

JNS GBT Broken wheels

And good cooperation within the sector

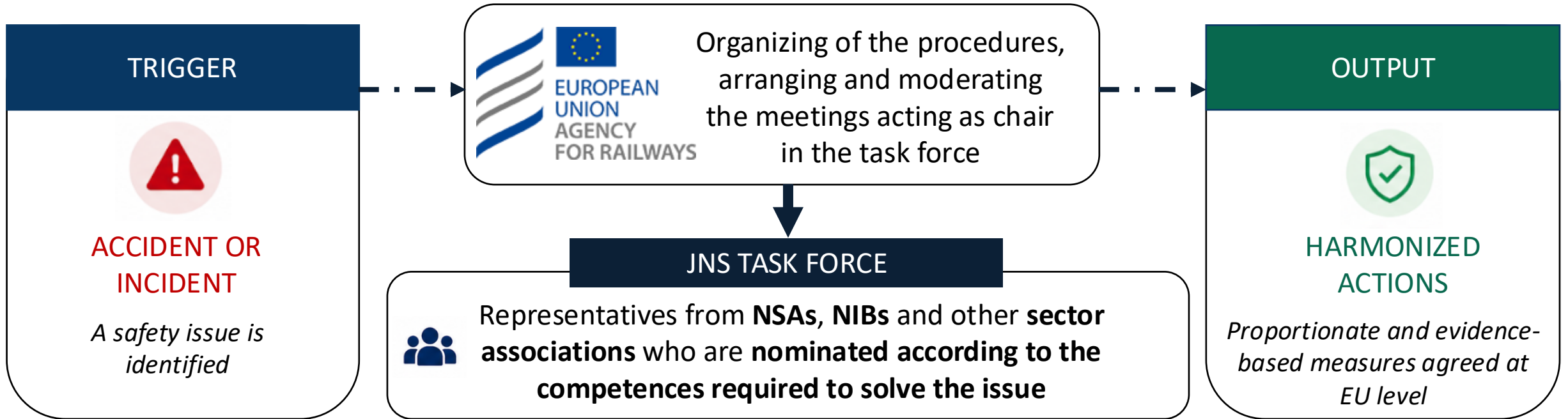


What is the JNS?

European coordination mechanism for railway safety issues

The Joint Network Secretariat (JNS) ensures **EU-wide harmonization** of actions taken after incidents/accidents in railways in the EU.

System triggered by the Viareggio accident in 2009



TWO TYPES OF PROCEDURES



URGENT PROCEDURE

- For high safety impact issues
- Target duration : **up to 2 months**



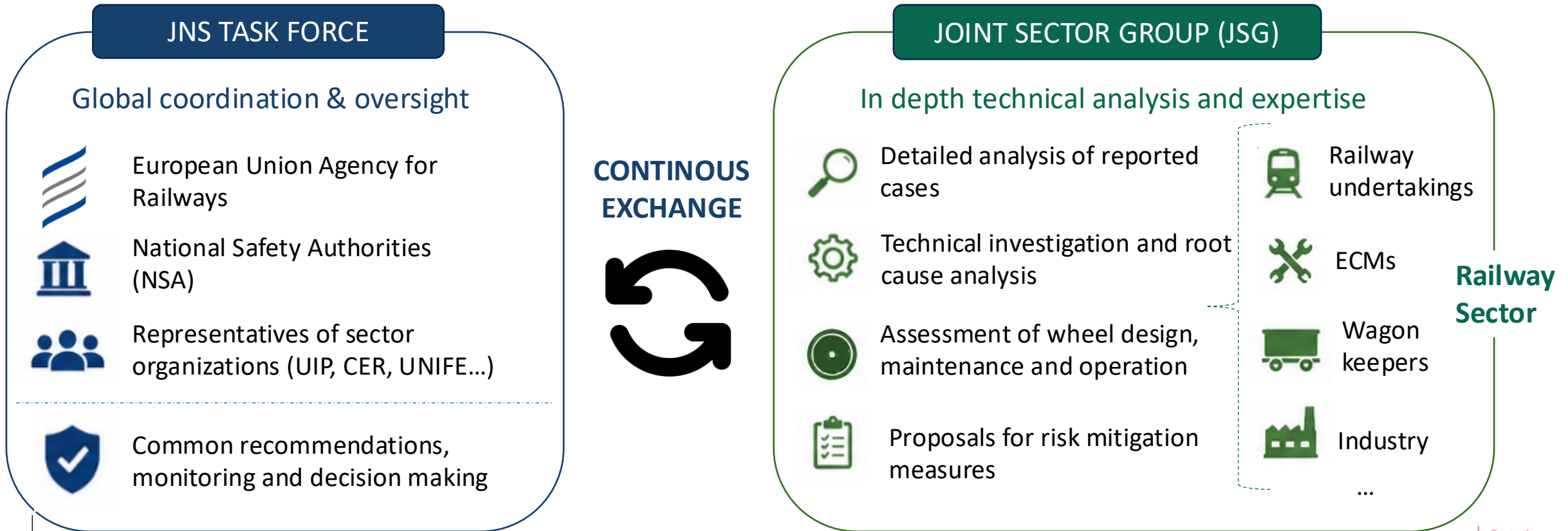
NORMAL PROCEDURE

- Complex issues requiring in-depth analysis
- Target duration : **up to 2 years**

2017 – First activation of the JNS Broken wheel

Multiple cases reported across Europe
Cases of broken and cracked wheels type BA004 and BA314/ZDB29

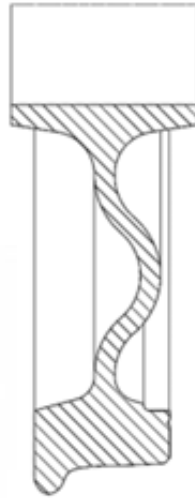
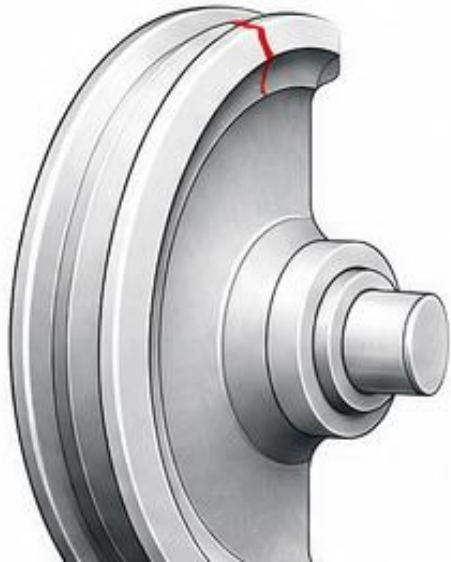
Organization of the work



JNS Broken wheel – Technical findings (2017-2019)

Identification of two distinct failure mechanisms

crack in the rim
BA 004



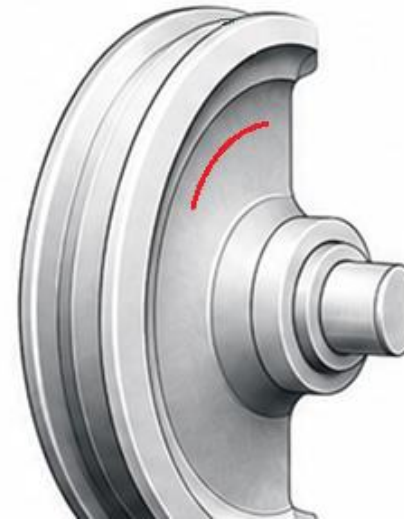
Near wear limit,
reduced ability to
withstand high
mechanical and
thermal solicitations
in operation

**Wheel kept in service under
specific conditions**

**Risk controlled through
operation and
maintenance measures
defined by the JNS/JSJ**



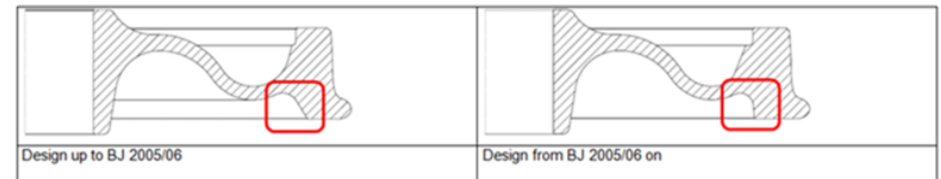
crack in the web
BA314 / ZDB29 (with a
slope under the wheel flange)



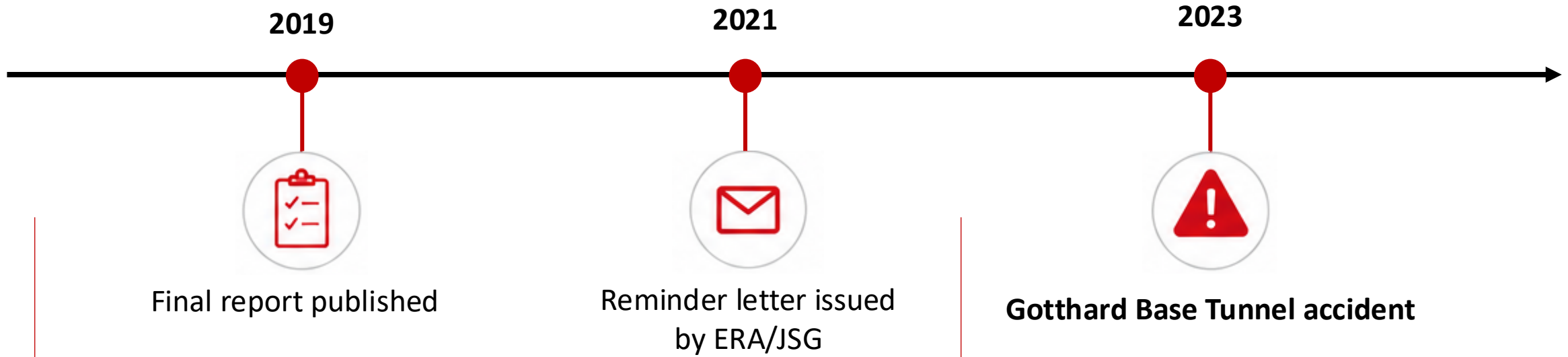
**Design related stress
concentration**

Change of design (without
slope) reduces stresses in the
web and in particular in the
area of the crack initiation

**Specific conditions +
Systematic NDT during off
vehicle maintenance**



JNS Broken wheel (2019-2023) – Continuous monitoring



Final output

- Long-term measures defined
- JNS Task force closed



Since 2019 JSG Monitoring activities

- Review of newly reported cases
- Monitoring of effectiveness of mitigation measures
- Assessment for potential need for updates
- Exchange of information



Reminder letter (August 21)

- Reinforcing the application of the measures
- Reminder to apply and control the application of the defined measures
- New templates for information collection

The GBT accident



10th August 2023

Major derailment in the Gotthard Base Tunnel

Significant operational impact and major damages to rolling stock and infrastructure



STSB interim report - 15th August 2023

- Broken wheel of **BA390** type quickly identified as the cause of the accident
- Similarities identified with BA004 failure mechanism



Safety Alert raised

- Request by Federal Office of Transport (FOT – CH NSA) to ERA to **reactivate the JNS Broken Wheel**



JNS Broken wheel reactivated

- Extraordinary pre-session on **October 6th, 2023**
- **December 6th, 2023** : Kick-off
- Initial elements highlighting the need to assess whether existing measures should be extended to a **wider range of wheel types**

New JNS Task-Force (2023-2025)

- Technical confirmation of the **similarities of design between BA390 and BA004** and therefore the same potential failure mode
- Investigation regarding **other potential comparable wheelsets**



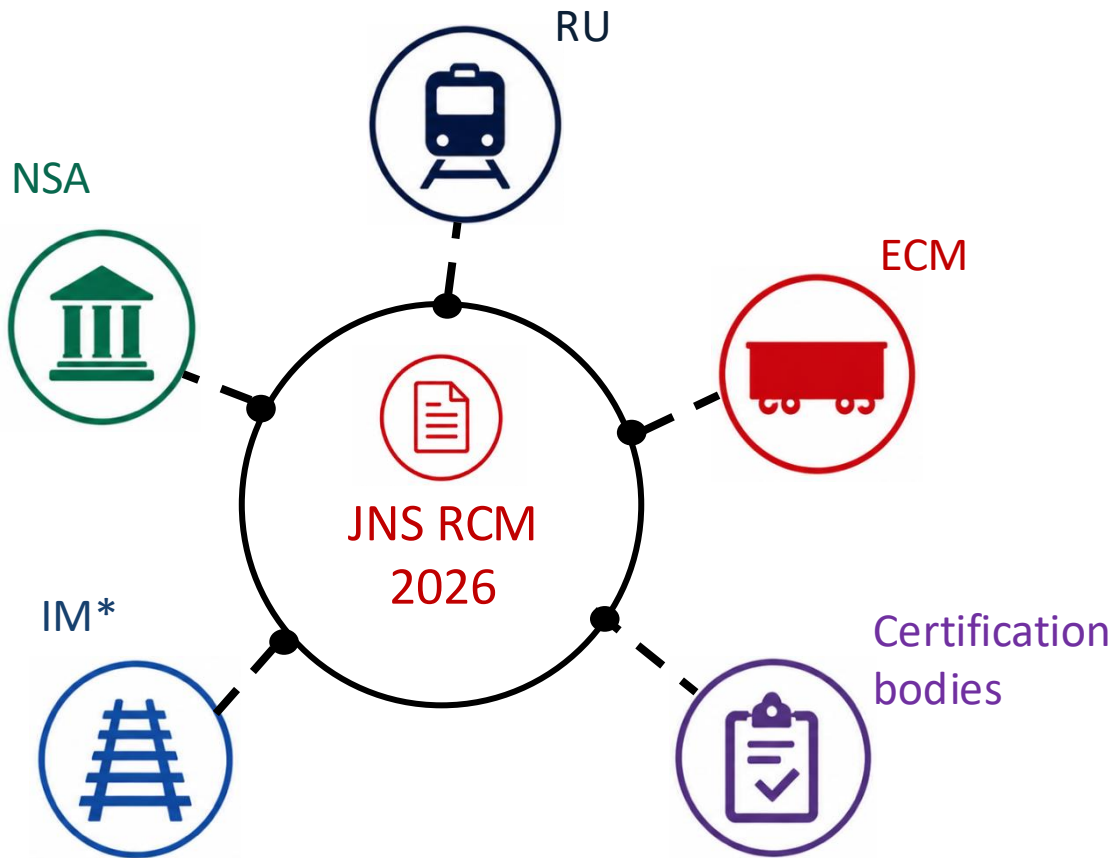
Wider population of wheels covered by the JNS Measures



Assessment method developed by the JNS TF

- For all wheel types not covered by the assessment by the JNS Task Force, ECMs shall use the assessment scheme to clarify if these wheel types are also comparable to BA 004. ECMs shall inform the JNS Task Force of the outcomes of their assessment. The list of the assessed wheel types is available on the ERA website.

Risk control measures 2026 (dec. 25)



* Operating freight wagons

Implementation requirement

Relevant actors of the sector shall declare the implementation of the applicable JNS risk control measures within their respective management systems.

OVERVIEW OF KEY MEASURES



Visual inspections



Removal of white stripe marking



Increased minimum wheel diameter



Supervision/Surveillance

With risk based associated implementation deadlines



Comparable wheelsets



Implementation by all sector actors



Common European risk control measures

STSB Report, Swiss measures and challenges



STSB final report

June 2nd, 2025



Swiss national measures

3 publications between Sept and Oct 25

- Broader scope than the JNS comparable wheel population
- **Application to all tread braked wheels**
- **Removal of the thermostable wheel concept**
- **Binding inspection requirements**



- Other **cases** of wheel failure reported
- Some **single cases** outside the scope of comparable wheels (2)
- **Investigation results** needed to progress on the root cause analysis – **Very difficult to get information**
- Questions raised regarding future **scope of wheels impacted** by the JNS measures
- Practical aspects of wheel **visual inspection** is the subject of a lot of discussions

Robust technical expertise and related analysis essential to support proportionate an evidence-based decision

2026 : The JNS Work continues

New publication expected mid-2026

The objective remains to ensure the implementation of measures justified, proportionate and efficient to properly manage the risk of broken wheel

Conclusion - JNS GBT and good cooperation within the sector



1. UNDERSTAND THE RISK

Every wheel failure must be properly investigated

No case is too small to be analyzed

Avoid conclusion based only on assumptions

Single cases cannot automatically drive system-wide conclusions

Identify the root cause

Robust investigation drives right actions



2. DEFINE THE RIGHT MEASURES

Evidence-based decisions

Measures should be technically justified

Proportionate measures

Reduce risk to as low as reasonably practicable

Risk identified, properly controlled and reduced

Risk zero does not exist



3. ENSURE IMPLEMENTATION

Measures must be applied

By all the relevant actors across the sector

Measures must be monitored and verified

Continuous follow-up and improvement

NSAs and certification bodies play a key role

Defining measures is not sufficient

Better understanding → Better measures → Better implementation → Safer railway system





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