Hot Axle Box Detection – Operational Instruction

This instruction is for:

HABD DETECTION

Saudi Arabia Railways (SAR)

Notice Board ☑ Staff Briefing ☑

Purpose

The purpose of this document is for Passenger Business Unit (PBU) to provide clear instructions to the Operations Control Centre (OCC), On-Board Technician (OBT), Train Driver and on-call staff (PBU RSM and PBU Operations), on how to respond to a Hot Axle Box Detection (HABD) in passenger service on the SAR East West Railway (EWR) Network.

Scope

This Instruction must be briefed to all OCC staff, On-Board Technicians and Train Drivers on the SAR EWR Network as soon as is reasonably practicable.

These instructions supersede the current SAR EWR operating rules. In the event of receiving any lineside HABD activation (warning (warm) or alarm (hot)), the train must be brought to a stand as quickly as possible.

Instructions

These instructions are intended to guide the technical response to a potentially failed axle box bearing. They introduce speed restrictions and re-check intervals through the course of the journey designed to prevent wheelset seizure.

The OCC/PBU may choose, based on the information provided by the OBT, to terminate the service and / or return the trainset to Riyadh and / or deploy a rescue trainset if they believe that the traffic restrictions imposed create excessive delay or inappropriate operating conditions.

The lineside equipment will trigger a warning at 90°C and an alarm at 110°C. The OCC must contact the train driver if either a warning or an alarm is triggered.

The OCC must inform the driver of the detected temperature and the driver must inform the OBT of this temperature.

In conditions of either a warning or an alarm the trainset must be stopped and the axle box in question measured by the OBT using a calibrated thermal heat gun.

The OBT must record the temperature detected by the thermal heat gun of all axle ends on the affected train side.

Condition 1: Hot Axle Box Detected by Lineside Equipment

1. The OCC is to arrange to stop the trainset immediately and advise the Train Driver of the detail of the HABD,
2. The Train Driver must advise the OBT of the HABD detail,
3. The OBT shall check the temperature of all axle boxes at the axle end point closest to the bearing assembly, the measurement must always be taken at the point shown in Figure 1. For the purposes of this instruction ignore any temperature stickers attached to the axle end – the Calibrated Heat Gun is to be used.
4. The OBT, on completing the check, will update the Train Driver who will advise OCC of the findings.
5. The On-Call PBU RSM and PBU Level 2 are to be advised by the OCC.
6. The train, if permitted to proceed, will comply with the arrangements in Table A detailed below.

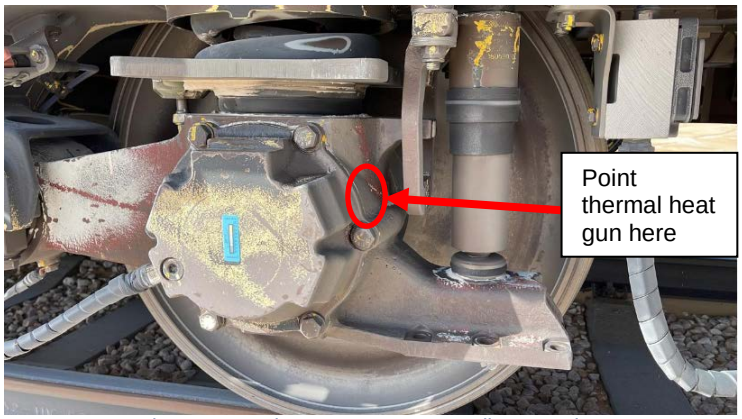

Figure 1: Bearing Temperature Reading Location

Table A

Axlebox Manual Temperature Check Rules – following an HABD alarm

The following table shall be used to determine the appropriate course of action at each manual heat gun temperature check:

Absolute Bearing Temperature Check

Scenario	Bearing Temperature	Speed	Immediate Action	Further Action
1	Less than 78°C	Line speed	Recheck bearing temperature at 50km or the next HABD lineside detector, whichever is sooner.	In the event of a consecutive HABD activation on the same axle end bearing, report to OCC that the train is a failure.
2	78°C or greater but less than 88°C	110kph	Recheck bearing temperature after 20 km	Continue this recheck until the bearing is either confirmed below 78C (move to 1 above) or above 88C (move to 3 below). In the event of a consecutive HABD activation on the same axle end bearing, report to OCC that the train is a failure.
3	88°C to 118°C	20kph	Recheck bearing temperature after 5 km	Report to the OCC that the train needs to be removed from passenger service. Move, with repeated heat checks and continued speed restriction, to the first station where passengers can be safely detrained.
4	Greater than 118°C	Walking Speed	Confirm the wheel is still turning freely	Report to the OCC that the train is a failure. If the wheel is rotating freely the train can continue at a maximum speed of 10kph until the next station where the passengers must be de-trained. Regular checks on wheel rotation must be repeated as advised by the On Call RSM Engineer.

NOTE: Scenarios 3 and 4 will require the passengers to be de-trained. The OCC (in consultation with PBU) shall decide which station / location to use for rescue purposes.

Axle End Relative Temperature

Relative Temperature	Speed	Immediate Action	Further Action
If no individual axle is above 78C but the temperature difference between axle end bearings on the same side is 40°C or higher	110 kph	Recheck the bearing temperature of the hottest axlebox after 50 km	Proceed on the basis of the highest axle temperature reading recorded at this recheck using Table A.

Condition 2: Hot Axle Box Detected on a Planned Check

1. At present additional routine checks are carried out in both directions by the OBT on every trainset at Hofuf station.
2. The number of routine checks by the OBT may be increased beyond Hofuf.
3. The OBT shall check the temperature of all axle boxes at the axle end point closest to the bearing assembly in accordance with Table B below, the measurement must always be taken at the point shown in Figure 1 (see above)
4. The OBT, on completing the check, will update the Train Driver of any issues who will advise OCC of any issues.
5. The On-Call PBU RSM and PBU Level 2 are to be advised by the OCC of any reported issue.
6. If an issue is found, the train, if permitted to proceed, will comply with the rules in Table B.

Table B

Axlebox Manual Temperature Check Rules – Planned Routine Checks

Absolute Bearing Temperature Check

Scenario	Bearing Temperature	Speed	Immediate Action	Further Action
1	Less than 78°C	Line speed	None	No further action
2	78°C or greater but less than 88°C	110kph	Recheck bearing temperature after 20 km	According to Table A.
3	Greater than 88°C	N/A	Detrain passengers and declare the train a failure.	Report to the OCC that the train needs to be removed from passenger service. Move the empty train back to Riyadh under conditions of Table A.

NOTE: Scenario 3 will require the passengers to be de-trained.

Axle End Relative Temperature

Scenario	Relative Temperature	Speed	Immediate Action	Further Action
1	If all axlebox temperatures are below 78C but the temperature difference between axle end bearings on the same side is 40°C or higher	110 kph	Recheck the bearing temperature of the hottest axlebox after 50 km	Proceed on the basis of the highest axle temperature reading recorded at this recheck using Table A.
2	If any individual axlebox temperature is above 78C **and** the temperature difference between axle end bearings on the same side is 40C or higher	N/A	Detrain passengers and declare the train a failure.	Report to the OCC that the train needs to be removed from passenger service. Move the empty train back to Riyadh under conditions of Table A.

NOTE: Scenario 2 will require the passengers to be de-trained.