile 11.0	
Mile 20.9	and	Mile 25.4	
Mile 26.6	and	Mile 28.1	
Mile 33.8	and	Mile 43.0	
Cranbrook Sub			
Mile 2.9	and	Mile 9.7	
Mile 36.6	and	Mile 37.7	
Mile 53.6	and	Mile 53.9	
Mile 67.8	and	Mile 68.1	
Mile 70.1	and	Mile 70.5	
Mile 95.5	and	Mile 95.8	
Mile 122.0	and	Mile 127.3	
Mile 133.7	and	Mile 138.4	
Mile 143.9	and	Mile 144.1	
Mile 150.3	and	Mile 151.1	
Fording River Sub			
Mile 0.5	and	Mile 0.7	
Mile 33.5	and	Mile 33.7	
Mountain Sub			
Mile 1.5	and	Mile 7.23	
Mile 11.3	and	Mile 11.5	
Mile 13.0	and	Mile 13.2	
Mile 15.1	and	Mile 15.4	
Mile 20.0	and	Mile 21.0	
Mile 22.6	and	Mile 33.8	
Mile 53.4	and	Mile 54.1	
Mile 66.1	and	Mile 66.3	Both Tracks
Mile 69.8	and	Mile 72.1	Connaught Track
Mile 75.4	and	Mile 76.4	Connaught Track
Mile 92.1	and	Mile 92.9	
Mile 94.5	and	Mile 99.4	
Mile 123.6	and	Mile 124.7	
Nelson Sub			
Mile 42.7	and	Mile 43.2	
Mile 46.6	and	Mile 51.9	
Mile 54.2	and	Mile 66.0	
Mile 69.8	and	Mile 117.1	
Mile 120.9	and	Mile 137.3	

Shuswap Sub			
Mile 4.2	and	Mile 4.5	North Track
Mile 16.6	and	Mile 16.8	
Mile 28.3	and	Mile 28.4	
Mile 36.4	and	Mile 36.5	
Mile 46.0	and	Mile 53.5	
Mile 59.2	and	Mile 60.6	
Mile 68.6	and	Mile 68.7	
Mile 73.5	and	Mile 73.7	South Track
Mile 75.3	and	Mile 75.5	South Track
Mile 82.1	and	Mile 89.7	
Mile 92.2	and	Mile 92.4	
Mile 99.8	and	Mile 100.1	
Windermere Sub			
Mile 14.6	and	Mile 14.9	
Mile 48.9	and	Mile 50.9	
Mile 63.4	and	Mile 64.0	
Mile 66.5	and	Mile 66.7	
Mile 67.8	and	Mile 68.0	
Mile 75.4	and	Mile 75.6	
Mile 76.8	and	Mile 77.1	
Mile 83.4	and	Mile 84.4	
Mile 91.0	and	Mile 91.4	
Mile 112.6	and	Mile 112.9	

Pacific Region (Vancouver)			
Cascade Sub			
Mile 4.3	and	Mile 4.7	
Mile 7.0	and	Mile 11.6	
Mile 13.0	and	Mile 14.5	
Mile 16.9	and	Mile 17.3	
Mile 20.8	and	Mile 21.6	
Mile 22.9	and	Mile 25.8	
Mile 37.5	and	Mile 37.8	
Thompson Sub			
Mile 8.8	and	Mile 15.6	
Mile 21.7	and	Mile 22.0	
Mile 26.6	and	Mile 29.7	
Mile 36.3	and	Mile 36.6	
Mile 50.2	and	Mile 50.7	
Mile 56.7	and	Mile 57.2	
Mile 66.6	and	Mile 66.7	
Mile 73.0	and	Mile 76.3	
Mile 79.9	and	Mile 80.2	
Mile 83.5	and	Mile 83.7	
Mile 86.7	and	Mile 88.3	
Mile 90.2	and	Mile 92.0	
Mile 100.0	and	Mile 103.1	
Mile 108.4	and	Mile 110.8	
Mile 112.6	and	Mile 114.4	
Mile 117.2	and	Mile 118.9	

c) When empty, maximum authorized speed for CWR equipment is 50 MPH.

26.2 Switching Restrictions

a) Avoid sudden stops and rough coupling.

b) Do not cut off in motion.

c) Do not allow to be struck by a car moving under its own momentum.

26.3 Marshalling Restrictions

a) Loaded cars that:

- have more than 15 strings, and
- the strings are longer than 150 feet;

May be moved as follows:

Special Trains: Including supplemental equipment related to CWR operations.

Note: These trains may handle up to 15 cars of OCS equipment (including ballast) or an empty CWR train, provided they are marshalled to the rear of the train.

Manifest Trains: Maximum 35 CWR cars including supplemental equipment related to CWR operations and CWR cars must be handled on the head end of the train. Maximum train tonnage 6000 tons and not exceeding 6000 feet including locomotives.

b) Two loaded or partially loaded CWR trains may be coupled together including supplemental equipment related to CWR operations.

Note: These trains must operate as Special Trains and are **restricted to operating in TrAM Area 1 only**.

c) All loaded CWR trains must have a buffer car at each end of the rail, unless cars are equipped with end doors/bulkheads that are secured shut to prevent rails from shifting.

26.4 Speed Restrictions - CP CWR trains on CN

The following speed restrictions apply to CP CWR trains operating on CN Track.

a) When **loaded** (maximum 82 cars) with 1 or more rails, do not exceed:
   - 40 MPH on straight track
   - 30 MPH on curves
   - 10 MPH through turnouts

Note: Loaded CP CWR cars (maximum 40) may be moved in regular trains on CN Track, provided the cars (including buffers), are marshalled on the Head End of the train.

b) When **empty**, maximum authorized speed: 50 MPH.

26.5 Train Meets

When practicable, the rail train should hold the main track during meets with other trains.

26.6 Break-in-two - Cars Carrying Long Strings of Rail

a) Notify RTC immediately. Give location and all pertinent information regarding break-in-two.

b) If possible, clear the main track before attempting to re-couple. When attempting to re-couple, ensure all rails enter the proper compartment on the roller racks.

c) If the train is on a grade, apply sufficient hand brakes to secure cars, until air pressure behind the break-in-two is restored. (This prevents movement if the air brakes leak off.) Where grades are involved, it is preferable to handle on descending grades to set off point.

d) If the train is on level or nearly level grade, cars of rail may be safely pulled to the nearest set-off point providing:
   - The movement is made using extreme caution, and
   - Abrupt starts and stops are avoided.

e) To restore air throughout the entire train and to tie cars together at the point of break-in-two, the following equipment is located in brackets on the side of the anchor car near the centre of the rail train.
   - Two 25-ft. and one 15-ft. air hoses with connections,
   - Two 25-ft. and one 15-ft. length of 1” cable with hooks.

26.7 Rail Shifting

If one or more strings of welded rail shifts:

a) Notify the RTC immediately. Give location and all pertinent information.

b) If possible, remove anchors and loosen tie-down bolts on displaced strings.

c) To pull strings into place, use:
   - safety pull hoists (located in the side of the roller rack on the first car behind the tie-down car), or
   - winch on “threader car” (if available).

d) After readjusting strings and recoupling cars, re-tighten all hold-down bolts and reapply anchors.

APPENDIX 1: Train Area Marshalling Messages

Note: Locomotive consists on a Distr Pwr train may be identified as follows in these messages:

```
L  - Lead locomotive consist
R1 - First remote locomotive consist
R2 - Second remote locomotive consist
R3 - Third remote locomotive consist
```

```
****            TRAIN AREA MARSHALLING MESSAGES            *****
                                          LOG KEY  nnnnnnnnnnnnnn
```

- When shown, this line provides information to computer personnel about the train consist, but does not form part of the Train Area Marshalling Messages.

PART 1 – TRAIN INFORMATION

```
TRAIN TYPE – XXXXXXXXXXXXXXXX
```

- This line indicates the train type. (See definitions, item 2.3.)

```
WEIGHT PER OPERATIVE BRAKE                                nnn TONS
```

- Shows total train weight, including locomotives, divided by the total number of operative control valves. Used in the application of item 13.0 (G) and Section 1 - Appendix 1, Descending Heavy Grade Protocol and in time tables under General Footnotes.

```
DYNAMIC BRAKE – APPLY GOI INSTRUCTIONS FOR A CONVENTIONAL TRAIN
```

- This line will appear for each conventional train. Apply GOI Section 1 Item 38.1 to limit total dynamic brake if required.

```
DYNAMIC BRAKE NOT RESTRICTED
```

- This line will appear for a Distributed Power train for which full available Dynamic Brake may be utilized.

```
CARS OR PLATFORMS:  ON TRAIN                                 nnn
```

- On a conventional train, lists the total count, cars or platforms.

```
LENGTH DISTRIBUTION (FEET) - L nnnnn R1 nnnnn R2 nnnnn R3 nnnnn
```

- This line will appear for a Distributed Power train, and indicates the train length in each segment of the train.

```
WEIGHT DISTRIBUTION (TONS) - L nnnnn R1 nnnnn R2 nnnnn R3 nnnnn
```

- This line will appear for a Distributed Power train, and indicates the train weight in each segment of the train.

```
PERCENTAGE OF TRAIN WEIGHT BEHIND LAST REMOTE LOCOMOTIVE      nn %
```

- Indicates the percentage of total train weight behind the last remote locomotive. This information may be required when the train is handling over 40 cars with cushioned drawbars.

```
CARS ON TRAIN WITH CUSHIONED DRAWBARS                        nnn
```

- Indicates the total number of cushioned drawbar cars on the train. (See item 5.0.)

```
CD OVER: vvv REAR 25%: www WGT: xx% NO: yy% MAX BLOCK: zzzzz TONS
```

This line will only appear if Cushioned Drawbar Rule 2 or Rule 3 can apply to the train. It provides information to those responsible for making up trains in yards and terminals on how train should be marshalled to avoid having Rule 2 or Rule 3 apply to the train. It does not provide information required for train crews.

PART 2 – CAUTION MESSAGES

Some messages in Part 2 give an instruction to the train crew. For example:

DYNAMIC BRAKE RESTRICTED – DO NOT EXCEED nnn KLBS RETARDING FORCE

- This line will appear for a Distributed Power train for which use of DP is restricted to avoid excessive in-train forces. It may be possible to reduce or eliminate this restriction by placing remote locomotive(s) in a different position in the train.

CD RULE 2 - CUSHIONED DRAWBAR SPEED RESTRICTIONS APPLY

- See item 5.2.

DRAFT FORCES EXCEED 24 AXLES LEAD REMOTE 1 REMOTE 2 REMOTE 3

- This line appears when the draft forces in a Heavy Bulk Distributed Power train exceed the maximum permitted for 24 axle territory (but do not exceed the equivalent of 30 driving axles), and indicates behind which locomotive(s) draft forces are exceeded. Unless operating only in 30 axle territory, train must be remarshalled. See GOI Section 1, Item 4.0.

The following messages are for information only and do not require crew action.

WAYBILL INFORMATION MISSING - PROCESSED AS EMPTIES nnn CARS

PLATFORM LOADING PATTERN UNKNOWN FOR nnn CARS

- Cars received at interchange may be missing loading pattern information; therefore the computer system assumes the most restrictive loading pattern.

MORE THAN 24 CARS MEET THIS CONDITION – INDIVIDUAL CARS NOT SHOWN

- Whenever "nnn CARS" or “nn CARS” is shown at the end of a message, the individual car numbers that meet that condition are listed, up to 24 cars, in the lines immediately following. If there are more than 24 cars that meet the condition, then this message is displayed. This message is also displayed, when appropriate, in Part 3.

VALID MASTER/REMOTE NOT DETECTED LEAD REMOTE 1 REMOTE 2 REMOTE 3

- This means that the computer did not detect a valid master/remote locomotive in one or more positions on a Distributed Power train. Only those positions in which a valid master/remote was not detected will be shown. This may be a foreign locomotive that is not in our system. Note that TrAM processing will still be done when this message appears.

CAR(S) AHEAD OF LEAD LOCOMOTIVE - TRAM PROCESSING NOT COMPLETED

- When a train is submitted to TrAM computer processing, and there is not a locomotive in the lead position (such as a snowplow train), this message will appear. In such case no other Caution message, or Part 1 or Part 3 of the Train Area Marshalling Messages, will appear on the train consist.

MORE THAN 3 REMOTE LOCOS DETECTED – TRAM PROCESSING NOT COMPLETED

- When a train is submitted to TrAM computer processing, and the system detects that there are 4 or more remote locomotive consists, this message will appear. In such case no other Caution message, or Part 1 or Part 3 of the Train Area Marshalling Messages, will appear on the train consist.

NO CAUTION MESSAGES

PART 3 - MARSHALLING VIOLATIONS

- This part is divided into messages that apply to **all** TrAM areas ("ALL AREAS"), and messages that are **specific** for each TrAM area (e.g.,"***** AREA 1 *****").

******* ALL AREAS *******

CP 654321 LESS THAN 32 FEET COUPLED TO CAR GREATER THAN 65 FEET

- See item 6.2.

CP 123456 LESS THAN 41 FEET COUPLED TO CAR GREATER THAN 80 FEET

- See item 6.2.

CP 456789 SCALE TEST CAR INCORRECTLY MARSHALLED

- See items 17.4 and 17.5.

BUFF FORCES EXCEED MAXIMUM REMOTE 1 REMOTE 2 REMOTE 3

- This line appears when the buff forces in a Distributed Power train exceed the maximum permitted, and indicates ahead of which remote locomotives buff forces are exceeded. Train must be remarshalled.

DRAFT FORCES EXCEED MAXIMUM LEAD REMOTE 1 REMOTE 2 REMOTE 3

- This line appears when the draft forces in the train exceed the maximum permitted for that type of train, and indicates behind which locomotives draft forces are exceeded. Train must be remarshalled.

LOCO CAPACITY EXCEEDS MAXIMUM LEAD REMOTE 1 REMOTE 2 REMOTE 3

- This line appears when there is more than maximum permitted equivalent locomotive capacity at any position in a Distributed Power train (see item 7.1), and indicates the position(s) in which locomotive capacity is exceeded. This may be corrected by removing or isolating locomotives, but another TrAM check is required after doing so.

MAXIMUM LENGTH xxxxx FT LEAD TO LAST REMOTE – EXCEEDED BY nnnnn FT

- See item 7.3.

FAILED REMOTE ZONE x MARSHALLING nn CARS

- See item 7.5. Applies to Mixed trains only. Message indicates ahead of which remote locomotive position remote zone fails. Message will be repeated if more than one remote zone fails remote zone marshalling.

REMOTE ZONE RULE DOES NOT APPLY

- Applies to certain Mixed trains only. See item 7.5.

REMOTE ZONE PROCESSING NOT DONE – PROHIBITED LOCO COMBINATION

- Displayed when there is a locomotive combination at any location in train which is prohibited. Locomotives must be remarshalled or set off and another TrAM check done.

PASSES REMOTE ZONE MARSHALLING

- Displayed when there are no Remote Zone marshalling violations. See item 7.5.

CD RULE 3 - CUSHIONED DRAWBAR CARS EXCEED MAXIMUM - REDUCE

- Displayed when there are over 120 cushioned drawbar cars on the train. See items 5.2 and 5.3.

CD RULE 3 - INSUFFICIENT CD CARS NEAR REAR OF TRAIN - REMARSHALL

- Displayed when train has a prohibited configuration of cushioned drawbar cars. See items 5.2 and 5.3.

CD RULE 3– REAR REMOTE LOCO INCORRECTLY PLACED FOR OVER 40 CD CARS

- Displayed when the rearmost remote locomotive consist is incorrectly placed for a train with over 40 cushioned drawbar cars. See item 5.2.

CD RULE 1 - NO CUSHIONED DRAWBAR RESTRICTIONS

- Displayed when there are no restrictions or violations related to cushioned drawbar cars. See item 5.2.

NO VIOLATIONS THAT APPLY TO ALL AREAS

- Displayed when there are no "all areas" violations.

***** AREA n *****

The following two messages can appear under Areas 1 to 6.

MAXIMUM TRAILING CAR TONNAGE EXCEEDED ON nnn CARS

- Applies to mixed trains only. See item 6.3.

NO SPECIFIC VIOLATIONS FOR THIS AREA

- No violations for the area, but there may still be "all areas" violations, listed above.

The following three messages can appear under Areas 4 and 5:

INSUFFICIENT WEIGHT FOR AGWZ IF OVER 24 EQ DRIVING AXLES nn CARS

- Applies to certain Conventional trains in Ascending Grade Weight Zones (AGWZ) only. See item 8.0.

EXTREME HEAD END MEETS MINIMUM WEIGHT REQUIREMENTS FOR AGWZ

- Applies to certain Conventional trains in Ascending Grade Weight Zones (AGWZ) only. See item 8.0.

TRAIN WEIGHT LESS THAN THRESHOLD – AGWZ DOES NOT APPLY

- Applies to certain Conventional trains in Ascending Grade Weight Zones (AGWZ) only. See item 8.0.

***** END TRAIN AREA MARSHALLING MESSAGES *****

General Operating Instructions (GOI)

Section 8 – 10/14/2015

Dangerous Goods

TABLE OF CONTENTS

General

a) **Guidebook:** A copy of the NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK must be accessible to each crew member while on duty. Refer to this book if required to reference applicable placard types, UN numbers, commodity names, and emergency procedures.

b) **Definition:** Dangerous goods car - A loaded dangerous goods car or a car containing a residue of dangerous goods.

1.0 Car Inspection by Train or Yard Crews

1.1 Shipper's Siding or Interchange

Before lifting a dangerous goods car from a shipper's siding or interchange:

1. Comply with Pre-departure Inspection Procedures in Section 5, item 4.0.
2. Ensure the car:
   - is not leaking;
   - is properly placarded (if required).

   If the car is a tank car, also ensure it has:
   - double-shelf couplers;
   - dome cover, or manway cover closed;
   - bottom outlet cap and plugs applied;
   - caps and plugs of all other visible openings in their proper places;
   - loading/unloading rack equipment is clear and secured.

If a car does not meet all of these requirements, and the exception cannot be corrected, then **do NOT lift the car.** If you do not lift the car, notify the appropriate person.

1.2 In Transit or in a Yard

Do not move, without authorization, a car found leaking in a yard or in transit.

Follow the Emergency Procedures outlined in item 7.2, Leaks and Spills.

2.0 Safety Marks (e.g., Placards)

2.1 Shipper's Siding or Interchange

Before lifting a placarded car from a shipper's siding or interchange, check the following:

a) **Placards** are:
- applied to both sides and both ends of the car, container, or trailer;
- the same in all locations;
- right-side up in the diamond position;
- clearly visible and legible from the ground; and
- in good condition.

b) **UN/NA number** is:
- displayed on placards or orange panels, e.g.,

- the same as indicated on the documents.

Notes:
- Placarded shipments without the required documentation must not be lifted, as per item 3.1.
- Traffic originating from the U.S. or overseas may display placards with words.
- Mixed loads may display danger placards. These placards do **not** display UN numbers.

2.2 In Transit or in Yard

Placards or orange panels found missing, unreadable, or damaged in transit must be replaced:

- at locations where THAT train is given a standing train inspection by Mechanical Forces, and
- prior to being interchanged to another carrier.

3.0 Documentation

3.1 Shipper's Siding or at Interchange

Before lifting a dangerous goods car from a shipper's siding or interchange, complete the following steps.

1. Must have for each car:

   At Shipper's Siding:

   - Compressed waybill, or
   - Shipper supplied document and either electronic work order/instructions or documented verbal confirmation of system waybilling from a CP manager

   At Interchange:

   - Compressed waybill, or
   - Shipper supplied document, or
   - Foreign line waybill (applies only at interchange).

   Note: Switching at a Shipper's Siding or Interchange does not require a shipping document.

2. Verify the following on each document:
   a) car initials and number,
   b) shipping name,
   c) class(es),

   Note: A non-numerical class may or may not be provided for some commodities (i.e., combustible liquids and limited quantity or consumer quantity shipments).

   d) UN/NA number (when displayed),
   e) a 24-hour emergency telephone number is indicated.

   Note: Some smaller shipments, residue drums and fumigated consignments do **not** require a 24-hour emergency number.

3. Update the appropriate train documents to show the position of all placarded cars. (See item 4.0.)

If a car does not meet all of these requirements, and the exception cannot be corrected, then **do NOT lift the car.** If you do not lift the car, notify the appropriate person.

3.2 At Train Origin or When New Train Documents Are Received

1. Ensure all dangerous goods cars on the train consist have one of the following required documents:
   - Compressed waybill, or
   - TSC-DG8 Documentation Authorization. (See item 3.6, Compressed Waybill Missing.)

   Note: A multi-car compressed waybill will be generated for each series of cars that are in sequential order on a train, with the same shipment information (e.g. origin, destination and commodity information).

2. If the first page of the FIT dangerous goods compressed waybill documentation package indicates there are mixed loads on the train requiring shipper supplied documentation (as per item 3.5) then:
   1. Ensure there is a documentation envelope for mixed loads.
   2. Compare the car initials and numbers on the envelope to the car initials and numbers listed in the FIT message.

3. A qualified employee must confirm on the FIT supplied Hazardous Materials document that all shipping documents / compressed waybills for the dangerous goods / hazardous materials shipments on the train are available and match those indicated on the document. The employee must record, in legible printing, their name, employee number and date along with their signature.

4. Emergency response information provided in the FIT documentation is intended as a supplement to the Emergency Response Guidebook. It is not a required document for train movement.

Do not leave without all of the required documents.

3.3 When Lifted/Set-Off Enroute

1. In addition to the requirements of Item 3.1(lift) or Item 3.8(set-off), the Conductor must update the FIT supplied Hazardous Materials document to reflect the lift/set-off and must record, in legible printing, their name, employee number and date along with their signature.

2. If a FIT supplied Hazardous Materials document is not available, the information must be recorded on the Form 125.

3.4 At Regular Crew Change Points / Staged Enroute

1. Conductor must confirm that the Hazardous Materials document or Form 125 has been signed at origin/enroute as per item 3.2. If signed as indicated, there is no need to re-check the documentation prior to leaving.
2. If the Hazardous Materials document or Form 125 has not been signed, the RTC must be advised and the conditions of item 3.2 will apply. If any documents are found missing enroute the provisions of item 3.9 (Radio Waybill – Missing Documents) apply.
3. At crew change points, radio waybills must be replaced with a compressed waybill or a TSC-DG8, unless the Superintendent Transportation provides authority to proceed with an existing radio waybill. (See item 3.9.)

Example of the Hazardous Materials Document confirmation section:

```
                        Canadian Pacific Railway
   Notice of Rail Cars & Intermodal Units Containing Dangerous Goods

Train#: 143WE14                    Location: SMITHSFA ON JUN 14 2012
1227EDT

*****************************************************************************
*****************************************************************************
* I certify that the train document package contains all shipping           *
* documents / compressed waybills for the dangerous goods/hazardous         *
* materials shipments listed below and is complete and accurate at origin.*
*                                                                           *
*                                                                           *
*_____________________  _______________  ___________________  _____________*
*Conductor Name (print)  EMPLOYEE NUMBER  SIGNATURE           DATE yy/mm/dd*
*****************************************************************************
*****************************************************************************
```

3.5 Mixed Loads

a) Message: Shipper Supplied Documentation Required

When shipper supplied documentation is required for a car or cars containing dangerous goods mixed loads, the first page of the FIT documentation package (compressed waybills) identifies the car(s). For example:

```
**********************************************************************************
**MIXED LOADS ON CONSIST REQUIRING SHIPPER SUPPLIED DOCUMENTATION.  PLEASE     *
**VERIFY CAR INITIALS/NUMBERS AGAINST THE FACE OF THE MIXED DOCUMENTS ENVELOPE.*
**IF NO ENVELOPE, VERIFY POSSESSION OF SEPARATE SHIPPING DOCUMENTS.  004 CARS  *
**.                                                                            *
**FOR MISSING CANADIAN DOCUMENTS CONTACT TSC WINNIPEG: 1-866-432-6437          *
**.                                                                            *
**                                                  1-866-4-DANGER            *
**.                                                                            *
**FOR MISSING U.S. DOCUMENTS CONTACT TSC MINNEAPOLIS 888-872-8720 2-2-4        *
**.                                                                            *
**.                                                                            *
**DTTX00721908, DTTX00659603, CP  00524341, DTTX00059238                       *
**********************************************************************************
```

b) Envelope remains sealed

Do **not** open the “Dangerous Commodity Mixed Load Documentation Package” unless there is an unplanned setoff or an emergency.

Pass the sealed envelope on to subsequent crews.

c) Compiling the Envelope for Mixed Loads

At locations where MIXED LOADS of dangerous goods requiring shipper supplied documentation originate, a designated individual:

1. Consolidates all mixed load documentation for each separate destination on the train, in a “Dangerous Commodity Mixed Load Documentation Package.”

   Note: If envelopes are **not** available to consolidate the documents, but all required documents are available, then proceed. Do not delay the train.

2. Indicates on the envelope the:
   - destination,
   - date,
   - train id, and
   - car initials and number.
3. Signs, dates, and seals the envelope.

When clerical staff is not available or no one is designated, a member of the train crew performs these duties.

3.6 Compressed Waybill Missing

a) "Compressed Waybill Missing" Messages

When a compressed waybill is missing, a message appears in place of the compressed waybill. The compressed waybill missing messages are summarized on the last page of the FIT documentation package. For example:

```
|-------------------------------------------------------------------------------|
|GATX098832                WB 000000 00/00/00  NET MASS       0 LB ___ FM ENG.|
|*******************************************************************************|
|*                                ATTENTION                                    *|
|*                                                                             *|
|*            DANGEROUS GOODS COMPRESSED WAYBILL MISSING                       *|
|*                                                                             *|
|*   FOR MISSING CANADIAN DOCUMENTS CONTACT CS WINNIPEG: 1-866-432-64 37       *|
|*                                                                             *|
|*                                                       1-866-4-DANGER        *|
|*                                                                             *|
|*   FOR MISSING U.S. DOCUMENTS CONTACT CS MINNEAPOLIS: 1-888-872-8720 2-2-4   *|
|*                                                      or                     *|
|*                                                      1-612-803-3668         *|
|*******************************************************************************|
```

b) Obtain Documents Before Departing

If the FIT documentation includes a "COMPRESSED WAYBILL MISSING" message, then **before departing** obtain:

- the missing compressed waybills, or
- TSC-DG8 authorization and appropriate shipping document(s). (A TSC-DG8 is the train crew's authorization to move dangerous goods on a document that is not FIT supplied.)

If the required documents cannot be obtained, then the car(s) must be set off.

3.7 Lifting a Dangerous Goods Car En Route (Except shipper siding or Interchange)

1. Before lifting a dangerous goods car, ensure you have the required documents:
   - Compressed waybill, or
   - TSC-DG8 Documentation Authorization. (See item 3.6.)
   - Documentation envelope for mixed dangerous goods, if applicable. (See item 3.5.)
2. Update the appropriate train documents to show the position of all placarded cars. (See item 4.0.)

3.8 Setting off a Dangerous Goods Car En Route

1. If the setoff was **planned**, deliver a copy of the document to the appropriate location (e.g., the consignee, or point of interchange).
2. If the setoff was **unplanned**, notify the RTC and request instructions. The RTC may specify where to leave the dangerous goods documents.
3. If the car is a **mixed load** of dangerous goods requiring shipper supplied documents, then:
   i) Open the "Dangerous Commodity Mixed Load Documentation Package;"
   ii) Extract only the documents for the car(s) set off;
   iii) Complete and sign the "CAR NUMBERS SET OFF ENROUTE" section of the envelope, including the:
      - date,
      - car number,
      - location,
      - employee name and number.
4. Update the appropriate train documents to show the position of all placarded cars. (See item 4.0.)

3.9 Radio Waybill (Required Documents Missing En Route)

Dangerous goods cars cannot be moved without the required documentation. Occasionally, errors occur and dangerous goods cars depart the origin or crew change point without the required documentation. This error may be identified by the train crew, or by another employee.

Use the following process when a train has departed the train consist origin or crew change point without the required documents.

Documents Discovered Missing while En Route		
Step	**Employee**	**Actions**
1.	Train crew, or other employee	Discovers documents are missing and **promptly** reports this to the RTC.
2.	Train crew	• Records information on "Dangerous/Hazardous Materials Radio Waybill;" or • Sets off car as per RTC instructions.
3.	Relief crew at next crew change point	Does not move the dangerous goods car until the radio waybill has been replaced by: • Compressed waybill, or • TSC-DG8 Documentation Authorization. Exception: The Superintendent Transportation may authorize continued movement with the existing radio waybill.

3.10 Custody or Control of Documents

Documents or copies must be in the custody or control of:

a) the crew, when the shipment is part of a train or any other movement for delivery to customer or interchange.

When not in the custody or control of the crew or on a train, documents or electronic copies must be readily accessible if required.

4.0 Record Position of Placarded Cars

4.1 Position of Placarded Cars

Train crews shall have in their possession a document indicating the position of each placarded car in their movement. When the position of a dangerous goods car changes (e.g., cars lifted or set off), or a placarded car is placed in the train, update the document to indicate the change. A train consist, switch list, or other prepared document may be used to meet this requirement.

4.2 Information to Show

When using form 125 (or any other appropriate form) to indicate cars lifted en route, show the following information for **loads and residues**:

- car initials and number,
- Shipping name,
- class,
- UN/NA number,
- position from locomotives, and
- **SPECIAL dangerous** (if applicable).

5.0 Switching

Important: Promptly report to the appropriate supervisor any impact suspected of being faster than 6 MPH with, or onto, a dangerous goods car.

5.1 Flat Switching

Do **not** cut off in motion, or couple onto by a car or cars moving under its own momentum:

a) A loaded dangerous goods car in class:
- Explosive 1.1 or 1.2

b) A flat car carrying containers or trailers bearing any placard.

6.0 Marshalling

6.1 Application

These Marshalling restrictions apply to all placarded cars (loads & residues) on movements **exceeding 15 MPH**.

6.2 Check Train Consist Dangerous Commodities Marshalling Messages

Step	Action
1.	Check the train consist "Start of Dangerous Commodity Marshalling Messages" for any marshalling violations.
2.	Verify and correct all violations.
3.	If discrepancies exist between the Dangerous Commodities Marshalling Messages and the marshalling instructions in this item 6.0, then comply with the instructions in this item.

6.3 General Marshalling Restrictions (Except Placarded Containers and Trailers Positioned on Flat Cars)

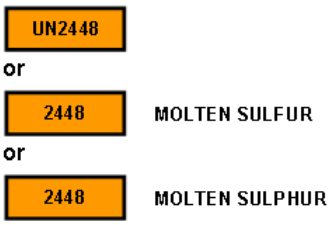
The following marshalling restrictions apply to all placarded dangerous goods cars.

Do **not** marshall a placarded Dangerous Goods car next to:

- an operating locomotive (unless all cars in the movement have a placard);
- any occupied car (unless all other cars are either occupied or have a placard);
- a car equipped with a mechanical heating or cooling device or has a source of ignition, and is in operating mode (This includes but is not limited to mechanical refridgerator units, intermodal generator sets and air repeater cars);
- an open top car when lading protrudes beyond car or lading above car end is liable to shift lengthwise (except packaged and/or banded lumber on a bulkhead flat car provided the top packages do not exceed the bulkhead by more than 50%);
- a loaded flat car (except trailers or containers on flat cars, multi-level auto transport cars, or any car specially equipped with tie down devices for handling vehicles).

Note 1: When a multi-platform car is used as a buffer car, each platform counts as one car.

Note 2: Except for the requirement to have a shipping document, Molten Sulphur is exempt from the TDG regulations, provided the rail car is marked on each side with the following markings (Note, these are not placards):



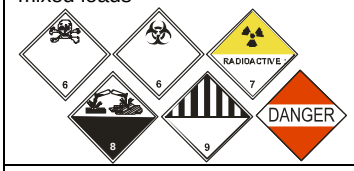
When marked as above, the General Marshalling Restrictions in item 6.3 do not apply.

Note 3: In Canada, Asphalt is exempt from marshalling requirements unless shipped as a Class 3 Flammable Liquid (UN1999). In the U.S., Asphalt is regulated as an Elevated Temperature Liquid, (UN 3257, Class 9). Class 9 products are exempt from marshalling requirements in the U.S., however the following mark will be displayed on the car (Note: this is not a placard).

Shipments destined to or from the United States which display the above mark are not restricted nor do marshalling restrictions apply in Canada.

Marshalling Chart

The following chart outlines additional restrictions for Placarded Dangerous Goods cars. (This chart does not apply to Placarded containers and trailers positioned on flat cars, item 6.4.)

Dangerous Goods Cars in Group/Class:	**Must not be placed next to:**		
	Group A	**Group B**	**Group C**
Group A: Explosives Classes 1.1 & 1.2 		X	X(1)
Group B: (Infrequently handled. See list below.)	X	X(2)	X
Group C: Explosives Classes 1.3 to 1.6,  Classes 2, 3, 4, and 5.  	X(1)	X	
Group D: Classes 6, 7, 8, 9, and mixed loads 	Only general marshalling restrictions (item 6.3) apply.		

Notes:
X "must not be next to" restriction
(1) not applicable to explosives in Classes 1.3 to 1.6.
(2) not applicable if the next car has the same UN number.

Group B Dangerous Goods (Infrequently handled)

UN 1008, CLASS 2.3	UN 1660, CLASS 2.3
UN 1026, CLASS 2.3	UN 1911, CLASS 2.3
UN 1051, CLASS 6.1	UN 1975, CLASS 2.3
UN 1067, CLASS 2.3	UN 2188, CLASS 2.3
UN 1076, CLASS 2.3	UN 2199, CLASS 2.3
UN 1589, CLASS 2.3	UN 2204, CLASS 2.3
UN 1614, CLASS 6.1	UN 3294, CLASS 6.1

6.4 Marshalling Restrictions - Placarded Containers and Trailers Positioned on Flat Cars

The following marshalling restrictions apply to placarded containers and trailers positioned on flat cars.

- Containers or trailers placarded as "Explosives 1.1 and 1.2" or "Radioactive, Class 7" must **not** be positioned on the first platform next to an operating locomotive.
- Containers or trailers placarded as "Explosives 1.1 and 1.2" must **not** be positioned or marshalled next to a container, trailer, or car that:
  - is equipped with a mechanical heating or cooling device, in **operating mode**
  - has a source of ignition.

  (For example: mechanical refrigerator units, intermodal generator sets, and air repeater cars that are operating.)
- For trains destined to the U.S.A., containers or trailers placarded as "Explosives 1.1 and 1.2" must **not** be positioned or marshalled closer than six cars or platforms from the operating locomotive.

Note: When a multi-platform car is used as a buffer car, each platform counts as one car.

6.5 Plain Bearing Cars

Plain bearing cars are prohibited on **KEY** trains or trains handling **SPECIAL** Dangerous Commodities.

Trains other than Key trains or not handling Special Dangerous commodities may handle cars with plain bearings, provided that the plain bearing cars are marshalled behind any loaded tank cars of dangerous goods on the train.

6.6 Marshalling U.S.A. Destined Trains

Crews on trains originating in Canada with a destination in the U.S. are governed by the "Trains Moving in the U.S. Marshalling Messages."

7.0 Emergency Procedures

7.1 Accidents, Collisions, Derailments

Immediately protect as per Operating Rules and in addition comply with the following procedures (a to e) for incidents involving a car, container, or trailer that contains or last contained dangerous goods.

The order in which the steps are completed depends on the incident. After the initial response and initial assessment, many actions are completed simultaneously.

Note: Emergency procedures for leaks and spills are described in item 7.2.

a) Assess Dangerous Goods Hazard

Step	Action
1.	Visually inspect the incident, from the cab of the locomotive if possible.
2.	Identify dangerous goods involved using the train documents: • Compressed waybill, or • TSC-DG8 Documentation Authorization. • Documentation envelope for mixed dangerous goods, if applicable.
3.	Use the Emergency Response Guidebook to identify protective actions. To use the Guidebook: i. Find the material's Guide number using the: – UN Number (yellow-bordered pages), OR – Shipping name (blue-bordered pages). ii. Use the Guide number to find the "Public Safety" instructions in the orange-bordered pages. (Note: The emergency response information in the train documents may be used as a supplement to the Emergency Response Guidebook.)

Continued on next page…

b) Assess Site Hazards

Step	Action
1.	If the dangerous goods hazard does **not** prevent you from approaching the derailed cars and it is necessary to approach the cars, then assess the site hazards. • **Physical**: slip, trip, fall, sharp objects, moving equipment, shifting loads, or shifting track material. • **Chemical**: from derailed cars, or damaged underground utility or pipeline. • **Electrical**: power lines (over-head or underground) and fiber optic cables. • **Other**: water, bridges, etc.
2.	Keep away from hazards to avoid injury.
3.	Avoid any unnecessary exposure to smoke or fumes.
4.	Keep all open flames, including fusees and smoking material, away from the incident scene.

c) Rescue and Secure

Step	Action
1.	If it can be done safely, rescue the injured and move them to a safe place.
2.	Keep public well away from the scene. If necessary, secure help from police forces.
3.	If the locomotives are not directly involved in the accident, the train should be cut as close as safely possible and cars removed a safe distance.

d) Communicate Details

Use the shipping document, compressed waybill, or the train consist to provide the following information for cars containing dangerous goods, or residue cars:

i) location (Subdivision and mileage),
ii) number of cars involved and condition,
iii) car initials and number,
iv) weather conditions,
v) any additional information, as requested.

e) Documents

KEEP all documents until relieved of that responsibility by a CP Officer.

When a public security official (e.g., police officer, fire fighter) arrives at the scene, assist him/her in examining the dangerous goods documents, train consist and Emergency Response Information.

7.2 Leaks and Spills

If you suspect a car containing dangerous goods is leaking, or you see a dangerous goods spill:

Step	Action
1.	Get clear of the spill or leak immediately, upwind if possible. Avoid low-lying areas.
2.	From a safe location, notify others in the area as soon as possible.
3.	En Route, notify the RTC and use the shipping document, compressed waybill, or the train consist to provide the following information: i) location, ii) car initials and number, iii) weather conditions, iv) additional information requested. In the yard, contact the responsible supervisor.
4.	Keep the area clear of all personnel except Emergency Responders.
5.	Do **not** move, without authorization, a car found leaking in a yard or in transit.

7.3 Cars Under Fumigation

An accident, collision, derailment, spill or leak involving a car under fumigation does **not** require special considerations for dangerous goods. However, **ensure no one enters these cars.**

8.0 SPECIAL Dangerous Commodities

8.1 Identifying SPECIAL Dangerous Commodities

To alert all concerned that a **SPECIAL dangerous** commodity is being handled, the load may be identified as follows:

a) The first line of messages on the train consist displays either:
   - "THIS TRAIN HANDLING **SPECIAL DANGEROUS** COMMODITIES," or
   - "TRAIN IS CARRYING **SPECIAL DANGEROUS** COMMODITIES."

b) The first page of the compressed waybill package displays "TRAIN IS CARRYING **SPECIAL DANGEROUS** COMMODITIES,"

c) Form 125 indicates **SPECIAL dangerous** lifted en route.

9.0 Positive Chain of Custody on Cross Border shipments of Alert Cars

9.1 Positive Chain of Custody

US Security Regulations require carriers to provide "Positive Chain of Custody", including attending or maintaining positive control, performing security inspections and "documenting transfers" of loaded shipments of rail security sensitive materials ("Alert" shipments) between carriers and:

- US Shippers
- Other rail carriers
- US Receivers located in "high threat urban areas"

This regulation applies in the US only and does NOT apply to CP-to-CP transfers. **Canadian crews performing interchanges of Alert Cars with foreign carriers at the Canada / US Border or in the US will be required to follow the procedures as outlined below.**

In order to accommodate the regulatory requirements, a section has been added to the Outbound Wheel Report / Train Consist. This section will appear on Canadian and US Train Documents but is only required as outlined in these procedures.

If you have any questions regarding if these changes apply to your terminal, please contact your immediate Supervisor.

9.2 Alert Cars

Alert cars include loads of:

- Tank cars containing poisonous inhalation (PIH) commodities
- Cars containing more than 2,268 kg (5,000 lbs) of a Division 1.1, 1.2, or 1.3 (explosive) material
- Cars containing a highway route-controlled quantity of a Class 7 (radioactive) material shipped under any of the following HazMat STCCs or Hazardous Materials Response Codes — 4929142, 4929143, 4929144, 4929147
- May also be referred to as Rail Security Sensitive Materials (RSSM)

Identifying Alert Shipments

Information to identify Alert Cars & Commodities will be available:

- On the Outbound Wheel Report / Train List, listed in the "Document the Transfer" section.
- Identified as "Alert Load" in the sequenced list of the cars on the Outbound Wheel Report.
- On the Compressed Waybill.
- On a shipper supplied document, such as a Bill of Lading.
  - Information is included as part of the hazardous materials details.
  - May be displayed in various locations on the document.

Identifying PIH Shipments

PIH commodities include but are not limited to:

- Materials that contain the phrase "Poison-Inhalation Hazard," "PIH," "Toxic Inhalation Hazard," or "TIH" on the shipping documents or compressed waybills.
- Materials identified or placarded as Class 2.3 or Class 6.1.
- The following commodities:
  - UN #1005 Anhydrous Ammonia
  - UN #1017 Chlorine
  - UN #1040 Ethylene Oxide
  - UN #1052 Hydrogen Fluoride, Anhydrous
  - UN #1079 Sulfur Dioxide
- In an electronic document package PIH shipments are identified as "PIH" in the sequenced list of the cars on the Outbound Wheel Report

9.3 Acceptance or Transportation of Alert Shipments

Only accept or transport loaded Alert shipments that conform to:

- The current General Operating Instructions (GOI), Section 8 **AND**
- These instructions

9.4 Interchange Transfers

CP Train Crew to a Foreign Carrier in the US or at Cross Border Locations to the US

1. Prior to delivering a train with dangerous goods cars, the conductor must:
   - Review the Outbound Wheel Report or other shipping documents for any "Alert Cars".
   - If "Alert Cars" are being delivered in the US or at cross border locations to the US:
     - As soon as practicable or if status changes en-route, advise the responsible CP RTC/Dispatcher, Supervisor Operations or other employee in charge that your train is carrying "Alert Cars" and may require special handling
     - Prior to delivery to the foreign carrier, contact the foreign carrier's designated on-site representative to notify them that the train requires special handling and to confirm that the transfer is attended. The on-site representative may be a Supervisor Operations, train crew member or other designated representative.

       "Document the Transfer" on the Outbound Wheel Report / Train List as per item 9.5.
2. Upon arrival at final terminal, fax the completed Outbound Wheel Report / Train Consist to the CSF (Customer Service Finance, formerly CST/CSO).

Foreign Carrier to a CP Train Crew in the US

1. Prior to receiving or taking charge of a train or dangerous goods cars in the US, the conductor must:
   - Contact the foreign carrier's designated on-site representative to determine if the train requires special handling or review shipping documents for any "Alert Cars".

     The Outbound Wheel Report, compressed waybill or other prepared document may be used to meet this requirement.
   - If "Alert Cars" are included in the train:
     - Contact the foreign carrier's designated on-site representative and confirm that the transfer is attended. The on-site representative may be a Supervisor Operations, train crew member or other designated representative.

       Perform a Car Inspection if required under General Operating Instructions (GOI) Section 8. If a car inspection is required, a security inspection must be included.

       "Document the Transfer" on the Outbound Wheel Report / Train List as per item 9.5.
     - Before departing or if status changes en-route, advise the responsible CP RTC/Dispatcher, Supervisor Operations or other employee in charge that your train is carrying "Alert Cars" and may require special handling
2. Upon arrival at final terminal, fax the completed Outbound Wheel Report / Train List form to the CSF.

Note: In the application of 9.3, the crew MUST CONTACT the RTC/Dispatcher, Supervisor Operations or other employee in charge as soon as practicable and be governed by their instructions, if the train crew determines that:

- The Alert Car CANNOT BE DELIVERED
- The crew will meet Hours of Service limit en-route while in the US

9.5 Attendance

If required, an employee or authorized representative attends an Alert Car by:

- Being physically located on site in "reasonable proximity" to the Alert Car AND
- Capable of promptly responding to unauthorized access or activity at or near the rail car AND
- Responding immediately to any unauthorized access or activity at or near the Alert car either personally or by contacting law enforcement or other authorities

"Reasonable Proximity" is classified as follows for:

A) Cars in a Train:

- Train crewmembers that: - Are located on or near the train.
  - May be located at the front of the train and physically unable to visually observe every rail car.

B) Cars NOT in a Train:

- An employee or authorized individual has within his or her field of vision either:
  - the rail car OR the area surrounding the rail car, including access paths to the car.

9.6 Document the Transfer

CP employees who transfer loaded Alert shipments to another party are responsible for completing a "Positive Chain of Custody" Report. The report must be filled out and faxed to the CSF (Customer Service Finance, formerly CST/CSO) along with any other required paperwork.

The conductor must record the following information in the section on the Outbound Wheel Report (OWR) / Train Consist:

- Car initial and number
- CP Conductor's first and last name
- First and last name of the transfer party's designated, on-site representative (Shipper, Receiver or Foreign Carrier)
- Date and time the transfer was completed
- Location of transfer (track ID)

- If additional room is required, information should be recorded on the F125

Fax the completed OWR / Train Consist to the CSF with other required crew documents.

9.7 Security Inspection Procedures

In conjunction with the inspections required under General Operating Instructions, Section 8, from ground level, inspect all loaded Alert rail cars for signs of tampering, such as suspicious or dangerous items or items that do not belong on trains as per Section 11, item 13.0.

10.0 Alert Trains

10.1 **Canadian crews handling Alert Trains in the US will be required to follow the procedures outlined below.**

10.2 General Requirement

Trains carrying specified numbers of loaded or residue / empty rail cars, trailers, or containers of dangerous goods must be operated as “Alert Trains.”

10.3 Alert Train Definition

An “Alert Train” is any train as described in either a, b, or c below:

a) one (1) or more loads and/or residue/empties containing a poisonous inhalation (PIH) commodity including anhydrous ammonia (Identification Number 1005) and Ammonia Solution (UN3318) in a single bulk packaging; **or**

b) one (1) or more loads and/or residue / empties of Highway Route Controlled Radioactive moving under the following Hazardous Materials Response Codes 4929142, 4929143, 4929144, 4929147; **or**

c) one (1) or more cars containing greater than 2,268 kg (5,000 lbs) of Class 1.1, 1.2 or 1.3 explosive in a single carload.

10.4 Identifying Alert Trains

a) The conductor must review the computer-generated train consist/train list for all dangerous goods cars and determine Alert Train status.

b) When a computer-generated train consist/train list is not available or dangerous goods cars are added to a train, the conductor must review the shipping papers for all dangerous goods cars and determine Alert Train status.

c) After picking up or setting out dangerous goods shipments en route, the Alert Train status may change. The conductor must determine whether or not Alert Train status has changed and, if so, promptly notify the RTC/dispatcher.

11.0 Key Trains

11.1 Crews handling Key Trains will be required to follow the procedures outlined below.

11.2 General Requirement

Trains carrying specified numbers of hazardous/dangerous commodities must be operated as “Key Trains.”

11.3 Key Train Definition

A “Key Train” is any train handling one or any combination of the following:

a) One (1) or more tank car loads of Poison or Toxic-Inhalation Hazard (PIH or TIH) (Hazard Zone A, B, C, or D), anhydrous ammonia (UN1005) or ammonia solutions (UN3318), **or**

b) A combination of twenty (20) or more car loads or intermodal portable tank loads of a combination of dangerous goods, **or**

c) One (1) or more car loads of Spent Nuclear Fuel (SNF), High Level Radioactive Waste (HLRW)

11.4 Identifying Key Trains – Conductor responsibilities

a) Review consist header (*look for KEY TRAIN header block*) at initial terminal and shipping papers for all hazardous/dangerous goods cars when lifted enroute and determine Key Train status.

b) Notify RTC of Key Train Status prior to departure from the initial terminal or if status changes enroute.

c) Update all changes on Consist List (Outbound Wheel Report or 125) if cars are picked up or set out enroute.

11.5 Operating Restrictions

a) Maximum speed – Unless a lower speed is specified, the maximum speed for Key Trains is 50 MPH.

b) Time Table “speed” restrictions for Special Dangerous Commodities also apply to Key Trains.

c) A Key Train will hold the main track when the maximum speed in the siding or track to be used is 10 mph or less. Exception: A Key Train may take the siding or other track when it is operationally infeasible to hold the main or when meeting a passenger train.

d) If a “Hot Box” alarm is identified on a "Key Train" while passing a wayside detector and the subsequent inspection fails to confirm evidence of a defect, the train must not exceed 30 MPH until it has successfully passed over the next wayside detector. If the same car again sets off the next detector or is found to be defective, train is restricted to 10 MPH until car is set out from the train. **Note:** At crew-change locations, the relieving crew must be notified if the 30 MPH restriction is still in effect to the next wayside detector.

e) If a Hot Box Detector is defective or temporarily out of service, a "Key Train" must not exceed 30 MPH from the location of the detector until it has successfully passed over a subsequent wayside detector. **Note:** At crew-change locations, the relieving crew must be notified if the 30 MPH restriction is still in effect to the next wayside detector.

f) Only cars equipped with roller bearings will be allowed in a Key Train.

Section 9 – 10/14/2015

Radio Procedures

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RADIO PROCEDURES

1.0 General

1.1 Only authorized radio equipment may be used.

1.2 Only authorized technicians are permitted to make technical adjustments to radio equipment.

2.0 Operation of Portable Radios

2.1 Every effort should be made to begin each tour of duty with a fully charged battery. Employees must not tamper with, add, or use unauthorized batteries in radios.

3.0 Transmitting Technique

3.1 The following points should be kept in mind when using a radio:

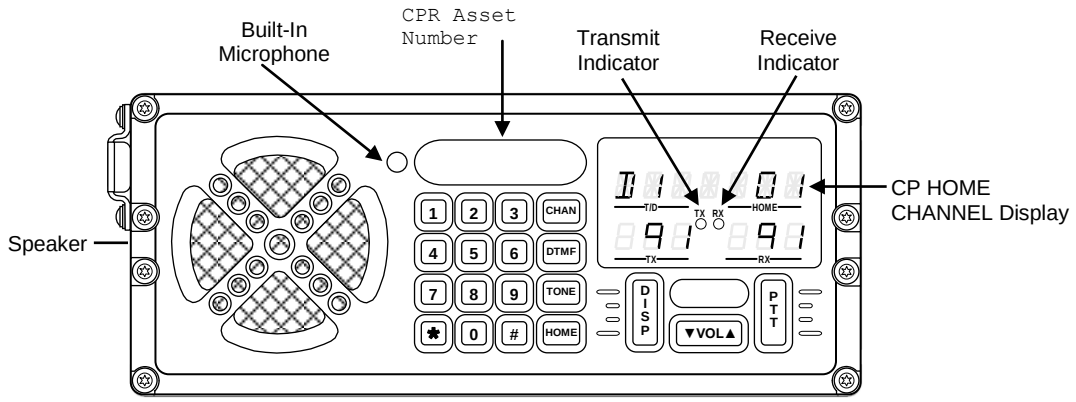
POSITION OF MICROPHONE: Microphone should be angled no more than 45 degrees and not more than 2 to 3 inches from the mouth of the sender.

SPEED: Keep the rate constant, neither too fast nor too slow. Remember in many cases the person receiving your message has to write it down.

PITCH: Remember, that high pitched voices transmit better than low pitched ones.

RHYTHM: Preserve the rhythm of ordinary conversation. To separate words so that they do not run together, avoid the introduction of sound that does not belong such as “er” and “um.” Attempt to maintain the pitch and rhythm of voice to the end of each sentence.

RITRON Railroad Radio Operating Instructions



KEYPAD — With no mode selected, pressing the keypad buttons will transmit DTMF tones. When a mode is selected, the keypad is used to enter CP HOME Channels, AAR Channels, DTMF digits, and TONE digits.

VOLUME UP/DN — Press ▲ to increase the radio receive volume, or press ▼ to lower the radio receive volume. The volume level is displayed while the button is pressed.

CHANNEL MODE — Press once, then enter either a four digit AAR channel pair (wideband) or a six digit AAR channel pair (narrowband) as will be designated in the current Time Table.

HOME MODE — Press once, then select a 2 digit CP Home Channel number; applicable for CP Home Channels 01-99 only. (Include the leading zero for channels 01-09.)

DTMF MODE — Press once and select digits for the required function - RTC, repeater, equipment, etc. (Use as specified in the current Time Table.)

TONE MODE — Press once, then key tone sequence as required. (mainly used by other railroads)

DISP KEY — To call CP RTC press once, CALL-IN will be displayed and the TX channel will switch to the CP call-in channel. Press DTMF calling code (* Z 1 # , Zone from Time Table), wait for the OK tone and Ring Back tone. Press the "DISP" key again to return to the standby channel.

NOTE: On some subdivisions the "DISP" Key will not place the radio on the correct call-in channel, and the channel selection must be done manually.

PTT KEY — If handset fails, press and talk into the front panel microphone located next to the speaker grille.

NOTES:

1) 2 DIGIT AAR CHANNEL PAIR CALLS FOR WIDEBAND OPERATION WHILE 3 DIGIT AAR CHANNEL PAIR CALLS FOR THE SAME FREQUENCY BUT IN NARROWBAND OPERATION.
2) RITRON RADIO ACCEPTS 2 DIGIT CP HOME CHANNELS.
3) "DISP" CHANGES THE Tx CHANNEL TO AAR 21 / 021 WHEN USING 2 DIGIT / 3 DIGIT AAR CHANNELS.

AAR TO CP RADIO CHANNEL CROSS REFERENCE

COMMONLY USED CHANNELS IN CANADA

AAR CHANNEL NUMBER		CP CHANNEL NUMBER	CHANNEL NAME
TX	RX		
91	91	CP1	TRAIN STANDBY
95	91	CP2	RTC CALL IN
21	91	CP3	RTC CALL IN
67	67	CP4	TRAIN STANDBY
81	81	CP5	TRAIN STANDBY
21	81	CP6	RTC CALL IN
95	95	CP7	TRAIN STANDBY
21	95	CP8	RTC CALL IN
21	67	CP9	RTC CALL IN
21	41	CP10	RTC CALL IN
49	49	CP11	MAINTENANCE OF WAY
15	49	CP12	UTILITY REPEATER
71	71	CP13	MAINTENANCE OF WAY
15	71	CP14	UTILITY REPEATER
09	49	CP15	UTILITY REPEATER
77	77	CP16	MAINTENANCE OF WAY
09	77	CP17	UTILITY REPEATER
35	71	CP18	UTILITY REPEATER
93	93	CP19	MAINTENANCE OF WAY
35	93	CP20	UTILITY REPEATER
33	77	CP21	UTILITY REPEATER
33	93	CP22	UTILITY REPEATER
09	93	CP23	UTILITY REPEATER
21	66	CP25	RTC CALL IN
47	47	CP82	TRAIN STANDBY
51	51	CP83	TRAIN STANDBY
98	98	CP197	MAINTENANCE OF WAY
66	66	CP92	TRAIN STANDBY
69	51	CP145	UTILITY REPEATER
11	11	CP59	SOUTHERN RLY BC
39	39	CP77	BC RAIL
41	41	CP78	TRAIN STANDBY
87	87	CP101	CN 1
73	73	CP95	CN 2
55	55	CP85	CN 3
37	37	CP76	CN 4
17	17	CP63	CN 5
79	25	CP157	CN 6
63	02	CP201	CN 7
61	61	CP88	CN 8

Section 10 – 10/14/2015

Dimensional Handling

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DIMENSIONAL HANDLING

1.0 General

Wherever the term "train" appears herein, it also applies to an engines and transfers. Wherever the term "protection notice" appears herein, it also applies to "blanket clearance."

1.1 A dimensional shipment is one which exceeds the maximum standards of size, weight, and/or height of centre of gravity as established by CP.

2.0 Protection Notices

Note: A protection notice affords protection only upon Main Tracks, Sidings, Interchange Tracks, or other tracks specifically identified in the protection notice.

2.1 Format of the protection notice has been divided into 6 sections:

"Section 1": Lists e-mail addresses which receive a copy. Specifies the file number, the classification, and indicates if the shipment is governed by Specific Restrictions.

- A file number commencing with "DL" indicates that General Restrictions apply. (e.g. DL4011109)
- A file number commencing with "RL" indicates General and Specific Restrictions apply. (e.g. RL4013099)

"Section 2": Specifies the date the Protection Notice was issued. Specifies the characteristics of the shipment, including the car number(s), car marshalling, type of lading, shipper/origin, consignee/destination, full route and CP routing.

"Section 3": Specifies the measurements of the shipment: height, width, length, gross weight, center of gravity from the truck center and the combined center of gravity.

"Section 4": Specifies the subdivision name and the mileage points between which the protection notice applies on the subdivision. Specifies the W-code Classification.

"Section 5": Specifies the "Specific Restrictions" that apply to a load at precise locations along its routing. They are listed by mileage in the sequence in which they will be encountered. Some examples are: reduce speed over bridges or passing specific obstructions; stop, examine and proceed with crew observing the movement; and special marshalling.

"Section 6": Specifies the "Code 6 Instruction message" and file number of the Protection Notice. The "Code 6 Instruction message" on the train consist must be exactly as shown in Section 6 of the Protection Notice.

Examples of a CP and CN Protection Notice, which are issued by the Clearance Bureau authorizing movement of dimensional traffic are appended to the rear of this section.

2.2 All dimensional traffic, with the following exceptions, must be protected by a protection notice:

a) **Fully enclosed** (roof, sides and ends) multi-level traffic, not exceeding 19 ft 1in ATR (Above Top of Rail). This traffic can be handled without restriction on CP, except at the locations shown in Time Table footnotes.

b) **Fully enclosed (roof, sides, and ends) extended height multi-level traffic (Automax).** This traffic can be handled without restriction on CP, between the locations shown below.
Note: This traffic is NOT authorized to move beyond these limits unless authorized by valid dimensional protection.

Between	Via
Buffalo and St. Luc	(CSX/CN trackage between Buffalo and Brookfield East) Hamilton, Guelph Jct, Toronto, Smiths Falls
Guelph Junction and Windsor ON	Galt, Windsor Subdivisions
Galt and South Junction	Waterloo Subdivision
West Toronto and Mactier	Mactier Subdivision
Toronto (Obico-Vaughn) and College Ave	Galt and Windsor Subdivisions (Prohibited between College Ave and Detroit)

c) **Double stack container** traffic, not exceeding 20 ft 4 ins ATR (Above Top of Rail), equivalent to two (2) 9 ft 6 ins high, by 8 ft 6 ins wide containers stacked (double stack cars identified on train consist as plate "H" or "I", either empty or loaded with containers single tier are considered non-dimensional).

Note: This item covers containers loaded double stacked in:

CONVENTIONAL CARS EQUIPPED FOR DOUBLE STACK OPERATION AND MULTI-PLATFORM CARS.

This traffic can be handled on CP between the locations shown below, via the routes indicated.

Between	Via
Vancouver and Alyth	Revelstoke, Field
MacAulay and Mile 6.9 Westminster Subdivision	
Mission and Huntingdon (Mission Subdivision)	
Roberts Bank and Riverside	- BCR Port Subdivision, joint track Roberts Bank to Pratt - CPR Page Subdivision, Pratt to Livingstone - CN Rawlison Subdivision, joint track Livingstone to Hydro - CN Yale Subdivision, joint track Hydro to Page - CPR Page Subdivision, Page to Riverside
Alyth and South Edmonton	Red Deer, Leduc Subdivisions
Golden and Dunmore	Fort Steele, Crowsnest & Lethbridge
Alyth and Coutts	Aldersyde Subdivision
Wetaskiwin and Portage La Prairie	Saskatoon
Alyth and Winnipeg	Regina, Medicine Hat
Winnipeg (Woodman & Kemnay) and Estevan	Glenboro & Estevan Subdivisions
Pasqua and North Portal	Weyburn Subdivision
Regina and Lanigan	Lanigan Subdivision
Winnipeg and Emerson	Emerson Subdivision
Winnipeg and Toronto (Obico-Vaughan)	Sudbury, MacTier
Smith Falls and Brockville	Brockville Subdivision
Montreal (Montreal Wharf-Lachine) and Toronto (Obico-Vaughan)	Belleville and Winchester Subdivisions
Montreal (Montreal Wharf-Lachine) and St. Jean / Rouses Point	Adirondack Subdivision and Lacolle Subdivision
Toronto (Obico-Vaughan) and Buffalo	Canpa, Galt and Hamilton subdivisions. Also trackage as noted. (CN Oakville sub. between Canpa and Desjardins (CN Hamilton Jct) CN/CSX trackage between Brookfield East and CSX Buffalo (ICTF) NS trackage between CP437 and Bison Yard.
Toronto (Obico-Vaughan) and College Ave	Galt and Windsor Subdivisions Double stack container traffic between College Ave. and Detroit prohibited, unless authorized by Protection Notice. Note: North tube of the Windsor/Detroit tunnel suitable to accommodate two 8'6" high by 8'6" wide containers stacked.

A train handling articulated multi-platform cars loaded with one or more containers and equipped with 125 ton trucks will be so identified on train consist and the following speed restrictions apply **IF** containers are double stacked:
Note: The speed restriction applies to the cars, not the entire train.

Subdivision	Maximum speed	Location	Mile
North Toronto	30 MPH	Over railway crossing at grade	5.3
Wetaskiwin	25 MPH	Over railway crossing at grade	69.4
Wilkie	25 MPH	Over railway crossing at grade	2.3
Winchester	40 MPH	Over railway crossing at grade	35.4
Windsor	25 MPH	Over railway crossing at grade	11.8
Windsor	25 MPH	Over railway crossing at grade	63.7
Windsor	40 MPH	Over railway crossing at grade	68.6

d) **Overloaded cars:** Unless otherwise indicated on train consist, overloaded cars may be accepted without additional authority. Overloaded cars which are NOT acceptable for movement without additional protection, will be identified as such on train consists and must be authorized by dimensional protection notice.

e) **Detouring onto CN tracks:**

Subject to instructions contained in CN dimensional blanket file(s);

- Fully enclosed multilevel traffic as described in item a)
- Automax extended height multilevel traffic as described in item b)
- Double stack container traffic as described in item c) can be handled over CN detour routes between;
    - Kamloops BC and Vancouver BC.
    - Reynolds ON and Winnipeg MB (via CN's northern route).

Important: When detouring over CN, train crews must ensure they are in possession of CN dimensional blanket file(s).

Crews detouring between Reynolds and Winnipeg must also be in possession of the Special meet and pass instruction identified in CN's time table covering the Bala Subdivision at Burton.

2.3 A copy of the Protection Notice must;

- accompany the movement from origin station to destination station,
- be attached to the shipments waybill (if a waybill is provided).

2.4 The crew of a train or engine handling dimensional traffic;

- Must comply with all applicable specific restrictions listed in the Protection Notice.
- And are responsible to ensure a dimensional traffic is not diverted from the limits stated in section 4 of the Protection Notice. If necessary to move the shipment outside of these limits, a revised protection notice must be obtained.

In terminals where crews are not in possession of Protection Notices, the person in charge is responsible to protect these limits.

3.0 Classification

3.1 Dimensional traffic is classified according to width, based on factors including track geometry and equipment type. This classification will be included within the protection Notice and on the train consist in a "Code 6 Instruction Message"

Classification	Effective Width		Classification	Effective Width
W-00	10' 8' or less		W-06	13' 1" to 13' 6"
W-01	10' 9" to 11' 0"		W-07	13' 7" to 14' 0"
W-02	11' 1" to 11' 6"		W-08	14' 1" to 14' 6"
W-03	11' 7" to 12' 0"		W-09	14' 7" to 15' 0"
W-04	12' 1" to 12' 6"		W-10	15' 1" and over
W-05	12' 7" to 13' 0"			

Notes:

Classification W-00 refers to dimensional traffic that has an effective width of 10'8" or less. (e.g. shipment exceeds CP maximum weight or height standards but not maximum width standards).

In the application of 4.3 (meet and passing), Non dimensional traffic shall be treated as being W00.

4.0 General Restrictions

The following definitions apply in this subsection:

Restricted Meet: When the train handling the wide traffic is required to move past trains, equipment, or other permissible wide traffic, movements must be stopped and inspection made to ensure that adequate clearance exists before proceeding.

Note: A Restricted Meet is not required at the following locations where tracks are known to diverge onto separate roadbeds.

Subdivision	Location
Cascade	Between Mile 63.45 and Mile 63.76 North and South Track.
Shuswap	Between M. 2.20 at Signal 22N and M. 5.0 North Track & M. 2.20 at Signal 22S and signal 51S South Track. Between M. 72.30 at Signal 723N and M. 81.50 at Signal 815N North Track; & M. 72.30 at Signal 723S and M. 81.50 at Signal 815S South Track
Mountain	Between M. 69.70 at Signal 697C and M. 89.90 at Signal 899C Connaught Track & M. 69.50 at Signal 695M and M. 89.50 at Signal 895M MacDonald Track.
Laggan	Between M. 116.20 at Signal 1162N and M. 121.50 at Signal 1215N North Track & M. 116.20 at Signal 1162S and M. 121.50 at Signal 1215S South Track.
Keewatin	Between M. 35.30 and M. 33.60 North and South Track.
Ignace	Between M. 100.50 and M. 102.10 North and South Track. Between M. 114.00 and M. 116.00 North and South Track.
Kaministiquia	Between M. 18.60 and M. 21.90 North and South Track.

Unrestricted Meet: Movements may meet or pass without restrictions.

The meet and pass instructions listed herein are calculated on standard track centres between adjacent tracks on the same roadbed. Standard track centres are 13 feet between main tracks and 14 feet between a main track and a track other than a main track.

Some locations on CP have track centres that exceed these standards. At such locations where track centres between adjacent tracks on the same roadbed are known to exceed these standards, meet and pass instructions may be relaxed provided that a Restricted Meet takes place.

4.1 Specific Meet/Pass Instructions

Classification ***Instructions***

W-09 & W-10:
- Owing to extreme width, shipment to be moved in DAYLIGHT ONLY, unless otherwise authorized by the Service Area Manager - Field Operations.
- Trains handling W-09 or W-10 traffic must approach all track units prepared to stop unless it is determined that adequate clearance exists.

W-08 to W-10: **Adjacent Main Tracks (Multitrack Territory)**
- All adjacent main tracks to be kept clear of trains and equipment during movement.

Also: See item 4.2 for further restrictions applicable on SPECIFIC CURVES & SIDINGS.

4.2 Specific Curves and Sidings

The following additional restrictions apply on these specific curves:

Mile	Sub	Mile	Sub	Mile	Sub
2.03	Outremont Spur	73.5	Cartier Sub	79.5	Cartier Sub
3.59	Outremont Spur	74.8	Cartier Sub	80.4	Cartier Sub
9.70	Parc Sub	75.0	Cartier Sub	124.6	Keewatin Sub
42.42	Adirondack Sub	76.2	Cartier Sub	0.0	Emerson Sub
0.60	Westmount Sub	76.7	Cartier Sub	122.7	Cascade Sub
1.40	Westmount Sub	76.8	Cartier Sub	123.7	Cascade Sub
1.90	Westmount Sub	76.9	Cartier Sub	125.9	Cascade Sub
1.93	Westmount Sub	77.4	Cartier Sub	126.4	Cascade Sub
		78.2	Cartier Sub	128.2	Cascade Sub

The following additional restrictions apply on these sidings:

Nemegos Sub	White River Sub	Heron Bay Sub	Nipigon Sub
Stralak	Esher	Mobert	Pays Plat
Pogamasing	Musk	Struthers	Dublin
Drefal	Girdwood	Heron Bay	Nipigon
Devon		Steel	Bowker
Ramsey		Coldwell	Mackenzie
Kinogama		Middleton	Navilus
Roberts - Between East Sdg Swt & Mile 61.40	Lochalsh - Between West Sdg Swt & Mile 66.80	Jackfish - Between West Sdg Swt & Mile 97.50	

W-05 and Greater:

- All adjacent main tracks to be kept clear of trains and equipment during its movement.

W-04:

- All adjacent main tracks to be kept clear of traffic W-01 and greater.
- Unrestricted meet with traffic W-00 and non-dimensional traffic on Adjacent Main Track.

W-03:

- All adjacent main tracks to be kept clear of traffic W-02 and greater.
- Unrestricted meet with traffic W-01, W-00 and non-dimensional traffic on Adjacent Main Track.

4.3 Meet/Pass Instruction Charts

The Meet/Pass Instruction Charts shown below may be used to determine meet and pass restrictions.

How to use charts: In the vertical column on the left, find the classification of the dimensional shipment being handled. Follow this row until it intersects with the appropriate column showing the classification of the shipment being met or passed. Determine the colour of the intersecting square and refer to explanation below. Note: W-00 is the equivalent of a standard car.

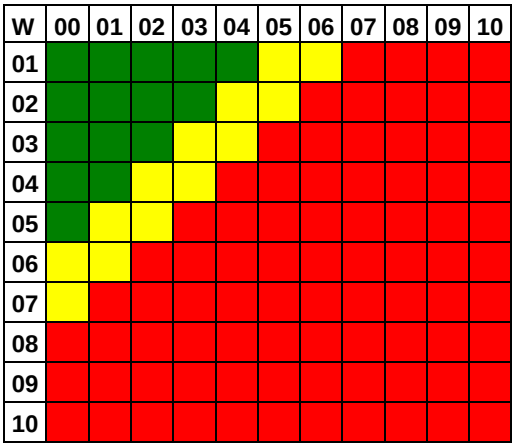


CHART #1: Adjacent Main Tracks

- Unrestricted meet or pass.
- Restricted meet or pass.
- Must not meet or pass on an adjacent main track except where track centres are known to be greater than 13 feet. At such locations a restricted meet must take place.

  Important: This chart does not apply on specific curves & sidings listed in item 4.2

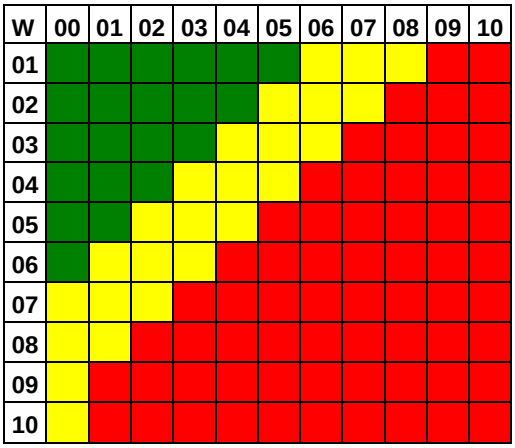
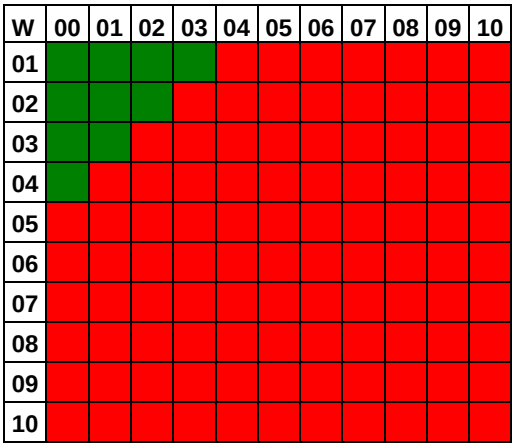


CHART #2: Adjacent Track (Non Main Track)
(including signalled track)

- Unrestricted meet or pass.
- Restricted meet or pass.
- Must not meet or pass on an adjacent track except where track centres are known to be greater than 14 feet. At such locations a restricted meet must take place.

  Important: See item 4.4 for dimensional bulge instructions.



⇧ These 00 columns include W-00 and non-dimensional .

CHART #3: Specific Curves & Sidings
(see item 4.2)

- Unrestricted meet or pass.
- Must not meet or pass on an adjacent main track.

4.4 DIMENSIONAL BULGE and DIMENSIONAL SIDING Meet/Pass Instructions

Dimensional bulge. Location within a siding where track centers are 15”7” or greater and will be indicated in Time Table footnotes and identified by dimensional bulge track signs adjacent to the track.

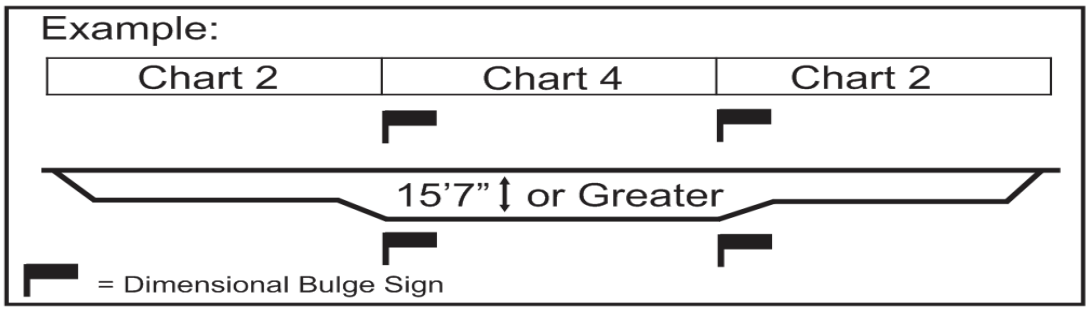
Dimensional siding. Siding where track centers for its length are 18’ or greater and will be indicated in Time Table footnotes

The following only applies when a meet or pass takes place at a dimensional bulge/siding location identified by time table footnote. A dimensional bulge where this item applies is subject to the dimensional shipment(s) being located between the designated (dimensional bulge) track signs.

Classification	***Instructions for 15’7” bulge***
W-10	• Will be protected by specific restrictions contained in the protection notice.
W-09 & W-08	• Restricted meet with traffic W-09, W-08 and W-07. • Unrestricted meet with traffic W-06 or less.
W-07	• Restricted meet with traffic W-09 and W-08. • Unrestricted meet with traffic W-07 or less.

Classification	***Instructions for 18’ or greater dimensional bulge or siding.***
W-10	• Will be protected by specific restrictions contained in the protection notice.
W-09	• Unrestricted meet with traffic W-09 or less.

Important: Chart # 2 must be used to protect equipment located outside limits of the bulge.



W	00	01	02	03	04	05	06	07	08	09	10
01											
02											
03											
04											
05											
06											
07									+	+	
08								+	+	+	
09								+	+	+	
10	See protection notice										

CHART #4: Dimensional Bulge/Siding

Unrestricted meet or pass.

Restricted meet or pass.
+ = Unrestricted when bulge or siding is 18’ or greater.

See Protection notice.

5.0 Handling Procedures

5.1 Before any dimensional traffic may be placed in a train, permission of the responsible OC Manager must be secured. A crew member must confirm any dimensional traffic lifted enroute with the RTC.

5.2 Before setting out dimensional traffic (W-01 or greater), the crew must obtain authority from the RTC or person in charge.

When dimensional traffic is set out, the crew must confirm the location of such traffic with the RTC or person in charge before leaving that location.

If communication with the RTC or person in charge is not possible, dimensional traffic must not be set out on a track adjacent to a main track or adjacent to a siding. Communication must be made with the RTC at the first opportunity.

5.3 Supervisor Operations or other employees in charge are responsible to keep crews informed of the location of conflicting dimensional traffic within yards and cautionary limits.

5.4 Dimensional Load Zone (D L Zone) - Within limits specified in Special Instructions, the designated employee is responsible for protecting the movement of dimensional traffic against main track movements. Before entering such limits, the crew of a train or engine handling dimensional traffic must advise the responsible employee;

- of the widest classification (W-01 or greater) being handled,
- if any dimensional traffic being handled has specific restrictions that apply within the limits specified in Special Instructions.

Trains or engines entering or moving within these limits will be governed by instructions from the responsible employee.

5.5 When necessary to protect the movement of dimensional traffic through a controlled interlocking, the signalman will be governed by instructions from the RTC or the person in charge.

5.6 Crews must be especially watchful when operating through yards, sidings, interchange tracks and cautionary limits to ensure ample side clearance exists between dimensional traffic being handled and equipment on adjacent tracks.

Crews must also ensure ample side clearance exists between equipment being handled and dimensional traffic on adjacent tracks.

Where overhead or side clearance is doubtful, movement must be stopped and inspection made to ensure that adequate clearance exists before proceeding.

5.7 Dimensional traffic should be marshalled as close as possible to the leading locomotive to permit visual observation by the crew.

Note: Train consist or protection notice will indicate dimensional shipments to which this item applies.

Note: See GOI Section 7, Item 16.2 (B) for lading which is prone to shifting.

5.8 Cautionary limits: Crews must advise the RTC when handling wide traffic (W-01 or greater) on the main track or adjacent to the main track.

Employee	**Important Responsibilities when Handling Dimensional Traffic**	GOI
D L Zone designated employee	• Provide protection for dimensional traffic against main track movements within D L Zone.	5.4
	• Provide instruction for RTC or Interlocking RTC to protect dimensional traffic through controlled interlockings and CTC within D L Zone.	5.5
	• Protect dimensional track units against other main track movements.	
	• Ensure dimensional traffic is not diverted from limits stated in protection notice (Item 2.1, "Section 4") in terminals where crews are not in possession of Protection Notice.	2.4
Person in Charge	• Obtain permission from responsible OC Manager prior to placing dimensional traffic on a specific train.	5.1
	• Keep crews in yards and cautionary limits informed of the location of conflicting dimensional traffic.	5.3
	• Ensure traffic requiring visual observation is properly marshalled on train.	5.7
OC Managers	• Provide permission to place dimensional traffic on a specific train. • Update appropriate Nexus screen before giving permission. • Inform the RTC of the dimensional traffic and which train it will be on. • Ensure Nexus is updated when dimensional traffic is set out on line.	5.1
Train Crews	• Ensure Protection Notice accompanies dimensional traffic and comply with Specific Restrictions.	2.3
	• Ensure dimensional traffic is not diverted from limits stated in section 4 of the protection notice.	2.4
	• Ensure movement is stopped and inspected at locations where a meet is restricted.	4.0
	• Confirm with RTC when dimensional traffic is lifted en route.	5.1
	• Confirm location with RTC or Person in Charge when dimensional traffic (W-01 or greater) is set out on line.	5.2
	• Ensure designated employee is advised of dimensional traffic on train prior to entering locations specified as D L Zone.	5.4
	• Ensure ample side clearance exists when operating through yards, sidings, interchange tracks and cautionary limits.	5.6
	• Ensure dimensional traffic is properly marshalled.	5.7

6.0 CP Protection Notice

(CN protection will be included where required)

```
 SECTION 1
 THIS PROTECTION NOTICE HAS BEEN ISSUED TO THE FOLLOWING S2MR IDS:
 #OM0141 CWR1001 HHS0146 HHS0156 HHS0157 HHS0178 HHS0192 HHS0202
 HHS0282 HHS0313 HHS0319 HHS0474 HHS0495 JON0079 KOH0005 NMC0007
 NMC0009 NMC0010 NMC0033 NMC0034 NMC0039 NMC0040 NMC0050 NMC0051
 OM00445 OM00450 OM00544 OM00563 OM00628 OM00727 OM00741 OM00874
 OM00897 OM00918 OM00919 OM00962 OM01333 OM01335 OM01380 OM01482
 OM01571 OM01572 OM01683 OM01697 OM01698 OM02657 OM02699 OM04100
 OM04370 OM05200 OM06016 OM08205 OM08579 OM09707 OM09947 OM09950
 OM09951 OM09960 OVR1002 SLH0021 SLH0036 HUYO
 ****************************************************************
 PERSONNEL INVOLVED WITH THE MOVEMENT AND PROTECTION OF DIMENSIONAL
 TRAFFIC ARE REQUESTED TO REVIEW DIMENSIONAL HANDLING OPERATING
 INSTRUCTIONS TO ENSURE THEY ARE FAMILIAR WITH THEIR JOB
 RESPONSIBILITIES.
 ****************************************************************
 RL9250515     W-05-07    GENERAL AND SPECIFIC RESTRICTIONS APPLY

 SECTION 2
              CP RAIL DIMENSIONAL SHIPMENT CLEARANCE    DATE: 04/01/29
              -------------------------------------
 -- PROTECTION NOTICE - AUTHORIZATION --
 -- OVER MAIN TRACKS, SIDINGS, AND INTERCHANGE TRACKS

 SHIPMENT CAR(S)  : TTRX 361069
 CAR MARSHALLING  : SHIPMENT TO BE HANDLED NEAR HEAD END OF TRAIN TO
                    FACILITATE OBSERVATION BY TRAIN CREW.
 SHIPMENT         : VESSELS
 TO MOVE FROM     : CPINTSER   VAUGHAN ON
                    SUB  : MACTIER
                    MILE :  15.30
 TO MOVE TO       : CPINTSER   PT VANCOUVER BC
                    SUB  : CASCADE
                    MILE : 129.10
 ROUTED VIA       : CPR
 CP ROUTING         WESTTORO, LEASIDE , TOR YD , LEASIDE , WESTTORO,
                    MACTIER , ROMFORD , CARTIER , CHAPLEAU, WHITERIV,
                    SCHREIBE, TH.BAY , IGNACE , KENORA , WINNIPEG,
                    BRANDON , BROADVIE, MOOSEJAW, SWIFTCUR, MEDICHAT,
                    CALGARY , FIELD , REVELST , KAMLOOP (also over cn
                    detour route kamloops to vancouver) NORTHBE ,
                    MISSION , MISSION , MACAULAY, MACAULAY
SECTION 3
                         SHIPMENT MEASURES:
                         ------------------
 CENTRE MEASUREMENTS  :
     --- HEIGHT ABOVE RAIL ---          ---------- WIDTH -----------
        FROM            TO                FROM              TO
      FT   IN        FT   IN             FT   IN           FT   IN
       3   4.00       4   4.00            8   0.00
       4   4.00       7   7.00            8   0.00  INCR   12   4.00
       7   7.00       9   5.00           12   4.00
       9   5.00      14   9.00           12   4.00  DECR    8   0.00
 LOAD LENGTH               :  29 FT  0 IN
 GROSS WEIGHT              :  147700 POUNDS
 TRUCK CENTRE LENGTH       :  69 FT  9 IN
 COMBINED CENTRE OF GRAVITY:  49.98 IN  ATR
```

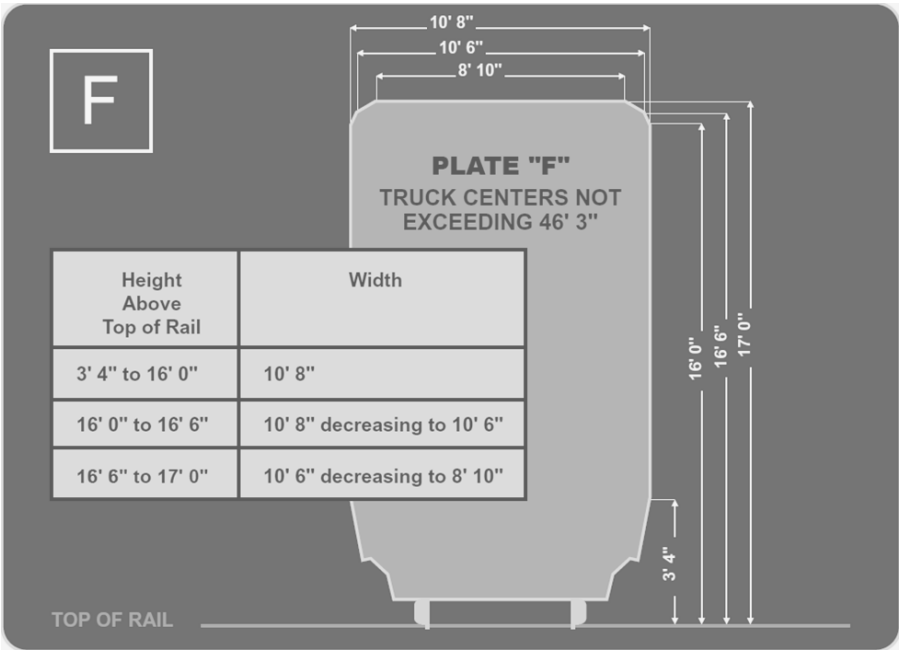
```
SECTION 4
  SUBDIVISION NAME      FROM MILE  TO MILE   CLASS
  MACTIER                  15.30     0.00    W05
  NORTH TORONTO             5.99     0.00    W05
  BELLEVILLE              206.31   197.00    W05
  HAVELOCK                181.50   182.40    W05
  BELLEVILLE              197.00   206.31    W05
  NORTH TORONTO             0.00     5.99    W05
  MACTIER                   0.00   126.90    W05
  PARRY SOUND               0.00   121.74    W05
  CARTIER                  72.40   111.00    W05
  CARTIER                 111.00   113.05    W05
  NEMEGOS                   0.00   136.40    W06
  WHITE RIVER               0.00   129.90    W05
  HERON BAY                 0.00   118.30    W06
  NIPIGON                   0.00   126.38    W06
  NIPIGON                 126.38   132.90    W06
  KAMINISTIQUIA             0.00   147.23    W05
  IGNACE                    0.00   146.20    W05
  KEEWATIN                  0.00   125.70    W05
  CARBERRY                  0.00     9.20    W05
  CARBERRY                  9.20   133.10    W05
  BROADVIEW                 0.00   130.94    W05
  INDIAN HEAD               0.00   135.14    W05
  SWIFT CURRENT             0.00   110.43    W05
  MAPLE CREEK               0.00   147.40    W05
  BROOKS                    0.00   175.82    W05
  LAGGAN                    0.00   136.62    W06
  MOUNTAIN                  0.00   125.70    W06
  SHUSWAP                   0.00   128.52    W06
  THOMPSON                  0.00   121.52    W06
  CASCADE                   0.00    87.00    W06
  MISSION                   0.00     1.40    W06
  CASCADE                  87.00   109.58    W06
  CASCADE                 109.58   112.40    W06
  WESTMINSTER               0.00     9.20    W07
  CASCADE                 112.40   129.10    W06

  SECTION 5
  SPECIFIC RESTRICTIONS APPLY:
  CASCADE                   MILE :  11.42
  STOP, EXAMINE AND PROCEED 3 MPH    SLIDE DETECTOR FENCE

  SECTION 6
  APPLY FOLLOWING EQUIPMENT MESSAGE INSTRUCTION MESSAGE:
  6 TTRX361069 DIMSL W-05-07 SEE PROTECTION NOTICE FOR
  6 GENERAL AND SPECIFIC RESTRICTION. FILE RL9250515

  PLEASE PROTECT
  SHIPMENT CAN BE HANDLED OVER CN DETOUR ROUTE BETWEEN KAMLOOPS AND
  VANCOUVER WITH ADVANCE NOTICE.  COPY OF CN PROTECTION SHOWN BELOW.

                                                        FILE : RL9250515
  DIRECTOR NMC. RTC - CMC
  CP RAIL
  CALGARY ALBERTA
  RJS
  CONTACT:    RAILWAY LINE CLEARANCE OFFICER
              CLEARANCE BUREAU
              PHONE 403-319-7471 (OR) 800-363-0177
              S2-MR-#OM0184  FAX 403-319-6840
```

7.0 CN Protection Notice

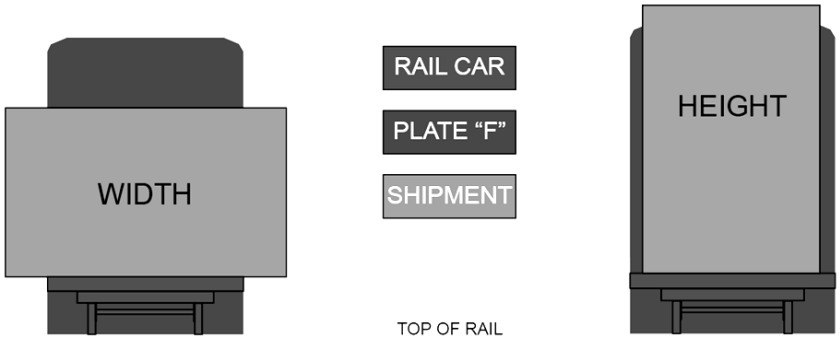
```
                PROTECTION NOTICES FOR CAR ID : TTRX361069

FILE:  - L42619
FOR: CP RAIL   REGION:
MONTREAL, QUEBEC                   JANUARY  29, 2004
TO ALL CONCERNED

DIMENSIONAL LOAD:
+++ DIMENSIONAL DUE TO WIDTH +++
D4R
TTRX 361069          VESSELS          147,000 LBS GROSS
MEASURING :
            8' 0" WIDE FROM  3' 4" TO  4' 4" ATR
           12' 4" WIDE FROM  7' 7" TO  9' 5" ATR
            8' 0" WIDE AT 14' 9" ATR
FROM        :  KAMLOOPS BC
TO          :  VANCOUVER BC
ROUTE       :  CN DETOUR ROUTE
VIA         :  VANCOUVER - YALE SUB - BOSTON BAR - ASHCROFT SUB -
               KAMLOOPS

IN ADDITION TO THE OPERATING RULES AND ANY YARD OR OTHER
SPECIAL INSTRUCTIONS, THE FOLLOWING RESTRICTIONS APPLY:

GENERAL RESTRICTIONS:
DO NOT HUMP, KICK OR DROP SWITCH.
WHEN ADVISED THE VIA LRC BANKING SYSTEM HAS FAILED EN ROUTE, THE
RTC WILL ISSUE INSTRUCTIONS TO ALL AFFECTED MOVEMENTS THAT SUCH
VIA EQUIPMENT IS OPERATING AS A D2U LOAD.

MEET/PASS INSTRUCTIONS
(Applicable until the restricted car(s) pass one another)

D-4
On adjacent Main tracks may meet/pass:
D1, D2: No restrictions
D3:  When one movement is stopped, the other movement is unrestricted.
When both are moving at meet/pass location, do not exceed 10 MPH.
D4: When one movement is stopped, the other movement not to exceed 10 MPH.
D5: Both movements must stop, then one movement must proceed on hand
    or radio signal.
Must not meet/pass D6 to D9

On single track at sidings may meet/pass:
D1 to D6: No restrictions
D7: When one movement is stopped, the other movement is unrestricted.
    When both are moving at meet/pass location, do not exceed 10 MPH.
D8: When one movement is stopped, the other movement not to exceed 10 MPH.
Must not meet/pass D9

SPECIFIC RESTRICTIONS:
WHEN "S.P.H.R.S." IS USED IN THESE RESTRICTIONS IT MEANS "STOP AND PROCEED ON
HAND OR RADIO SIGNAL".

WESTERN CANADA
NONE
FILE NO  : L42619

BARRY ANDERSON,  CN CLEARANCE BUREAU
FOR :   SENIOR VICE PRESIDENT. TRANSPORTATION
EDMONTON, ALBERTA  TEL:  780-421-6416  FAX:   780-421-6453
```

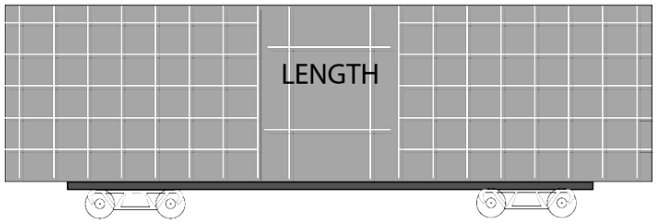
8.0 Appendix 1 - Dimensional Traffic Plate F

In reference to item 1.1. CP defines dimensional traffic as being any shipment exceeding Plate F.



Dimensional traffic may be easily identified by width, height, length.





General Operating Instructions (GOI)

Section 11 – 10/14/2015

General Information / Special Instructions

TABLE OF CONTENTS

1.0 Definition of Train / Movements

In the application of the rule definition of a Movement(s), where the term “train” appears within the GOI, unless specifically identified, it also applies to a transfer and/or engine in yard service.

2.0 Operation of Movements - Seating

2.1 Unless relieved by a Qualified Manager / Trainer, the Conductor and Locomotive Engineer on a movement shall be stationed in the operating cab of the lead locomotive.

A company officer or a Transport Canada Safety Inspector riding a movement will be accommodated in the lead unit.

When a Qualified Manager / Trainer is evaluating an employee, the Conductor and/or Locomotive Engineer may be deployed to other than the lead locomotive.

Note: Where seating will not accommodate all crew members in the leading unit, a trailing unit or other means of transport may be used to accommodate other employees required to ride.

Under these circumstances, the Qualified Manager / Trainer will assume the normal responsibilities of the relieved employee(s). The relieved employee(s) will have their normal responsibilities relaxed to the extent they may be performed from a trailing unit.

3.0 Movements Operating Over Unidentified Track Occupancy (UTO)

Note: The provisions of this instruction also apply in controlled interlockings.

3.1 When a movement operating at restricted speed (“on the lookout for broken rails”) discovers a broken rail, the movement must stop immediately and await the arrival of a QUALIFIED ES employee at the site to determine if the movement may continue under the supervision of such qualified ES person, or if the rail must receive temporary or permanent repairs first. The movement may then only resume operation once permission has been received from the RTC.

4.0 Movements Operating Over Suspected Broken Rail

4.1 When a movement passes over a location that creates a loud noise, unusual locomotive ride or other indication consistent with the possibility of a broken rail, whether in signalled or non-signalled territory, the following must be adhered to.

1) Speed must be immediately reduced to 10 MPH and a pull-by inspection or passing train inspection on at least one side of the movement must be performed as soon as possible. The crew must immediately report their observation to the RTC.

2) The provisions of item 3.1 apply.

5.0 UNIDENTIFIED TRACK OCCUPANCY (UTO) BEHIND A MOVEMENT

1. When a movement has been advised by the RTC that a Unidentified Track Occupancy (UTO) inspection is required, the movement is governed by the following:

1st UTO	2nd UTO	3rd UTO
If moving to OCS, the movement must have a pull-by inspection performed in one of the following manners, in no case exceeding 60 miles from the location of the 1st UTO: • By other crew members at a crew change or meet location. • By wayside employees. • By crew members of the movement which left the UTO.	Movement must stop and perform a pull by inspection at the first safe location, avoiding impediments to a safe inspection such as bridges. **NOTE:** Inspection to be performed by qualified Field Operation personnel. The inspection must include a pull-by inspection of one side of the equipment at a speed **not exceeding 10 MPH**, followed by a stationary inspection on the other side. BOTH sides of ALL cars and locomotives must be inspected for potential wheel defects. Inspection of entire movement must be completed even if defects are found.	The movement must be stopped immediately until full inspection can be made by a certified car inspector.
NOTE: For 2nd or 3rd UTO inspection, the RTC may allow a movement to proceed at a speed not exceeding 10MPH in order to clear a switch prior to the inspection being performed.		

2. If any wheels are found or suspected to have defects, that piece of equipment must be set off at that location if possible, OR moved at a speed **not exceeding 10 MPH** to the nearest location where it can be set off, but only if deemed safe to move by the person making the inspection. Results of the inspection must be recorded on the Crew Information Form, noting "UTO inspection".

3. In situations where the crew has been advised by the RTC to inspect and it is further determined that the UTO was not caused by railway equipment, the RTC will advise the crew that they are relieved from performing the inspections required by the UTO policy. The crew must draw a line through any related entry on the Crew Information Form and enter "UTO cancelled" with the date, time and RTC initials for the UTO that was removed.

6.0 Reporting Requirements

6.1 All employees must immediately report an accident / incident or injury that has occurred that is beyond what would be considered as normal railway operations.

Reporting procedures:

- Report to the RTC, Superintendent – Operations Center Calgary or immediate supervisor.
  Calgary OC Emergency phone number is: 1-800-795-7851.

6.2 The employee making the initial report must complete the General Incident report (provided in the conductor's form package) as soon as possible after the occurrence and supplemental report (as provided at home terminals) and submit them to his/her immediate supervisor.

6.3 Employees must immediately take whatever action may be required, and which can be performed safely, to protect the safety of persons, property, or the environment.

6.4 Employees are to remain at the scene of an accident until released by the RTC, their supervisor, or another person in charge at that location.

7.0 Protecting the Accident Scene

7.1 Employees have an obligation to protect any evidence relevant to a reportable accident.

Members of train crews and other employees who may be on the scene or are otherwise involved with an accident should note all relevant facts including the names and addresses of potential witnesses, so that they will be in a position to give information should the matter be investigated.

NOTE: If there is any doubt about what actions should be taken, communicate with the RTC or immediate supervisor.

7.2 At the scene of an accident or incident, if requested to give a statement to any government authority, employees should:

- Verify the other person's identification before providing any information.
- Provide only the facts as you know them. Do not offer opinions, assumptions, or impressions.
- Contact your supervisor if you are uncertain whether to respond to requests for information or any particular line of questioning.
- Always advise your immediate supervisor or the RTC when you have provided information to outside authorities.

NOTES:

Do **not** provide signed statements, unless required by a company officer.

Do **not** provide a drivers license, even if requested.

Do **not** give statements or information to anyone who does not have a legal right, such as the news media, attorneys, insurance representatives, etc.

Give statements only to legal authorities (TSB or Transport Canada investigators, Police, or Coroner).

8.0 Injuries or Fatalities

8.1 When an accident involving serious personal injury has occurred, the local police and any required medical support should be immediately summoned to the scene.

8.2 When a fatality has occurred due to any cause, crews must report the fact immediately to the RTC or their immediate supervisor.

8.3 A copy of the Canadian Rail Incident Investigation Guideline is supplied in the conductor's form package and is to be provided to any police officer responding to incidents involving injuries or fatalities.

9.0 Environmental Incidents

9.1 An environmental incident includes the accidental or unintended release of any dangerous or non-dangerous substance into the natural environment, including land, water, or air.

Immediate reporting to the OC is required for all environmental incidents.

10.0 Regulatory Requirements

10.1 Regulatory Requirements are available upon request to your immediate supervisor.

11.0 Passenger Train Procedures

11.1 Passenger Train Procedures are available on-line through the employee website or upon request to your immediate supervisor.

12.0 General Security

12.1 Employees must immediately report to the RTC, their supervisor or CP Police, any security incident, including suspicious objects, activity or unauthorized people on or near Company property.

CP Police Communication Centre
1 – 800 – 716 – 9132

- Employees should:
  - Be prepared to provide details such as descriptions of objects, individuals and/ or vehicles.
  - Not place themselves at risk
  - Not approach or confront unknown persons if they appear threatening, upset, depressed, or intoxicated. If you feel threatened back off and call the police.
- Suspicious objects can come in many different forms and may appear ordinary.
- Remote Monitoring Equipment (RME), such as GPS (Global Positioning System) devices are commonly being installed on highway trailers, railroad freight & tank cars and are not suspicious objects. Per AAR Standard S-2045, they are:
  - Identified by a sticker, label or stencil:
    - At least 2" X 3"
    - In a highly visible bright yellow or orange with black lettering
    - Located within 12 inches of the sensor
    - With information describing the device indicating its function and providing a phone number for information related to the device.
  - Located in various locations on rail cars.
  - Identified in UMLER if the RME is permanently mounted
- More information on CP's Security Plan and Programs can be found on RailCity.

12.2 In the event of a security incident and / or change in CP's Security Alert Level, RTC's will notify train crews of any required actions. Train crews will be governed by these instructions.

13.0 Persons Riding Trains

13.1 The conductor or other employee in charge must immediately report to the RTC whenever there are other persons riding in locomotives or other non-passenger rail equipment, excluding assigned crew members and managers / supervisors performing their duties.

Managers must notify the OC Supervisor RTC when they will be riding.

13.2 This report should identify the individual(s) name and what authorization they have for accompanying the train or equipment, including:

- a company employee who is performing normal duties and has company ID
- a company employee who possesses a signed access pass and has company ID
- a non-employee who possesses a signed pass, photo ID and has completed a liability waiver form.

13.3 If there are unauthorized persons riding on the train, the train crew should:

- not proceed, or stop at the next available location, AND
- notify the RTC or CP Police.

14.0 Employee Identification

Employee identification cards are issued to all CP employees.

Employee identification cards include the employee's name, employee number and a phone number that can be used to confirm employment or obtain emergency contact information. The cards must be signed and carried along with valid photo ID by all employees on duty, and both pieces of identification must be presented for on-demand checks by a Company officer or by a customer while at a customer site. The employee identification cards do not replace location-specific access cards.

Employee identification cards are non-transferable, and are the responsibility of each employee. If an employee's card is incorrect, irreparably damaged, lost or stolen, the employee must contact the Human Resources Service Centre at 1-866-319-3900 to arrange replacement. The contact number or HR Self Service on CPStation must be used to ensure emergency contact information is up-to-date.

15.0 Disclosure of Sensitive Information

15.1 Be aware of personal conversations with others off the property concerning your job and workplace. Unusual interest in technical details should be reported to your supervisor and CP Police.

NOTE: All CP employees are prohibited from providing any outside third party with information regarding dangerous goods movements, routing, volumes or storage.

16.0 Border Crossing

16.1 All employees crossing the border must comply with all requirements and requests from both the U.S. Customs and Border Patrol and Customs and Immigration Canada officials.

Unless otherwise instructed, you must check in with border officials each time you cross, regardless of why or the duration. It is illegal to cross the border with firearms, explosives, drugs, other banned substances or goods that may be subject to any form of import duty.

17.0 SPECIAL CONTROL ZONE (SCZ)

CP - SYSTEM SPECIAL INSTRUCTION

IMPORTANT: The following special instruction only applies when a GBO declaring Special Control Zone is in effect.

SPECIAL CONTROL ZONE (SCZ)

Definition:
A method of control used in situations where SCZ System Special Instruction applies. Within SCZ, the Site Supervisor will issue instructions to co-ordinate track work, the operation of movements and track units.

GM Transportation - OC must consult with T&E Managers, Engineering and S&C.

GM –Transportation will authorize Special Control Zone.

Within limits specified by GBO:

CTC is withdrawn from service and main track(s) and signalled siding(s) are designated as “NON-MAIN TRACK,” or OCS (or OCS/ABS) is withdrawn from service and main track(s) are designated as “NON-MAIN TRACK.”

Unless otherwise indicated, all signal indications within the specified limits are suspended.

Unless otherwise specified, interlocking limits remain in service.

Before entering or moving within the zone, all movements and track units must receive permission from the Site Supervisor.

Prior to placing protection, the Site Supervisor must be advised.

Unless otherwise instructed by the Site Supervisor:

- all requirements of non-main track outside of non-signalled sidings in CTC apply;
- movements must not exceed 15 miles per hour while the leading end of the movement is within the limits; and
- track units must not exceed 15 miles per hour.

All GBO within the limits remain in effect. Speed restrictions not protected by foreman or Site Supervisor instructions may be protected by GBO.

All TOP and GBO Protection within the proposed limits should be cancelled before the GBO declaring Special Control Zone in effect is issued.

Exception: When necessary to maintain protection, GBO and/or TOP may remain in effect after Special Control Zone GBO is in effect until alternate protection is established.

Unless otherwise instructed by the Site Supervisor, dual control switches and dual control switch point derails must be placed in hand position. Before moving over a dual control switch or dual control switch point derail, a crew member must observe that the switch points are lined for the route to be used.

Unless manual protection is provided or advised otherwise by the Site Supervisor, protected crossings must not be obstructed until the warning devices have been operating for at least twenty seconds.

Prior to cancellation of the Special Control Zone, the Site Supervisor must inform all concerned, ensuring protection is in place when required, and advise the RTC accordingly.

Note: Instructions for the proper application of Special Control Zones and Question & Answer guide, are available on CPSTATION under:

OPERATION > Operating Rules & Practices > Rule Book and forms > All Operations employees.

Section 12 - 10/14/2015

Track Signs

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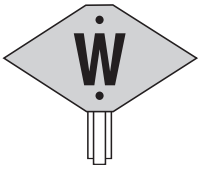
Signs illustrated in this section are in accordance with current standards. Signs of older types still in service convey the same meanings.

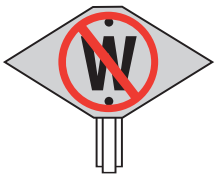
WHISTLE POST



Black letter W on reflective silver background

Located at least one-quarter (1/4) mile from the edge of all public crossings at grade, blind curves and tunnels.

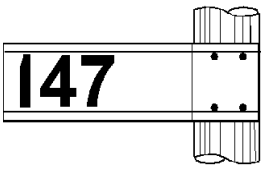
PROHIBITED WHISTLE POST



Black letter W encircled in red with red diagonal bar, on reflective silver background

Located at least one-quarter (1/4) mile from the edge of every public crossing at grade, where engine whistle signal Rule 14 (l) is prohibited by special instruction.

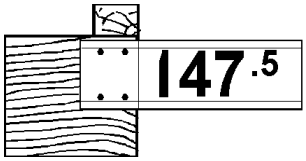
MILE POST



Black numerals on white background

Located at one mile intervals to designate subdivision mileage.

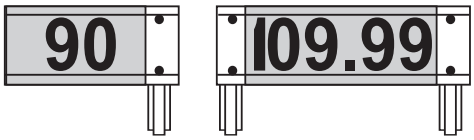
STRUCTURE NUMBER SIGN



Black numerals on white background

To designate to nearest tenth of a mile the location of certain structures such as bridges, tunnels and snowsheds.

SWITCH MILE SIGN



Black numerals on reflective silver background

Located opposite actual point of switch, to identify certain switches which are designated by mileage in Track Occupancy Permits or Clearances.

STATION MILE SIGN

Black letters on white background

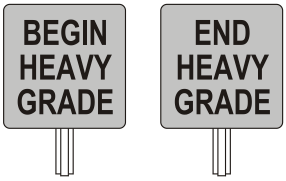
Located one mile from station, siding switch, first main track switch where trains can enter or leave yard tracks, designated switch, or junction switch, whichever is the most outlying in each direction.

STATION NAME SIGN

Black letters on white background

Located at mileage shown in time table, parallel to main track.

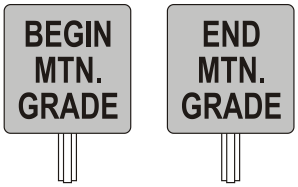
BEGIN HEAVY GRADE SIGN and END HEAVY GRADE SIGN



Black letters on reflective silver background

Placed at locations indicated in special instructions or in time table footnotes to mark the beginning and end of a downgrade which exceeds 1.0%, but does not exceed 1.8%, for a distance of 2 miles or more.

BEGIN MOUNTAIN GRADE SIGN and END MOUNTAIN GRADE SIGN



Black letters on reflective silver background

Placed at locations indicated in time table footnotes or special instructions to mark the beginning and end of a downgrade which exceeds 1.8%.

ADVANCE SPEED SIGN

Black vertical arrow above black letters, on reflective yellow background

Located one mile in advance of a permissible speed sign marking the beginning of a zone of lower speed.

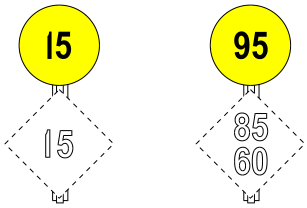
PERMISSIBLE SPEED SIGN

Black numerals on reflective yellow background

To mark the beginning of a speed zone specified in special instructions. When two speeds are shown on the sign, the upper speed applies to passenger trains and the lower speed to other trains and engines.

When one speed is shown on the sign it applies to all trains and engines.

SPECIAL SPEED SIGN



Black numerals on reflective yellow background

To mark the beginning of a speed zone for special types of passenger train equipment when specified in special instructions. Mounted on a sign post, above a permissible speed sign.

POINT PROTECTION ZONE SIGN

White lettering on octagonal red background

When used, will be located either at the Point Protection Zone (PPZ) limit or in close proximity to provide a visual reminder of entering a PPZ. Note: May be mounted to a post, switch or other structure and may include a number plate to identify separate zones when used.

STOP SIGN

Black letters on reflective red background

Unless otherwise specified, movements must STOP prior to passing the sign.

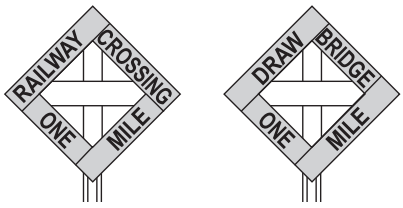
Located 500 feet, except where otherwise indicated, from non-interlocked railway crossings at grade, non-interlocked drawbridges, and at other locations where its use is required.

END OF TRACK SIGN

Black check on reflective yellow background

Located at the actual termination point of track, to indicate end of track.

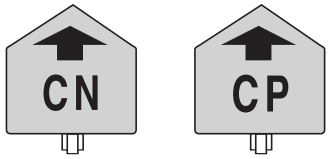
RAILWAY CROSSING AT GRADE and DRAWBRIDGE SIGN



Black letters on reflective silver background

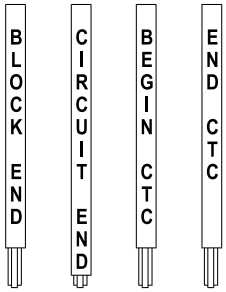
Located one mile from non-interlocked railway crossings at grade and non-interlocked drawbridges.

BEGINNING OF (named) RAILWAY SIGN



Black vertical arrow above black initials of railway, on reflective silver background

BLOCK and CIRCUIT END, BEGIN and END CTC SIGNS



Black letters on white background

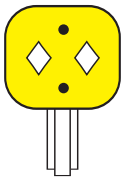
BLOCK END - Indicates end of track circuit controlling a block or interlocking signal.

CIRCUIT END - Indicates end of track circuit controlling automatic warning devices at locations specified in special instructions, or other designated devices.

BEGIN CTC - Indicates beginning of centralized traffic control system territory.

END CTC - Indicates end of centralized traffic control system territory.

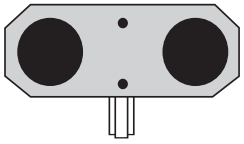
RESTRICTED CLEARANCE SIGN



Two diamond shaped holes in yellow background

To call attention to restricted side or overhead clearance, or both, where employees must not ride sides or above the roof of a moving engine or car.

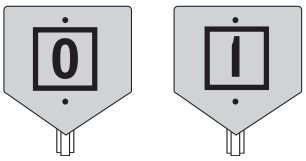
SNOW PLOW AND FLANGER SIGN



Black circles on reflective silver background

To call attention of snow plow and flanger operators to an obstruction to the operation of their snow removal equipment.

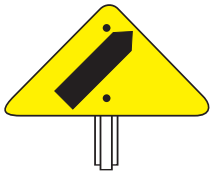
BEGIN MEASURED MILE SIGN and END MEASURED MILE SIGN



A black numeral within a black hollow square on reflective silver background

Placed exactly one mile apart, and located where required, to permit crews to verify accuracy of the Locomotive Speed Indicator and/or the Distance Measuring Device.

ADVANCE INTERLOCKING SIGN



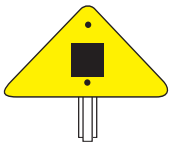
Triangular shaped sign with a black diagonal arrow on reflective yellow background

Located one mile from interlocking not provided with an advance block signal.

Indication: Proceed, preparing to stop at the interlocking signal.

Note: This requirement does not apply when track is seen to be clear to the interlocking signal and such signal indicates proceed.

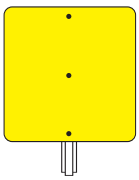
ADVANCE CAUTIONARY LIMIT SIGN



Black square on reflective yellow triangle

Placed at least one mile in advance of each cautionary limit sign.

CAUTIONARY LIMIT SIGN



Reflective Yellow Square

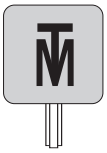
To define cautionary limits. Sign visible from both directions.

DIMENSIONAL ZONE SIGN

Black letters on reflective silver background

To define dimensional zone limits specified in the time table and described in GOI Section 10, Item 5.4.

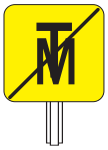
MAIN TRACK BEGINS SIGN



Black letters T over M symbol on reflective silver square

Located at the actual point where main track begins.

MAIN TRACK ENDS SIGN



Black letters T over M symbol with black diagonal bar on reflective yellow square

Located at the actual point where main track ends.

Note: These signs need not be placed where the main track begins or ends at a switch.

ENGINES PROHIBITED BEYOND THIS POINT SIGN

Black engine symbol encircled in red with red diagonal bar on reflective yellow square

Located at actual point beyond which an engine is prohibited from moving.

SPOTTING OF EQUIPMENT PROHIBITED BEYOND THIS POINT SIGN

Black car symbol encircled in red with diagonal red bar and black arrow on white square

Located at sufficient distance from a road crossing, and to the outside of the outer track(s) to which it applies, in order to provide adequate sight distance of adjacent main track for vehicles using the road crossing.

Indication: Cars, engines or track units may not be left between the sign and the road crossing in the direction of the arrow.

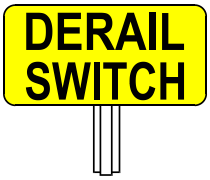
DERAIL/DERAIL NUMBER SIGN

Black letters/numeral on reflective yellow background

DERAIL - Indicates location of derail.

DERAIL NUMBER - When added to DERAIL sign, indicates another derail, or other derails, on adjacent track(s) where derail signs cannot be installed because of clearance restrictions. Number refers to the total number of tracks having derails at the location marked by the derail sign.

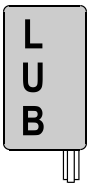
DERAIL SWITCH SIGN



Black letters on reflective yellow background

Indicates location of a switch point derail.

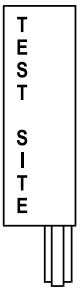
LUBRICATOR LOCATION SIGN



Black letters on silver background

To indicate to snow plow operators the location of a rail lubricator mounted on track.

TEST SITE LOCATION SIGN

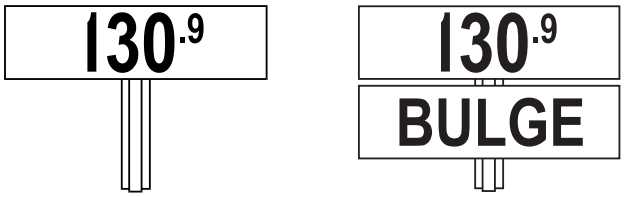


Black letters on white background

To mark location of a service test of track materials or other test location.

When length of test site warrants, beginning and end of test site may be marked.

DIMENSIONAL BULGE SIGN



Optional

Black numerals on white background

To designate, to the nearest tenth of a mile, the location of the beginning or end of the dimensional bulge identified in the time table.

Located to the outside of main track and siding at each location.

REMOTE LOCOMOTIVE OPERATION SIGN

Located in areas where remote operations are in use