

No. ECoR/SFY/ 67/915

Date 13.12.2024

Safety Circular No. 16 /2024

Subject: Safety Circular on Frequently Asked Questions (FAQ) on Hot Axles.

1. What is a "hot axle"?

A Hot Axle refers to an axle that has become overheated due to friction, lack of lubrication, or other mechanical issues. This can happen in wagons, coaches, locomotives and other railway vehicles, and may cause significant damage to the axle or surrounding components, especially bearings, if not addressed promptly.

2. What causes an axle to become hot?

The most common causes for an axle to overheat include:

- **Insufficient Lubrication:** Lack of grease or oil can cause the axle to overheat due to increased friction.
- **Excessive Load (Overloading):** Overloading a vehicle can put undue stress on the axle while generating heat.
- **Brakes Dragging:** If the brake system is malfunctioning, it can cause the brakes to drag which leads to excessive heat build up.
- **Bearing Failure:** Faulty wheel bearings or bearing races can generate heat and cause the axle to overheat.
- **Misaligned or Loose Components:** Improperly fitted components can cause body vibrations in a wagon or coach which in turn can result in wobbling of wheels and damage bearings and its housing. This can lead to a hot axle.
- **Friction:** Inadequate or worn-out seals or bushings can result in increased friction at the axle.

3. What are the signs of a hot axle?

Signs that an axle is overheating may include:

- **Unusual Odours:** A burning or hot metal smell can indicate overheating.
- **Wheel Wobble:** If the axle or bearings are worn, you may notice a wobbling or vibrating feeling while driving.
- **Increased Friction:** A hot axle may cause the vehicle to drag, leading to difficulty moving or reduced fuel efficiency.
- **Unusual Noise:** Grinding, whining, or squealing noises could be signs of bearing failure or friction issues.
- **Visible Damage:** You may notice smoke or the axle components may appear discoloured or warped due to excessive heat.

4. How does one can prevent a hot axle?

Preventive measures include:

- **Regular Maintenance:** Ensure proper lubrication and timely oil or grease changes for the axle.
- **Monitor Weight Limits:** Avoid overloading your vehicle, which can strain the axle.
- **Inspect Bearings:** Regularly check for signs of wear or damage in the bearings.
- **Brake System Checks:** Ensure the braking system is properly aligned and free from dragging.
- **Use Specified Components & Spares:** Always use quality parts for the axle, bearings, and lubrication.

5. How dangerous is a hot axle?

A hot axle can be very dangerous, especially if left unresolved. In extreme cases, overheating can lead to:

- **Derailment:** An overheated axle on expansion jams the bearing. This restricts free movement of the wheel and can cause derailment.
- **Complete Axle Failure:** This can cause the wheel to seize, resulting in a loss of control of the vehicle.
- **Fire Risk:** If the axle gets hot enough, it may ignite surrounding components, especially in vehicles carrying flammable materials (like trains carrying petroleum or coal).
- **Vehicle Breakdown:** An overheated axle can cause major breakdowns, requiring expensive repairs and loss of traffic movement.
- **Delay or Cancellation of Trains:** It can cause severe inconvenience to passengers by blocking train movement and hence causing delays or even cancellation of trains.

6. How hot axle can be detected?

A hot axle can be detected by observing symptoms by line staff or during rolling-in-examination by C&W staff or by HABDs. Symptoms are listed in question number 3.

Hot Axle Box Detector (HABD): HABDs can be installed on tracks in regular intervals to monitor temperature of bearings. It sends SMS alerts to C&W Control Room when temperature of a bearing is observed above permissible limits.

Use of HABDs is prevalent in Indian Railways. Alternatively, **acoustic sensors** or **vibration analysers** may be used for detection of hot axles.

7. What should one do if one notices a hot axle?

If you notice a hot axle:

- **Pull Over Safely:** LP/ALP should stop the rake immediately in a safe location and inspect the affected area.
- **Examination:** Affected axle to be examined LP/ALP/TMR and decision is to be taken if the vehicle can move to next station or has to be detached immediately to prevent further damage to railway property.
- **Reporting:** Line staff to immediately alert TMR by shouting or hand gestures and then report to SM/SMR of the nearest station and sectional controller for controlling the train.

8. What should be done if C&W staff detects hot axle during rolling-in-examination?

If hot axle in a vehicle is detected during rolling-in-examination, the temperature of the axle boxes to be measured and decision should be taken accordingly as elucidated below.

For Wagons	
Temperature of axle box is found above 80°C.	Wagon to be detached.
Temperature of axle box is found between 65°C and 80°C.	Wagon to be allowed to run with accompanying C&W staff.
Temperature of the axle box is found below 65°C.	Wagon to be allowed to run.

For Coaches	
Difference in temperature of axle boxes in same axle is found above 20°C.	Coach to be detached.
Difference in temperature of axle boxes in same axle is found between 15°C and 20°C.	Coach to be allowed to run with accompanying C&W staff.
Difference in temperature of axle boxes in same axle is found between 10°C and 15°C.	Inform next TRX point for examination of the vehicle.
Difference of temperature of axle boxes in same axle is found below 10°C.	Coach to be allowed to run.
Temperature of axle box is found above 80°C.	Coach to be detached.

9. How long can an LP/ALP drive with a hot axle?

It's not advisable to drive with a hot axle, as it can lead to further damage to the axle, bearings, and other vehicle components. Prolonged driving with a hot axle can cause severe damage and potentially result in a derailment. Always address the issue as soon as possible to avoid more costly repairs and potential safety hazards.

(S. K. Mishra)
PCSO/ECOR/BBS

Copy To:

1. Secretary to GM/ECOR for information of GM/ECOR, please.
2. Secretary to AGM/ECOR for information of AGM/ECOR, please.
3. All PHODs for information and necessary action, please.
4. DRMs KUR, SBP and WAT for information and necessary action, please.
5. CWM/MCS for information and necessary action, please.
6. Sr. DSOs KUR, SBP and WAT for information and necessary action, please.