

# EAST COAST RAILWAY

Office of the  
Pr. Chief safety officer,  
Bhubaneswar.

No:- ECoR/SFY/Alert advice-45/2025/35

Date: 15.01.2025

To

The Divisional Railway Manager  
KUR, SBP & WAT

## ALERT MESSAGE-45

Sub:- Defective wheel (Flat Tyre, Hollow tyre, Thin flange, etc.); cause, repercussion, action taken and prevention.

A number of accident and unusual incidences are reported due to wheel defect in recent past resulting traffic loss/ disruption to traffic and loss of revenue as well. Some cases are as under:

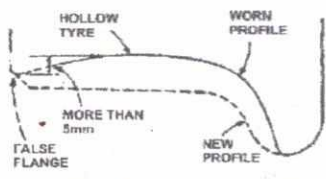
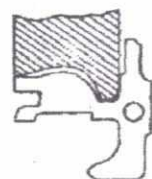
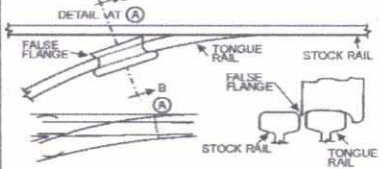
SN	CASE STUDY
A	<p>On 01.01.2025 at 06:30 hrs at BBSN Station of KUR Division Flat tyre in the 1st wagon (BLCA 61250625283) from Engine of Train no. E/CCJS/CONT detected which measured 70mm;</p> <ul style="list-style-type: none"> <li>➤ While passing through CTC, LP was reported of brake binding next to engine, controlled at Gopalpur-Balikuda PH; found metal deposit on wheel and release brake binding.</li> <li>➤ After start LP noticed abnormal sound on run, reported &amp; controlled at BBSN, on checking found Flat Tyre of approximately 70mm in L4 wheel and Skidding mark in other wheels of said wagon. R2 CC spring loaded side bearer housing cracked and L4 bearing CTRB backing ring found cracked.</li> <li>➤ Hand brake was found in partially applied condition.</li> <li>➤ Last POH: 31.01.22 at PWP, Last ROH: 27.09.23 at WATK, Return date: 09/26.</li> </ul>
B	<p>On 29.07.2024 at 03:30 hrs Nine wagons of train No. UP ME/TPAK-243 goods got derailed on Middle line of MCS yard R/7 obstructing Middle line.</p> <p>Divisional JAG Inquiry committee found Hollow tyre/false flange having 9mm in 3<sup>rd</sup> wagon. The false flange has entered in between tongue rail &amp; stock rail on RH side (closed condition of tongue) during movement of train in trailing direction of point no. 61B.</p>



On the above context some Frequently Asked Questions (FAQs) on Wheel defect are discussed under to inculcate safety awareness among field staff:





1. What are the main defects of a Wheel; cause, repercussion & detection?


When wheel profile gets worn, it may reach condemning limits in a particular parameter which are as under:

SN	Wheel Defects	Cause	Repercussion
1	Thin Flange	When the flange thickness reduces from 28.5mm (New) to 16 mm (Condemning limit) or less for goods stocks, then the flange is called thin flange. (Condemning limit is 22 mm for coaching stock & for high speed coaches like Rajdhani & Satabdi Express etc).	Chances of bursting of point due to entering of flange between Tongue rail and Stock rail. Detected with a tyre measure gauge.
2	Sharp Flange	When the radius given at the tip of flange is worn out from 14.5mm (New) to 5 mm (Condemning limit) or less is called Sharp Flange.	It is highly dangerous as it mounts the rail at points and crossings.
3	Radius too small at the root of flange	New Radius of flange at the root is 14R, when it is reduced to 13R or below, it is called Radius too small at the root of flange.	Excessive lateral play result in chances of mounting of flange over rail.
4	Deep Flange	The New height of the flange is 28.5mm, when it increased up to 35mm or more is called Deep Flange.	Shearing of fish plate bolts at rail joints.
5	Flat faces on Tyre	Flatness on wheel circumference is called Flat faces on tyre. a) For Coaching Stock and Loco wheel, it is allowed up to 50 mm. b) For Goods Stock it is allowed up to 60 mm.	Chances of rail fracture due to hammering effect on rail.
6	Wheel Distance	Wheel distance: $1600 \pm 2/-1$ mm. a. Newly assembled wheel set should be checked for the distance between inner face of wheel by using Wheel Distance Gauge. b. The wheels to be gauged on a level track after taking off from vehicle. c. Under loaded conditions the limits are not applicable.	Wheel may be slack/tight gauge and chances of derailment of wagon/coach.
7	False Flange/ Hollow Tyre	When the projection of the outer edge of the wheel tread below the hollow of the tyre  exceeds 5 mm then the outer edge of the wheel is called false flange, and the worn tread is called hollow tyre.  <b>Action:</b> To be detached/replaced	Effect on safety: A false flange may spilt open points while travelling in trailing direction, as the false flange may tend to get wedged in between the tongue rail and 



2. What are the other defects of wheel in addition to the above; how it can be detected and action taken thereto?

Sl. No	Type of wheel defects	Causes of defects	Visual detection during primary / secondary maintenance
1	Shattered Rim	<p>Wheel with a fracture on the tread or flange.</p> <p><b>Action:-</b>It must be withdrawn from service.</p>	 <p>Shattered Rim</p>
2	Spread Rim	<p>If the rim widens out for a short distance on the front face, an internal defect may be present. Spreading of the rim is usually accompanied by a flattening of the tread, which may or may not have cracks or shelling on the tread.</p> <p><b>Action:-</b>Such wheels must be withdrawn from service.</p>	 <p>Spread Rim</p>
3	Shelled Tread	<p>Shelling can be identified by pieces of metal chucked/breaking out of the tread surface in several places more or less continuously around the rim. Shelling takes place when small pieces of metal break out between the fine thermal checks. These are generally associated with small skid marks or "chain sliding."</p> <p><b>Action:-</b>Such wheels should be withdrawn from service.</p>	 <p>Shelled Tread</p>
4	Thermal Cracks	<p>Thermal cracks appear on a wheel due to intense heating of the wheel arising out of sever brake binding. Such cracks occur on the tread and generally progress across the tread in a transverse &amp; radial direction.</p> <p><b>Action:-</b> Whenever such a crack becomes visible on the outer face of the rim or a tread crack has reached the outer edge (non-gauge face) of the rim; the wheel should be withdrawn from service.</p>	 <p>Thermal Cracks</p>

5	Heat checks	<p>Thermal cracks are deeper and need to be distinguished from fine superficial cracks visible on the tread on adjacent to the braking surface. This defect is also observed with the brake discs on LHB coaches.</p> <p>These are called heat checks, which are usually denser than the thermal cracks. Heat checks are caused on the tread &amp; on the brake disc due to heating and cooling cycles undergone by the wheel &amp; disc during normal braking cycles.</p> <p><b>Action:-</b> Such wheels do not need to be withdrawn but should be carefully distinguished from the rejectable thermal cracks</p>	 <p>Heat checks</p>
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3. What are the Wheel diameters of various wagons/coaches and their condemning limits which should not be allowed to continue in service:-

Sl. No	Type of Train	Type of Trolley	Diameter (In New wheel)	Diameter (Condemnation limit)
1	Goods	CASNUB	a. 1000 mm. b. 956mm for Retrofitted CASNUB-22W(R).	a) 906 mm b) 906 mm
		BLC	840 mm	780 mm
2	Coaching	ICF/RCF	915 mm	825 mm
		LHB coach with FIAT trolley	915 mm	855mm
		Vande Bharat	952 mm	877 mm

This is to be circulated down the line to inculcate safety awareness among the field staff & to be discussed in safety seminars/safety meetings & during counselling by officers/supervisors. At training centres the same may be discussed among the trainees. In case of any discrepancy the instructions in Codes and manuals shall prevail.

Pr. Chief Safety Officer  
Bhubaneswar

15/01/25

Copy to-

1. Secy. to GM for kind information of GM.
2. Secy. to AGM for kind information of AGM.
3. PCE, PCME, PCOM, PCEE, PCCM, PCSTE, PCSC & CAO (Con) for information.
4. Sr.DSO/ KUR, SBP & WAT for information & necessary action.
5. Principal MDTC/VSKP & BBS for information & necessary action.