

SOUTH CENTRAL RAILWAY

Safety.387/Fly Leaf/05/2023

Fly Leaf No. 05 / 2023

Attention..... All Concerned

INSTRUCTIONS FOR DRIVERS TO MANAGE BRAKE SYSTEM OF LOCOMOTIVE / TRAIN IN DIFFERENT SITUATIONS ENCOUNTERED DURING TRAIN OPERATION.

As per RDSO Lr. No. MC / LHB / Brake dated 08.08.2019.

1.0 Introduction :

A number of instructions have been issued by RDSO from time to time on various aspects of train operation and train handling by drivers. In this report, all instructions specifically with regard to action by the driver (both diesel and electric) to deal with different situations that he may encounter during train operation, have been collected together along with any later developments and presented in a concise form for guidance of driver. The instructions have been divided into two sections:

- I. General instructions
- II. Instructions for abnormal situations.

The general instructions are for following situations :

- i. Before starting the train at originating station/yard.
- ii. Starting of train after stopping.
- iii. Stopping of train.
- iv. Single pipe working.
- v. Change of power at loco interchange point.

Instructions for actions to be taken in abnormal situations cover the following :

- i) Alarm chain pulling / Train parting / hose pipe disconnection.
- ii) Cattle run over
- iii) Working of twin pipe brake system to single pipe brake system.

Although efforts have been made to cover most of the situations encountered during train operation yet there may be some situations which may have not been covered in this report. In such situations, driver will have to take action befitting the situations keeping in view the general guidelines given in this report.

2.0 General Instructions :

2.1 Before starting of the train at originating station/yard

2.1.1 Before starting a train, the following air pressure/vacuum settings of brakesystem are to be checked :

(a) Air Braked Train

S. No.	Parameter	On Locomotive (In kg/sq.cm)	On Brake van (In kg/sq.cm)
1	Main reservoir pressure	8-10	-
2.	Brake pipe pressure		
	<i>Passenger</i>	5.0	4.8 – 5.0
	<i>Goods</i>	5.0	4.8 – 5.0
3.	Feed pipe pressure		
	<i>Passenger</i>	6.0	5.8 – 6.0
	<i>Goods</i>	6.0	5.8 – 6.0

S.No.	Parameter	On Locomotive (In kg/sq.cm)	On Brake van(In kg/sq.cm)
4.	Max. BC pressure when i) Brakes are applied <i>Passenger</i>	3.5	-
	<i>Goods</i>	3.5	-
	ii) Brakes are released <i>Passenger</i>	0	-
	<i>Goods</i>	0	-
5.	Air flow indicator*	White and red needle should coincide	

* Observe the position of movable needle of air flow indication gauge. Coincide red needle with white needle. Audio visual indication system provided in locomotive should be in working order.

(b) Vacuum Train

S.No.	Parameter	On Locomotive (vacuum in cm)	On Brake van (vacuum in cm)
1.	Vacuum level**		
	<i>Mail/Express</i>	53	47
	<i>Passenger</i>	50	44
	<i>Goods</i>	46	38

** Authority- Rly Board's letter No.83/M(N)/951/34 dated 26/05/99.

- 2.1.2 Check proper coupling of brake pipe and feed pipe of locomotive with trailing stock. For identification of air pipes, brake pipe angle cock & palm coupling are painted in green colour and feed pipe angle cock & palm coupling are painted in white colour. FP and BP are written on palm coupling of feed pipe and brake pipe respectively. Also both the couplings are in opposite directions.
- 2.1.3 All the angle cocks of brake pipe and feed pipe of the locomotive and trailing stock should be open. While hauling single pipe air braked stock, the feed pipe angle cock should be in closed condition.
- 2.1.4 Handle of A-9 automatic brake valve and SA-9 independent brake valve should be removed from inoperative control stand and their respective cut out cocks should be closed.
- 2.1.5 While hauling air braked stock H-5 relay air valve should be opened and HB-5 relay air valve should be closed.
- 2.1.6 Ensure that guard emergency valve/alarm chain pulling, air flow measuring device, light indication and buzzer sound indication are in working order.
- 2.1.7 The changeover cock of C-3-W distributor valve should be in goods or passenger (G or P) position for hauling goods/passenger trains respectively.
- 2.1.8 Perform the continuity test of brake pipe and feed pipe on the train from leading locomotive to the last vehicle.
- 2.1.9 Check that the brakes are applying on the entire train.

- 2.1.10 Release the brakes and check that the brakes are releasing on all the stock.
- 2.1.11 Check the operating cylinder percentage. In case of air braked train, it should be 100% on passenger trains and 85% on freight stock. In case of vacuum braked train it should be 95% on passenger train and 85% on goods train.
- 2.1.12 Check that brake pipe and feed pipe angle cock of the last vehicle are closed and their respective hose couplings are kept on support carrier.
- 2.1.13 For double headed train the maximum current limit shall be 650 amps for WDM2 locomotives and 750 amps for WAP1/WAP3 locomotives.
- 2.1.14 Ensure that proportionate brake of locomotive is in working order.

2.2 Starting of train after stopping

Do

- Move the brake valve handle (A-9) to release position.
- Wait for 3 minutes to release the brakes in case of single pipe brake system and 1-1/2 minute in case of twin pipe brake system fitted on trailing stock. Earlier starting, if train brakes have not been released fully, may result in excessive force on coupler and brake binding.
- Wait for 4 minutes in case of vacuum braked passenger train and 6-7 minutes in case of vacuum braked freight train to release the brakes.
- Ensure that air flow indicator white needle coincide with fixed red needle and light & buzzer is not giving any indication.

Do not

- Do not move the train unless air pressure and vacuum level is achieved as specified in para 2.1.1 (a&b).

2.3 Stopping Of The Train

2.3.1 On level track :

When the train (passenger/freight) is to be brought to a stop on level, first apply brakes with a small reduction of vacuum/brake pipe pressure in the train pipe by auto brake valve (A-9). This will allow the rear portion to run smoothly. A heavier reduction of vacuum / brake pipe pressure may then be made. In order to make the final stop very smooth, the brake application should be gradually reduced by recreation of vacuum/increasing the brake pipe pressure as the train is about to come to stop. The loco independent brakes should only be applied gradually when the speed has come down to about 5 kmph. This would help in bunching of the train and would help in easier start.

2.3.2 On down grade :

Destroy vacuum /brake pipe pressure partially on trains (passenger/freight) by automatic brake valve except in case of emergency stop. The application of vacuum/air brakes being increased as the speed comes down. When speed comes down, if proportionate brakes are in operation, the train shall be brought to stop with train and loco air brakes on. Heavy application should never be made or the rear portion is liable to run in violently and damage to rolling stock may occur. Similarly quick release will cause front portion to run out

resulting in service jolts.

2.3.3 On up grade :

When a train (passenger/freight) is brought to stop on an up gradient, the brakes should be kept applied by the automatic brake valve, till the train actually stops. This will prevent the rear portion from rolling back.

Note : After stopping of train keep brakes on locomotive and train applied by A-9 brake valve . It will prevent rolling back of train on gradients. Do not leave the train with only SA-9 in applied condition.

2.4 Working Of Single Pipe Brake System

Do

- Ensure that brake pipe of locomotive is connected with brake pipe of trailing stock. Ensure that angle cock of locomotive feed pipe is in closed condition and hose pipe is kept on support carrier on locomotive.
- Ensure that brake pipe angle cocks of loco and first vehicle are in open position.
- Ensure the continuity of the brake on train.
- Apply and release brakes and check that the brakes are applied and released on the train.
- Ensure the proper working of audio visual indication device with light indication and buzzer.
- Ensure that sufficient time i.e. 3 minutes is given to release the brakes after stopping the train.
- Wait for 4 minutes in case of vacuum braked passenger train and 6-7 minutes in case of vacuum braked freight train to release the brakes.
- Ensure that red needle coincides with white needle of air flow indicator.

Do not

- Do not move train if the indication light and buzzer are ON.
- Do not move train unless the pressure setting is achieved on locomotive and brake van as specified in para 2.1.1 (a)

2.5 Change of power at loco interchange point

Do

- Before detaching the locomotive close B.P and F.P angle cocks of locomotive and first vehicle.
- Disconnect hose coupling between locomotive and first vehicle.
- Open screw coupling and electrical coupler and detach the locomotive.
- Keep locomotive hose coupling on support carrier.
- Release brakes of locomotive and whole train
- Bring outgoing locomotives for attachment with the train.
- Couple brake pipe, feed pipe, screw coupling and electrical coupler (In case

of passenger train) of locomotive with first vehicle.

- In case of vacuum train couple vacuum hose pipe.
- Ensure correct coupling of the locomotive hose pipe with the trailingstock.
- Open brake pipe and feed pipe angle cocks of attached locomotive and first vehicle.
- Check the continuity of brake pipe and feed pipe of the train.
- Ensure that locomotive and stocks couplings are not loose.
- Ensure that locomotive proportionate brakes are in working order.
- Ensure that audio visual indication device and indicating light and buzzer are in working order.
- Ensure that air flow indicator reading is normal and its red needle is coinciding with white needle.

Do not

- Do not move train if the indication light and buzzer are ON.
- Do not move train unless the pressure setting is achieved on locomotive and brake van as specified in para 2.1.1 (a & b)
- Do not move unless the G&P position of distributor valve handle is kept on a proper position according to trailing stock i.e. passenger or goods.
- Do not try to detach hose connection between loco or between the two adjacent vehicle without closing the angle cocks.
- Do not start the train without ensuring full release of train otherwise it will create excess force on the coupler and/or brake binding.
- Do not attach outgoing locomotive until brakes of whole train have been released manually.

3.0 Actions to be taken in case of alarm chain pulling/ hose pipe disconnection / train parting :

If sudden rise of air flow indication much higher than the reading given by fixed red needle, drop in brake pipe, feed pipe and main reservoir pressure is noticed accompanied with buzzer sound of audio visual system on air braked train, it indicates either alarm chain pulling or hose pipe disconnection or train parting has happened. In case of vacuum braked train, drop of vacuum in vacuum gauge on loco will be observed during above mentioned conditions.

The actions to be taken during alarm chain pulling, hose pipe disconnection and train parting are given below :

3.1 Alarm Chain Pulling

Do

- Apply brakes by moving automatic brake valve (A-9) handle to stop the train.
- Bring throttle handle to idle.
- Inspect the train to identify the coach from which alarm chain has been pulled. This can be identified by coach body side indication lamp which will glow in the event of ACP as well as by air leakage sound.

- After identification in case of air braked train, reset the ACP apparatus by rotating the key which is provided in alarm chain pull box. Resetting will be ensured if air leakage sound disappears and body side indication lamp goes off. In case fixed key is not provided, resetting has to be done with a key which should be available with train crew.
- In case of vacuum braked train, reset the clappet valve.
- Check the vacuum hose coupling properly in case of vacuum braked train.
- Check that brake pipe and feed pipe angle cocks are in open position, in case of air braked train.
- After resetting of ACP apparatus, wait for 3 minutes to release the brakes in case of single pipe air brake working and 1-1/2 minutes in case of twin pipe air brake working.
- Wait for 4 minutes in case of vacuum braked passenger train and 6-7 minutes in case of vacuum braked freight train to release the brakes.

Do not

- Do not operate D-1 emergency brake valve
- Do not leave the train with only loco brake (SA-9) . After stopping both loco and train brake should be applied by automatic brake valve (A-9).
- Do not start the train if air flow indicator is showing abnormal reading, indicator light is glowing or buzzer is giving sound and its white needle has not coincided with red needle.
- Do not move train unless specified pressure or vacuum as given in para 2.1.1 (a&b) are achieved.
- Do not isolate the passenger emergency alarm system from isolating cock.

3.2 Train Parting / Hosepipe Disconnection

Do

- Apply brakes by moving automatic brake valve handle to stop the train. In case of train parting, ensure that before stopping of front portion of the train, parted rear portion has stopped first then apply emergency brake.
- Bring throttle handle to idle.
- Ensure that guard has protected the rear portion of the train.
- Ensure that brakes are in applied condition to avoid roll back of the train.
- Check the train to identify defective coach/wagon.
- Heavy sound of air leakage will indicate the affected hose pipe.
- Close the angle cocks of adjacent ends of two coaches where hose pipe disconnection has taken place.
- Inspect the hose pipe which has got disconnected.
- In case these pipes are damaged replaced them, In case there is no damage, reconnect the existing ones.
- In case train parting has taken place, reconnect the parted portion of the train as per prescribed procedure.

- Now open the closed angle cocks, no leakage should take place from the reconnected hose pipe.
- Ensure the continuity of the brake system and train.
- In case the brake hose/ vacuum hose pipe is damaged or cannot be replaced the pipe of the last wagon of the front portion should be put on dummy and the angle cock closed. The brakes of the portion in rear should be manually released and the train brought to the next station at reduced speed.
- Ensure that screw coupling of effected coaches are not loose.
- Observe the position of movable needle of air flow indication gauge, it should coincide with the fixed red needle. Audio visual indication system provided in locomotive should stop giving indication.

Do not

- Do not operate D-1 emergency brake valve.
- Do not move train until the air flow indicator light is glowing and its white needle has not coincide with red needle or buzzer is giving sound.
- Do not start train after stopping the train at least for 3 minutes in case of single pipe air brake system and 1-1/2 minute in case of twin pipe air brake system fitted on trailing stock to release the brake.
- Do not start train after stopping the train at least for 4 minutes in case of vacuum braked passenger train and 6-7 minutes in case of vacuum braked freight train to release the brakes.
- Do not move train unless the brakes on entire train are released fully.
- Do not move train unless specified pressure or vacuum as given in para 2.1.1 (a&b) are achieved.

4.0 Action to be taken in case of Cattle Run Over :

Due to cattle run over sudden impact in front of the locomotive is observed. Action to be taken during such condition is given below:

Do

- Apply brake through A-9 brake valve to stop the train.
- Check leading angle cocks of brake pipe and feed pipe to ensure that they are in proper condition.
- In case leading brake pipe angle cock is damaged then
 - a) If an additional cock is provided on the loco then close the additional angle cock on leading side of the loco.
 - b) If additional cock has not been provided then fail the locomotive and ask for assistance.
- In case feed pipe leading cock is damaged, close the additional cock, if provided or close the cutout cock before feed valve and rear feed pipe angle cock and work train as single pipe.
- Ensure that trailing end hose pipe coupling and angle cocks of the locomotive and trailing stock are in perfect working condition.
- Ensure that cattle guard is O.K. and there is no infringement with the track or with any part of the locomotive.
- In case the run over cattle has also passed below the train, check the undergear of the effected train coach/wagon. Any hanging parts shall be secured or

removed. There should not be any infringement of track.

- After resetting of ACP apparatus, wait for 3 minutes to release the brakes in case of single pipe air brake working and 1-1/2 minutes in case of twin pipe air brake working.
- Wait for 4 minutes in case of vacuum braked passenger train and 6-7 minutes in case of vacuum braked freight train to release the brakes.

Do not

- Do not move the train if any part of locomotive and trailing stock concerning to brake is damaged.
- Do not leave the train with only loco brake (SA-9) . After stopping both loco and train brake should be applied by automatic brake valve (A-9).
- Do not move the train without continuity test.

5.0 Actions to be taken to convert Twin Pipe Brake System To Single Pipe Brake System :

Such type of working is to be done when feed pipe is leaking or damaged or other problem connected with feed pipe. The actions to be taken in such a situation are given below:

Do

- Move A-9 brake valve handle to application position to stop the train.
- Close loco feed pipe angle cock of locomotive
- Check the location from where the feed pipe has disconnected.
- Immediately close the angle cocks of the effected vehicle
- Couple feed pipe hose coupling with the effected vehicle
- Open angle cocks of locomotive and effected vehicle
- If feed pipe coupling is defective change the complete hose pipe, if new one is not available than keep feed pipe angle cock of locomotive in closed position and work the train as a single pipe brake system.
- Ensure that screw coupling is not loose.
- Ensure continuity of the train.
- Keep in mind that the train is working as single pipe brake system and, 3 minutes time is required to release the brake after stopping of the train.

Do not

- Don't move train unless specified pressure as given in para 2.1.1 (a) is achieved.
- Do not leave the train with only loco brake (SA-9) . After stopping both loco and train brake should be applied by automatic brake valve (A-9).

PRINCIPAL CHIEF SAFETY OFFICER

SAFETY ORGANISATION

SOUTH CENTRAL RAILWAY