SOUTH CENTRAL RAILWAY

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Fly Leaf No. 03 / 2026

Attention..... All Concerned .....

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HOT AXLE, CAUSES & PREVENTION AND ENROUTE ATTENTION

In the recent past, it was reported/observed that Train Crew and Station staff have failed to act promptly and adopt the correct procedures, whenever unusual incidents/circumstances are arising out of train working. In order to prevent such failures, the following guidelines by connecting various instructions published in G&SR, Coaching Manuals, Freight Manuals, Accident Manual, etc., from time to time are once again re-iterated for the benefit of staff.

Hot axle box in a railway vehicle (wagon/Coach) occurs when inadequate wheel-bearing lubrication or mechanical flaws or defects cause an increase in temperature. If undetected, in time, the bearing temperature can continue to rise until there is a bearing "burn-off", movement or the train stops due to jamming of bearing and wheel which may cause a derailment.

A hot **axle box** (or "hot box") term is used when a railway rolling stock's axle bearing overheats abnormally due to friction, which can lead to bearing seizure or axle fracture resulting into derailment if not addressed immediately. The term is derived from the journal bearing trucks used before the mid-20th century

Hot Axle is a phenomenon which is caused due to overheating of ball, cylindrical or tapered rollers. Over heating may be due to the overloading (or) faulty condition of the bearing such as defective balls or rollers or races (or) insufficient lubrication and generate smoke or fire caused by igniting fires in EM pads or grain, coal, saw dust etc., available over the bogie.

(A) COMMON CAUSES OF HOT BOX / HOT AXLE :

The primary reasons for an axle box to overheat include:

I. Non-standard/sub-standard Lubricant
II. Mechanical defects
III. Irregularities in loading
IV. Miscellaneous reasons

I. NON -STANDARD/SUB-STANDARD LUBRICANT :

- Bad or sub-standard quality of grease.
- Excessive quantity of grease.
- Non availability / inadequate quantity of grease.
- Foreign material/moisture Contamination of grease

II. MECHANICAL DEFECTS :

- Defective or Broken bearing or its sub components.
- Oozing out of grease due to perished/defective rubber seal
- Defective or damaged adopter
- Defective or broken springs
- Incorrect fitment
- Improper mounting during maintenance
- Improper handling of bearing

III. IRREGULARITIES IN LOADING :

- Uneven loading
- Over loading
- Impact Load due to wheel defects/ track defects

IV. MISCELLANEOUS REASONS :

- ✓ Derailment
- ✓ Defects in rail track
- ✓ Excessive speed
- ✓ Skidded Wheels
- ✓ Wagon wheels submerged in Flood/rain water.
- ✓ Excessive oscillations or vibrations due to component wear and tear

(B) SYMPTOMS OF HOT AXLE / SEIZURE OF ROLLER–BEARING:

- ❖ Marks of Splashing / oozing of grease on wheel disc & Dis-colouring of grease.
- ❖ Smell of Burning grease.
- ❖ Light smoke from axle box.
- ❖ Hotness of axle box by feeling.
- ❖ Red glows during the night times.
- ❖ Discolouring of paint surrounded the axle box concerned.
- ❖ Burning of EM pads.
- ❖ Burning out of molten front cover in case of coaches
- ❖ flame over Axle Box
- ❖ Dis–colouring of Axle Box faceplate.
- ❖ Axle box face plate or front cover or end cap or damage or cut or missing.
- ❖ Axle Box cover becomes Red Hot.
- ❖ Metallic noise after grease has worked out and rollers have seized
- ❖ Screeching Sound
- ❖ Canted axle box.
- ❖ Axle may get locked and wheel skidding
- ❖ Sparks on Rail due to skidding
- ❖ High temperature measured with Non-contact thermometer or HABD/OMRS or WILD alerts
- ❖ Tilting of springs in case of primary suspension
- ❖ Vibrations of wagon /trolley

(C) INSTRUCTIONS ON AXLE BOX TEMPERATURE

i. Freight Stock:

(Ref: Railway Board lr No. 2018/M(N)/951/35. (E-3323024) New Delhi dated: 22.05.2025)

If any bearing temperature is more than 90 °C AND/OR temperature difference of more than 35°C in CTRBs on the same axle, detected through wayside equipment or manually using temperature gun wagon should be detached.

ii. Coaching Stock:

a) ICF:

(Ref: RDSO Lr No MC/RB/GNL dt 20-4-2015)

If the Temperature of the Axle Box is above 80 °C and/ or the difference in temperature of two axle boxes on a coach is above 20°C, the affected coach should be detached from the service.

b) LHB:

(Ref: RDSO Lr No. MC/CTRB/Defects Date: 12.02.2025)

For en-route measurement of temperature of axle boxes of coaches at halting stations and criteria for detachment of coaches on account of hot axle is as below:

S. No	Axle Box Temperature of Particular Coach	Action
1	Below 65°C and temperature difference on axle boxes of same axle is less than 20 °C	No action required.
2	From 65°C to 80° C and temperature difference on axle boxes of same axle is less than 20 °C	Information to next halting station & C&W control to check the temperature and C&W staff to accompany upto destination.
3	If temperature difference on axle boxes of same axle is more than 20° C, in which minimum temperature of any axle box is ≤ 50°C.	Information to next halting station & C&W control to check the temperature and C&W staff to accompany upto destination.
4	If temperature difference on axle boxes of same axle is more than 20°C, in which minimum temperature of axle boxes are ≥ 50°C.	Coach should be withdrawn from service
5	Above 80° C	Coach should be withdrawn from service

PRE-CAUTIONARY MEASURES / PREVENTIVE ACTION TO BE TAKEN DURING ROH & POH TO AVOID HOT AXLES:

(i) Use of specified tools only.

(ii) Work with clean tools in clean surroundings.

(iii) Keep bearings wrapped in polythene sheet when not in use.

(iv) RDSO approved brands of grease should be used.

(v) Apply clean grease and keep grease in closed container when not in use.

(vi) Never mix up the different greases of different grades or even different makes of same grade.

(vii) It must be ensured by stamping particular of grease seal that the CTRB would not complete more than 72months by the time it becomes due for next POH/ROH.

(viii) The dismounting of bearing by oxy cutting strictly prohibited, as above such defects are considered very prone to generation of fatigue during service.

(ix) Overhauling cycle of new CTRB to take place of 72 months interval.

(x) Prescribed Quantity of grease is to be used.

(xi) Load wear Zone area of bearing must be changed during fitment.

(xii) Each and every ROH/POH lateral play of bearing must be checked and UST of all Axles should be done.

(xiii) Damaged outer cup bearing should not be allowed in service.

(xiv) New Grease seal to be provided in bearing Over hauling.

(xv) Don't reuse locking plate locking plate should be replaced with new in ROH.

(xvi) End cap screws to tighten with the torque wrench at specified torque of 40 kg –meter (290 foot-pounds).

(xvii) All tabs of locking plate are properly bent up against the flats of the cap screw heads.

(xviii) Earthing in wagons during welding should be done properly and very close to the welding area so that electric current does not pass through bearing, it will cause arcing between the rollers and raceways leading to failure.

DUTIES OF RAILWAY SERVANTS IN CASE OF HOT AXLE ON RUNNING TRAIN:

(1) Any railway servant, observing symptoms of hot axle, seizure of roller bearing is noticed / reported on a running train, Station staff should exhibit danger hand signal and must do everything possible in their capacity to warn the train staff and to stop the train immediately. If all attempts fail to draw attention of the train staffs, the Station Master / Cabin Master / SM / Switch Man shall inform to the SM of the station in advance to stop and examine the train through available communication and shall also inform the Section Controller.

(2) In case it is not possible to stop the train by the exhibition of a Stop hand signal, the Competent Railway Servant on off side shall inform to the Station Master. (SR 4.42.5 (2))

The Station Master upon receiving such information or noticing such unusual by himself/herself shall at once –

i) advise the Gateman in section to stop the train and inform Loco Pilot and Guard of the circumstances and/or keep IBS signal, if any at 'on' and advise Loco Pilot of the circumstances when he/she contacts on telephone attached to IBS signal and/or

ii) inform TPC in case of electrified section to switch off OHE power supply and advise Loco Pilot of the circumstances when he contacts on emergency phone and/or

iii) advise the station in advance to stop and examine the train.

(3) Whenever station staff notices a train worked by an electric engine passing with a hot axle/any vehicle running in dangerous condition or smoke/fire emanating from a vehicle or with any other abnormality in the running train which is likely to endanger safety of the train/passengers, the Switchman/Station Master shall immediately take steps to stop the train. In case they fail to stop such train by normal means as laid down in G & SR, then, they shall immediately inform the TPC either directly or through SCOR to switch off the power supply of the OHE of the affected section under exchange of PNs. In case TPC has been directly informed, SCOR has also to be informed subsequently. (SR 17.09.1.11)

(4) If it is in block section and after the examination of GLP the Loco Pilot should exercise his discretion with regard to the restricted speed at which it is safe for the vehicle to run to clear the block section (SR 4.29.2).

(5) The Station Master receiving advice of a hot axle vehicle on a train shall receive it on the Main Line. If he is unable to do so, he shall bring the train to a stop outside the FSS before admitting it on any other line. After the arrival of the train at the station, the hot axle vehicle shall be examined by the C&W staff, where provided or by the Loco Pilot of the train. The wagon shall be detached if considered unsafe to run. (SR 4.29.3)

(6) When the Station Master receives advice of a vehicle on a train whose running gear is in any way considered dangerous, he shall bring the train to a stop outside the FSS and the train shall be thoroughly examined before being admitted into the station yard. (SR 4.29.4)

(7) In the event of the main line being not available and the train is to be received on a loop line, the SM, after ensuring that the train has come to stop outside the first stop signal, shall arrange to advise the LP of the train of the reason of the train being so stopped through a Station Staff / Points Man. The speed of train, while admitting on loop line, shall not be more than 10 KMPH.

(8) The LP on being so advised shall examine the train to ascertain if it would be safe to work the train up to the station negotiating the crossover for entry into the loop line. The train, thereafter, shall be piloted up to the station after fixed signals have been taken OFF and it has been ascertained by the LP that it is safe to do so. The LP while negotiating the facing points shall observe the speed restriction, which under no circumstances, shall exceed 10 KMPH.

(9) If an axle box of a vehicle is found running hot at a station, where the C&W staff are not provided, the vehicle shall be detached from the train. (SR 4.29.1)

(10) In the event of any vehicle derailing or meeting with an accident, no repairs, except those absolutely necessary, shall be carried out. No such vehicle shall be worked away from the station at which the accident took place or to which it has been brought for stabling from the accident spot except with the permission of the DRM, as it is important, in the event of any enquiry, to have the vehicle as near the scene of the accident and in the same condition as possible. The vehicle, before being moved with the permission of the DRM, shall be examined and certified by the TXR (C&W Staff) as fit to run. (SR 4.29.5)

(11) When a vehicle has been detached from a train due to defect or damage, the nearest TXR (C&W Staff) shall be advised. This vehicle shall be stabled and secured separately. Unnecessary shunting with or against such vehicle shall be avoided. The vehicle shall not be accepted again for traffic use or worked away from the station until certified fit by the TXR (C&W Staff). (SR 4.29.6)

(12) Water must not be poured on the Hot Axle to cool it but wait until it gets cooled by itself. If there is fire on the hot box then fire extinguisher, sand, soil can be used to extinguish the fire.

(13) The vehicles / wagons with hot axle shall be detached from the train on arrival at the station and it will be entered in the Wagon Exchange Register and the concerned C&W STAFF shall be informed about it. Para 4.10 of BMW (Block Working Manual) shall be followed for other instructions.

ACTION TO BE TAKEN BY:

1. Station Staff :

(a) Check/Observe for above mentioned Hot axle symptoms while train passing.
(b) Alert the crew by calling on VHF set /Walkie-Talkie and displaying stop hand signal.
(c) Put-back the departure signal. Advice the train crew through VHF set to stop & examine the train.
(d) Inform the Gateman, SM of the next station & Section Controller.
(e) Advise the controller to arrange to stop the train as early as possible.
(f) Advise the SM in advance not to allow any train in the opposite direction under exchange of Private Number.
(g) SM receiving advice of a hot axle vehicle on a train shall receive it on the Main Line. If he is unable to do so, stop the train at first stop signal and receive on to other line by taking cautions as mentioned above.

(h) On arrival at the station, advise the C&W Staff or Loco Pilot to examine the vehicle and act accordingly for further movement.

2. Train crew :

(a) Lookout while running on curves for any symptoms of unusual like smoke, fire.
(b) Stop the train on observance of symptoms of hot axle by first means.
(c) Examine the affected vehicle.
(d) Exercise discretion and take decision on movement to clear section.
(e) Loco Pilot /Train Manager (Guard) should watch carefully the signals exhibited by station staff, gateman or any other railway servant and act immediately to control speed.

3. Engineering and S&T staff :

(a) Be vigilant while train is passing through.
(b) Inform about any unusual noticed in train to the nearest Station Master/Controller.
(c) Show danger signal and try to alert the guard by shouting/warning.
(d) Arrange to stop the train immediately.

4. Section Controller :

(a) Arrange to stop the train if hot axle on train is reported by field staff and station staff.
(b) Inform to concerned departments and get it examined by Guard/LP/Station staff.
(c) Train should be stopped and checked as far as possible for any symptoms noticed.
(d) Such train should be allowed to enter station only after it is checked.

5. C & W Staff :

(a) Regular monitoring of OMRS, HABD& WILD alerts and take necessary action.
(b) Carry-out Rolling-IN and Rolling-OUT examination on all trains at nominated stations/yards.
(c) Temperature of the axle boxes to be noted immediately on arrival of trains by hand-held infrared non-contact thermometers (NCTM).
(d) Detach the vehicle if hot axle is noticed and axle box temperature as prescribed above.

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SAFETY ORGANISATION **SOUTH CENTRAL RAILWAY**

Disclaimer:
It is clarified that the above content mentioned on the subject in this FLY Leaf is an extract from different manuals, RB's letters and other letters. The same to be read in conjunction with the original letter & other manuals / letters issued from time to time and does not supersede any existing provisions laid down by RDSO, Railway Board or Zonal Railways. This FLY Leaf is for guidance only and it is not a statutory document.