Section 16

Train Handling

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1.0 General Instructions

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

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

1.3 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.

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

1.5 Winter Conditions

A - During weather conditions which may cause snow or ice build up 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 build up 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.

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

B - 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.

1.7 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 systems 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.

1.8 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.

1.9 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.

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2.0 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 16, item 7.7 c), 12.1 e) and 12.4 b)

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.

3.0 Use of the Automatic Brake

3.1 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.

3.2 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 to 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.

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

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

3.5 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 25 cars in the train.

4.0 Reporting Undesired Brake Releases

4.1 Locomotive engineers are responsible for reporting undesired brake releases immediately to the RTC and to record the location of occurrence by subdivision and mile, as well as description of use of the automatic brake prior to the release, for furtherance to the Road Manager.

5.0 Minimizing Sticking Brakes

A - Do not overcharge the train brake system above the standard pressure for that train, 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 build up 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, if a 15 psi brake pipe reduction has not been made, it must be increased to that amount and comply with GOI Section 13, item 9.4, Continuity Test Procedure.

6.0 Emergency and Penalty Brake Applications

6.1 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.

6.2 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.

6.3 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.

6.4 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.

6.5 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.

6.6 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 - On locomotives so equipped, place the selector lever in the No 1 or Power position.

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

E - Advance the throttle to FIRST notch only.

7.0 Dynamic Braking (DB)

7.1 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	= 60,000 lbs	6
SOO SD40-2	= 60,000 lbs	6
Leased SD40/40-2/GP60	= 60,000 lbs	6
All CP AC4400 & ES44AC	= 98,000 lbs	10
CP 9100 - 9160 (SD90MAC)	= 96,000 lbs	10
CEFX 1026 - 1059 (AC4400)	= 96,000 lbs	10
SOO 6000 - 6062 (SD60)	= 80,000 lbs	8
Leased SD60	= 80,000 lbs	8
Some leased units	= nil	nil

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 the Locomotive Specialist.

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.

Note: When operating conditions permit, it is acceptable to operate with the lead locomotive isolated. Ensure DB factor does not exceed 20 when the locomotive is placed back "on line".

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 to Crew 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 this information on the Crew to Crew Form for the information of the next crew.

G - When changing off with another locomotive engineer, if the Crew to Crew 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 to Crew 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 less than indicated by this instruction.

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

7.3 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.

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

7.5 When commencing the descent of grades with train slack stretched, and it is known that both the DB and the train air brake will be used to control the train, the train air brakes must be applied first. The degree of the application is to be sufficient to control train speed throughout all but the steeper portions of the descent where DB is to be increased to whatever degree is required to provide the additional braking needed to control train speed.

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

A - At **Sidings** and **Crossovers**	When entering a siding or crossover and the DB factor of the lead locomotive consist is 14 or greater, 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**	When the DB factor of the lead locomotive consist is 14 or greater, the 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. **Note:** The train air brakes and DB may be used to comply with the speed restriction.
C - On **Yard Tracks**	When operating on any yard track, if the DB factor of the lead locomotive consist is 14 or greater, then the DB effort **MUST NOT** exceed 60 Klbs (500 amps on DC Traction motor power).

7.7 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 leased 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 during DB holding (refer to item 7.8 a) next page).

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 SD90MACs:

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 7.7 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 CP/StL&H/SOO 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
SD90MAC	CP 9100 to 9160
SD60	SOO 6000 to 6062
SD40/SD40-2	CP 786 SOO 778 CP or SOO 6601, 6602, 6604, 6606, 6608, 6610 6613 and 6615

F - Traction motors can be cut-OUT one at a time on an AC4400 locomotive. Even 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 an SD90MAC locomotives, it is not possible to cut-OUT a single traction motor. You may cut-OUT one truck (3 traction motors). If only truck # 1 is cut-OUT, then DB is approximately 50%. The DB factor is 5. If truck # 2 is cut-OUT, then DB is nil.

7.8 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 AC traction locomotives and CEFX 1026 - 1059 locomotives are equipped with DB holding features.

Additional information about DB holding:

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.

7.9 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 must be recovered as per GOI Section 15, Item 14.0. Penalty PCS must be recovered as per Section 15, item 13.0.

7.10 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.

8.0 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.

8.1 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
3 units	50 klbs	75 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 that 3 operating locomotives may be used when making reverse movements. Additional locomotives must be isolated.

8.2 On Distr Pwr trains, if at least 35 cars/platforms separate each locomotive consist, then each consist is permitted the limits as indicated in item 8.1 and in the application of item 8.3.

8.3 On Southern Ontario and Montreal Service Areas, if any part of the movement is on other than main track, and if you are handling one or more cars, the limits as shown for curves & turnouts in item 8.1 must be used when moving backwards, shoving or doubling over.

8.4 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.

9.0 Assisting Locomotive(s)

(Note: This instruction is governed by the Table in item 8.1.)

9.1 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.

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

Note:

I. It is not required to couple the brake pipe between the assisting locomotives 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.

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.

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.

9.2 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 15, Appendix 2 for axle counts.

Adding Assisting Locomotive(s) to head end of train	
Conventional trains	**Distr Pwr trains**
Must comply with GOI Section 15, item 4.0, "Number of Locomotives in a Basic Consist" (24/30 Driving Axles)	Maximum 24 driving axles allowed

Adding Assisting Locomotive(s) to Extreme Rear		
Conventional Trains		
As per table in item 8.1		
Distr Pwr Trains		
A. Distr Pwr Train with Remote Consist at Extreme Rear		
As per table in item 8.1, 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 8.1 would be two.		
B. Distr Pwr Train with Remote Consist Placed Mid Train		
As per table in item 8.1		
• 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 8.1 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.

10.0 Introduction to Train Handling Guidelines

10.1 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 purpose of these guidelines is twofold:

1 - to eliminate the occurrence of personal injury associated with severe slack action and,

2 - to minimize damage to the draft gear, cars and lading caused by poor train handling practices.

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.

10.2 GE AC4400 and GM SD90MAC Locomotives - Tractive Effort

Knuckles for standard freight cars are designed to withstand approximately 300,000 lbs of continuous tractive effort. Knuckles for bulk commodity freight cars are designed to withstand approximately 400,000 lbs of continuous tractive effort.

One AC4400 or SD90MAC locomotive is able to develop up to 180,000 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 9 MPH, one AC4400 or SD90MAC locomotive in throttle 8 will develop 145,000 lbs of tractive effort.

Due to the high level of tractive effort AC4400 or SD90MAC locomotives are able to develop, caution must be exercised when starting trains to avoid train separation.

11.0 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 when amperage or tractive effort begins to decrease.

12.0 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.
In many of the train handling methods, a final reduction is made approximately 200 feet from stop. This reduction is to keep the train bunched.
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.

13.0 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.

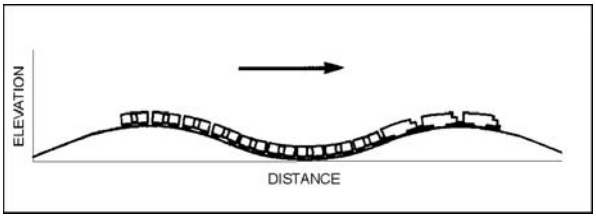
14.0 Slowing or Controlling Freight Trains

Methods to be considered:
Throttle Modulation - Gradually reduce throttle one notch at a time 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.

15.0 Definition of Track Profiles

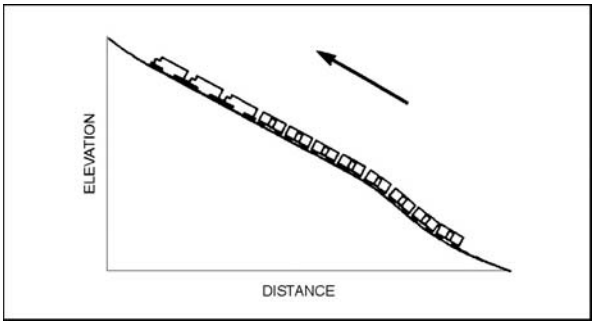
15.1 Undulating Grade

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.



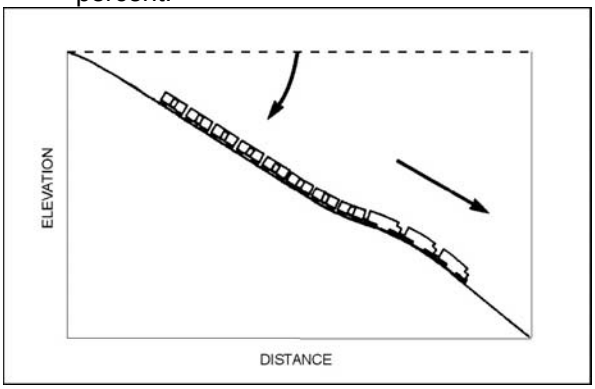
15.2 Ascending Grade

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



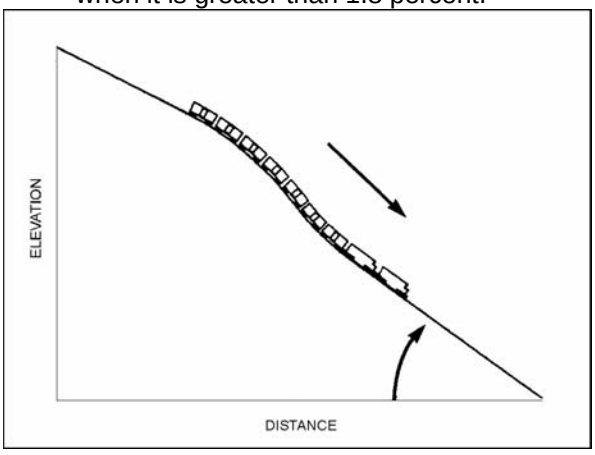
15.3 Descending Grade

A descending grade is considered HEAVY between and including 1.8 and 0.8 percent, while a light descending grade is below 0.8 percent.



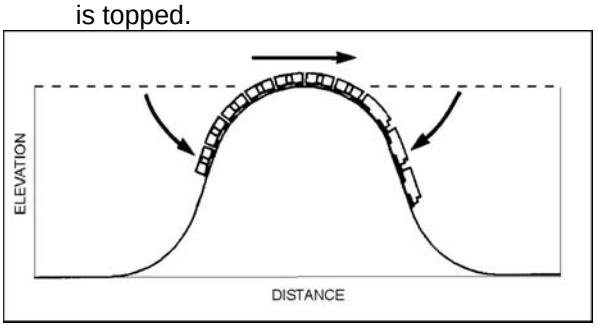
15.4 Mountain Grade

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



15.5 Cresting Grade

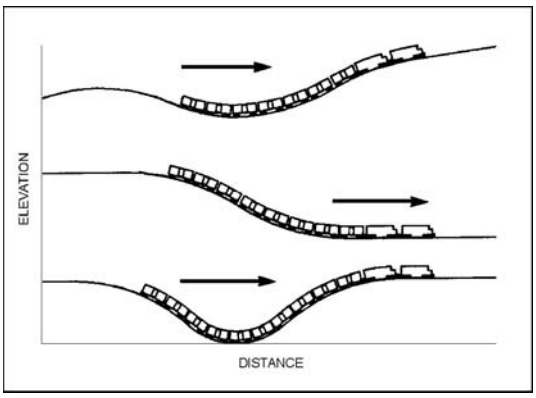
A long ascending grade which rapidly changes to a long descending grade, both of significant magnitude to require a change in the train handling procedure when the grade is topped.



16

15.6 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.

16.0 Passenger Train Handling

16.1 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.

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

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

16.4 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.

16.5 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.

16.6 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.

16.7 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.

17.0 Fuel Conservation

Using the most fuel efficient method of operation, not only reduces the amount of fuel used, it can also have tremendous advantages environmentally. The reduction of emissions into the atmosphere, such as hydrocarbons, nitrogen oxides, carbon monoxides, sulphur dioxides and particulate matter are greatly reduced.

Because fuel conservation techniques are of such importance, the following train handling guidelines are required, whenever, and wherever practicable. These instructions are in addition to those train handling guidelines and instructions contained in GOI Sections 15 and 16. 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	When choosing the low power split reduction method, the following steps must be followed: **1)** reduce the throttle to the 4th notch or less. **2)** the train air brakes must be applied in the following sequence: • make an effective minimum reduction. • reduce throttle again. • make additional brake pipe reductions in 2-3 psi increments as required, throttling down if possible between each supplement. * There are occasions when "ZERO THROTTLE" stretch braking might be employed - i.e. cresting grades, relatively short train with multi unit consists, trains where loads are marshalled near the head end, trains which are dynamically stable and are virtually slack free (i.e. bulk trains).
E	Unless authorized by Time Table or Special Instruction, High Throttle Power Braking (notch 5-8) is prohibited.
F	Whenever practicable, avoid increasing the throttle while the brake is set.

G	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 train 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.
H	Avoid short bursts of speed.
I	When charging the train air brake system, advance the throttle only when Main Reservoir pressure cannot be maintained at or above 105 psi., then promptly return the throttle to IDLE as soon as Main Reservoir pressure exceeds 105 psi.
J	The following locomotive defects are of particular significance concerning the efficient use of fuel and must be reported to the Central Locomotive Specialist: **1)** Non-operating, malfunctioning, or ineffective Dynamic Brakes. **2)** Engine not loading properly. **3)** Locomotive exhaust (e.g. excessive black smoke). **4)** Battery failure or other starting problems.
K	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.

17.1 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.

17.2 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 to Crew Form. When changing off with another crew, if the Crew to Crew 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.

17.3 Train Type Consist Header

There are two train types identified by consist header. locomotive engineer and conductor are jointly responsible to ensure that the train is operated as follows:

Expedited: Train is not limited by speed or throttle restrictions.

Non-Expedited: Maximum speed is limited to 45 MPH when operating in throttle 3 or higher.

Note: These instructions do not supersede CROR, Time Table or GBO restrictions.

17.4 Fuel Conservation Technology

Unless otherwise authorized by the NMC, fuel conservation technologies such as LEADER or Fuel Trip Optimizer when equipped on the lead Locomotive and operational, must be used on Subdivisions identified in Time Table footnote, Operating Bulletin or Special Instruction.

17.5 Diesel Engine Shutdown for Fuel Conservation

A	To conserve fuel, shutdown the diesel engine on locomotives 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. (i.e. trains staged on line, trains waiting work blocks, trains waiting crews, locomotive(s) set out on line, locomotives stored at tie-up points, locomotives on shop tracks, etc.)
B	Care and good judgment are to be used to determine if, and when, a diesel engine will be shutdown. When in doubt, contact the Network Management Center (NMC), yardmaster, local shop personnel, or a supervisor for information surrounding the decision to shutdown 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-2 Section 14, items 1.0 & 3.0. Trains left unattended for less than 15 MINUTES must be secured as required, but the locomotives can remain running. **Exceptions (attended or unattended):** 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 the locomotive(s). Also see Section 15 Item 20.0 for locomotive shut down system operation.
C	Follow the procedures for shutting down a locomotive (GOI Section 15, item 18.0) when it becomes necessary to shutdown a diesel engine.
D	Advise the NMC when locomotives are shutdown enroute and advise yard or terminal staff when locomotives are shutdown in yard areas. In addition, document on a Crew to Crew Form the time locomotives are shutdown in the event the locomotives are left for others.

Continued.....

E	Follow the procedures for starting a locomotive (GOI Section 15, item 17.0 and 18.0) when it becomes necessary to restart the diesel engine. **Note:** If the locomotive to be restarted has been shutdown for twenty-four hours or more, to ensure engine protection, contact local shop personnel or the central locomotive specialist for guidance.

APPENDIX 1: Descending Heavy Grade Job Aid

1.0 Purpose

This Job Aid 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 Service Area			
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 Service Area			
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
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
Boundary	MP 8.9 - 14.2	1.30%	Westward
Rossland	MP 18.2 - 14.6	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 Service Area			
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 Service Area			
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 Service Area			
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 Service Area			
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 Service Area			
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 Service Area			
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 Emergency Brake Application Required

Any train moving on a descending grade listed in Item 2.0, that attains a speed 5 MPH above permissible speed is considered an uncontrolled movement. An EMERGENCY brake application must be made.

Three immediate actions are required:

1 - the conductor must fully open the conductor's emergency valve

2 - the locomotive engineer must place the automatic brake valve handle in emergency position.

3 - the TIBS emergency brake feature must be activated. (Not applicable to trains without TIBS)

4.0 Train Handling Guidelines

Note 1: Wherein this Job Aid 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 17, 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 - 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 With Dynamic Brake

Step	Action
1	Crest the hill and gradually reduce the throttle to balance train speed below permissible speed.
2	Gradually move throttle to IDLE.
3	After 10 seconds, move dynamic brake handle to SET UP.
4	Advance dynamic slowly to bunch slack.
5	Control train speed by modulating dynamic brake handle to increase or decrease dynamic brake force.

4.3 With Dynamic & Train Air Brake

Step	Action
1	Crest the hill and gradually reduce the throttle to balance train speed below permissible speed.
2	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.
3	Check head-end display unit (TIBS) and observe brake pipe reduction at rear of train. (Not applicable to trains without TIBS)
4	Move throttle to IDLE.
5	Wait 10 seconds, place dynamic brake handle to SET-UP.
6	Slowly advance the dynamic brake handle to control train speed down the hill.
7	If necessary, make additional brake pipe reductions in 2-3 psi increments as the entire train moves onto the hill.

4.4 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.

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 road manager and be governed by his/her instructions.
- Reference must be made to applicable Emergency PCS recovery instructions **9.0** to **13.0** of this job aid.

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 road manager.

8.0 Moving from a Planned Stop on a Heavy or Mountain Grade: Conventional or Distr Pwr Train

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

Mountain grades are greater than 1.8% (See Time Tables for specific instructions)

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

Step	Switch / Part	Setting
1	a) Independent Brake	FULLY APPLIED
	b) Reverser	FORWARD
	c) Automatic Brake (AB)	RELEASE
	d) Dynamic Brake	DB #8
2	**When train starts to move** For **GM** (except SD90MAC) Locomotives RELEASE* independent gradually as DB increases (*if DB equipped and working) For **GE** and SD90MAC Locomotives FULLY RELEASE* independent (*if DB working)	
3	*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
	a) Automatic Brake / Equalizing Reservoir	REDUCE 7 psi below rear Car BP pressure
	***IF** speed still increasing;*	
	b) Automatic Brake	APPLY 2 psi supplements until grade is balanced and speed held within permissible limits

9.0 Emergency PCS Recovery: Conventional Train

Step	Switch / Part	Setting
1	a) Independent Brake	FULLY APPLIED
	b) Retainers	SET as required
	c) Reverser	NEUTRAL
	d) Throttle	IDLE
	e) Dynamic Brake	IDLE
2	a) Reverser	FORWARD
	b) Automatic Brake	EMERGENCY
	Wait 60 Seconds	
	c) Automatic Brake	Briefly return to HANDLE OFF, then RELEASE
	Ensure PCS indication is extinguished and brake pipe pressure is recharging normally	
	d) Dynamic Brake	DB # 8
3	**When train starts to move** For **GM** (except SD90MAC) locomotives RELEASE* independent gradually as DB increases (*if DB equipped and working). For **GE** and SD90MAC locomotives FULLY RELEASE* independent (*if DB working).	
4	*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
	a) Automatic Brake / Equalizing Reservoir.	REDUCE 7 psi below rear car BP pressure
	***IF** speed is still increasing;*	
	b) Automatic Brake	APPLY 2 psi supplements until grade is balanced and speed held within permissible limits

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10.0 Emergency PCS Recovery: Locotrol IV Leading Locomotives

Step	Switch / Part	Setting
1	a) Independent Brake	FULLY APPLIED
	b) Retainers	SET as required,
	c) Reverser	NEUTRAL
	d) Throttle	IDLE
	e) Dynamic Brake	IDLE
	f) Reverser	FORWARD
	g) Automatic Brake (AB)	EMERGENCY
	Wait 60 seconds	
2	***IF** Locotrol IS NOT in "Run Mode," then;*	
	a) MODE	PRESS
	b) RUN	PRESS
	c) EXECUTE	PRESS
	d) MAIN	PRESS
	Ensure each remote is in the FRONT GROUP	
	e) REMOTE	PRESS
3	Select each remote one at a time, press NORMAL, press EXECUTE.	
	***IF** IFD/ICE Indicates "Go To Release," then;*	
	a) Automatic Brake	Briefly return to HANDLE OFF, Then RELEASE
	Ensure the following results:	
	b) PCS indicator on lead and PC indicator on each remote	EXTINGUISHED
	c) Each remote	CHARGING
	d) Rear car BP Pressure	AIR RISING and RECHARGING normally
	e) Dynamic Brake	DB #8

Continue on next column…

Step	Switch / Part	Setting
4	**When train starts to move;**	
	a) Independent	FULLY RELEASE (if DB working)
	*Monitor speed and rear car BP pressure. Then, on **HEAVY** grades, prior to exceeding 50% of maximum permitted speed;* ***OR*** *on **MOUNTAIN** grades, prior to exceeding 5 MPH:*	
		Action
	b) Automatic Brake / Equalizing Res	REDUCE 7 psi below rear car BP pressure
	***IF** speed still increasing;*	
	c) Automatic Brake	APPLY 2 psi supplements until grade is balanced and speed held within permissible limits

11.0 Emergency PCS Recovery: Locotrol LEB Leading Locomotives

Step	Switch / Part	Setting
1	a) Independent Brake	FULLY APPLIED
	b) Retainers	SET as required
	c) Reverser	NEUTRAL
	d) Throttle	IDLE
	e) Dynamic Brake	IDLE
	f) Reverser	FORWARD
	g) Automatic Brake (AB)	EMERGENCY
Wait 60 seconds		
	If Locotrol is in "Run mode, go to **Step 3**	
2	***IF** Locotrol IS NOT in "Run Mode," then;*	
	a) DISTR POWER (IF DISPLAYED)	PRESS
	b) DP MAIN	PRESS
	c) MODE	PRESS
	d) ECECUTE	PRESS
	e) EXIT	PRESS
3	If all remote locomotives are in the FRONT GROUP, go to **Step 4**. If not, press MOVE TO FRONT, press MORE MENU (if displayed).	
4	Press REMOTE MENU (if displayed). Select each remote one at a time, press NORMAL, press EXECUTE.	
	***IF** IFD/ICE Indicates "Go To Release," then;*	
	a) Automatic Brake	Briefly return to HANDLE OFF, then SUPPRESSION, then RELEASE
	Ensure the following results:	
	b) PCS indicator on lead and PC indicator on each remote	EXTINGUISHED
	c) Each remote	Displays a value of flow CHARGING
	d) Rear car BP Pressure	AIR RISING and RECHARGING normally
	e) Dynamic Brake	DB #8

Continue on next column…

Step	Switch / Part	Setting
5	**When train starts to move;**	
	a) Independent	FULLY RELEASE (if DB working)
	*Monitor speed and rear car BP pressure. Then, on **HEAVY** grades, prior to exceeding 50% of maximum permitted speed;* ***OR*** *on **MOUNTAIN** grades, prior to exceeding 5 MPH:*	
		Action
	b) Automatic Brake / Equalizing Res	REDUCE 7 psi below rear car BP pressure
	***IF** speed still increasing;*	
	c) Automatic Brake	APPLY 2 psi supplements until grade is balanced and speed held within permissible limits

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12.0 Locotrol IV Communication 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

Locotrol IV Shut Down		
Note: Shut down Locotrol on the lead unit first, then remote units last.		
On Lead Locomotive		
Step	**Switch / Part**	**Setting**
1	SYSTEM Switch	PRESS
	UNLINK Switch	PRESS
	EXECUTE Switch	PRESS
2	**System Module Panel (in nose)**	
	Thumbwheels	0000
3	**Toggle Switches**	
	Locotrol/Conventional	CONVENTIONAL
	Lead/Remote	No Change
	Same/Lead or Opposite	No Change
4	**Circuit Breakers**	
	RELAY	OFF
	ELECT	OFF
	RADIO	OFF
5	**Engine Control Panel (in cab)**	
	GE's Distributed Power	
	Circuit Breaker	OFF
	GM's Locotrol Circuit Breaker	OFF
	Ensure AB handle is in EMERGENCY	

On Each Locotrol IV Remote Locomotive		
Step	**Switch / Part**	**Setting**
1	**System Module Panel (in nose)**	
	Thumbwheels	0000
	Toggle Switches	
	Locotrol/Conventional	CONVENTIONAL
	Lead/Remote	No Change
	Same/Lead or Opposite	No Change
	Circuit Breakers	
	RELAY	OFF
	ELECT	OFF
	RADIO	OFF
	Engine Control Panel (in cab)	
	GE's Distributed Power	
	Circuit Breaker	OFF
	GM's Locotrol Circuit Breaker	OFF
	Control Stand	
	Engine Run Switch	ON
2	**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
3	**IFD Screen**	
	Any F Key	TOUCH to turn on screen
	Operator Function	SELECT
	Air Brake Setup	SELECT
	IND Brake Lead/Trail	TRAIL
	AB Result	CUT-OUT
	Save Setup	SELECT & CONFIRM
4	**Ensure IND Brake is in TRAIL and AB is CUT- OUT**	
	Locomotives	ISOLATE
	Brake Cylinders (on each truck)	CUT-OUT
Repeat all the above steps on each remote unit On each Locotrol LEB Remote Unit, refer to Item 13.0 of this job aid.		
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 remote unit(s) are remarshalled to the head end or Locotrol is subsequently powered up again.		

13.0 Locotrol LEB Communication 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

Locotrol LEB Shut Down		
Note: Shutdown Locotrol on the lead unit first, then remote units last.		
On LEAD Locomotive		
Step	**Switch/Part**	**Setting**
1	On locomotive screen	press DISTR POWER (if displayed) press DP MAIN press SYSTEM
2	Press UNLINK	Press EXECUTE
3	Press END DISTR PWR	press EXECUTE
4	**Circuit Breakers in nose:**	
	DISTRIBUTED POWER RADIO	OFF
	DISTRIBUTED POWER TRAINLINE	OFF
5	CEFX 100-139 and CP 9300 - 9303 - Circuit Breakers are in the electrical cabinet:	
	D. Pwr Radio -	OFF
	EAB/DP - leave	ON
6	**Ensure AB handle is in EMERGENCY**	

On each Locotrol LEB Remote Locomotive		
Step	**Switch/Part**	**Setting**
1	DISTR POWER	Press
	END DISTR PWR	Press
	EXECUTE	Press
	Ensure "DP ON", or "DP REMOTE ENABLED" indicator is out.	
2	**Circuit Breakers in nose:**	
	DISTRIBUTED POWER RADIO	OFF
	DISTRIBUTED POWER TRAINLINE	OFF
3	CEFX 100-139 and CP 9300 - 9303 - Circuit Breakers are in the electrical cabinet:	
	D. Pwr Radio -	OFF
	EAB/DB - leave	ON
4	**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
5	**IFD Screen**	
	Operator function (if displayed)	SELECT
	Air Brake Setup	SELECT
	IND Brake Lead/Trail	TRAIL
	AB Result	CUTOUT
	Save Setup	SELECT& CONFIRM
6	***Ensure IND Brake is in TRAIL and Auto Brk is CUT OUT***	
	Locomotives	ISOLATE
7	Brake Cylinders (on each Truck)	CUT-OUT
	Repeat all the above steps on each remote unit. On each Locotrol IV remote unit, refer to item 12.0 of this job aid.	
8	**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.	

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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.