

## Amendments and additions to the GCU

### Proposal sheet

#### Amendments to Appendix 10 of the GCU, for application from 1 January 2013

<p><b>1.- Present the problem (with examples and, if possible, figures giving a measure of the scope of the problem):</b></p> <p>Full revision of the texts of Appendix 10 (alignment of French and German versions), and modifications prepared by the Maintenance WG, in particular the addition of an Annex 4 for K blocks.</p>	<p><b>2.- Show what the GCU is lacking in this respect:</b></p> <p>It was necessary to align the texts and publish the outcomes of the work of the Maintenance WG, in which representatives of UIP, ERFA and CER participate actively.</p>
<p><b>3.- Explain why the problem can only be solved through the GCU contract:</b></p> <p>Workshop interventions following a wagon's withdrawal need to be precisely defined in line with the criteria of Appendix 9.</p>	<p><b>4.- Outline why the problem should be solved as envisaged in the proposed amendment/addition:</b></p> <p>All the solutions have been approved by the members of the Maintenance WG.</p>
<p><b>5.- Describe how the proposed amendments or additions will help solve the problem:</b></p> <p>Clarifies and details workshop interventions.</p>	<p><b>6.- Assess the potential positive and negative impacts (on operations, costs, administration, interoperability, safety, competitiveness, etc.), using a scale from 1 (very low) to 5 (very high):</b></p> <p>No additional impact not currently allowed for.</p>
<p><b>7. – Text proposal:</b></p> <p>See consolidated texts of Appendix 10, in which all changes are indicated by means of a thick vertical line in the margin and the textual modifications highlighted in blue.</p>	

# **APPENDIX 10**

## **to the GCU**

### **Wagons – Corrective and Preventive Maintenance**

**In blue: amendments proposed by the Maintenance WG  
up to 2012-05-16, indicated on the right**

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## INTRODUCTION

Appendix 10 is intended for use by staff in workshops<sup>1)</sup> and ~~details~~ collates all the provisions governing the minimum condition for parts (in accordance with the criteria set at international level) on leaving the workshop.

It comprises four chapters.

Chapter A (Corrective Maintenance) is structured in the same way as Annex 1 to Appendix 9 (Catalogue of Irregularities). This structure is as follows:

- Minimum condition and limit values for dimensions
- Indications for corrective maintenance operations – Acceptable and prohibited practices

Chapter B sets out provisions for dealing with wagons after specific incidents which have caused, or potentially caused, damage.

Chapter C contains provisions on the subject of preventive maintenance.

Chapter D contains provisions for the storage and transport of spare and replacement parts in the workshop area before being fitted to and after being removed from the wagon.

The markings and signs that wagons must carry are given in Appendix 11. Appendix 10 only covers those markings that can lead to a wagon being withdrawn from service under the terms of Appendix 9.

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<sup>1)</sup> A workshop is a body comprising the management, staff, installations and tools necessary for the execution of corrective and preventive maintenance on wagons and/or their component parts. Mobile units are considered to be workshops if they operate under the authority of a maintenance workshop or if they operate independently and meet the aforementioned conditions.

## **A – CORRECTIVE MAINTENANCE**

### **0. PRINCIPLE**

Wagon keepers, customers of repair work and workshops must all ensure that wagons are free from defects that are liable to lead to the vehicle being removed from service again, based on the provisions of Appendix 9 on the instructions issued for repairs to be carried out and Appendix 10, Chapter A (and where appropriate also Chapter B) on the actual execution of repair work.

Chapter A of Appendix 10 contains criteria and guidance to be applied by workshops to remove irregularities as understood by Appendix 9.

It is not necessary to apply the whole of Chapter A of Appendix 10 each time a wagon is sent to a workshop, only those provisions relating to the damage that is to be repaired.

Irrespective of the reason for a wagon's withdrawal from service, compliance with those provisions that are marked with an asterisk (\*) is required systematically whenever a wagon is sent to the workshop.

If the workshop is not in a position to restore the wagon to the minimum specified condition, the vehicle must be handled in accordance with the keeper's instructions (procedure as per Appendix 9).

# 1. RUNNING GEAR

## Minimum condition and limit values for dimensions

### Wheelsets

- 1.1. The following four conditions concern the distance between the wheels, measured close to rail level, with the wagon empty or loaded, and the thickness of the flanges. They must all be met concurrently:
- 1.1.1 Distance between the active faces of the wheels, measured 10 mm down from the measuring circles:
- maximum 1426 mm
  - for wheels with a minimum diameter of 840 mm<sup>1)</sup>:
    - at least 1418 mm for the wheelsets of 2-axle wagons with double-link suspension, suitable for running at 100 km/h with a 22.5t axle-load and a wheelbase of 8 m or more;
    - 1410 mm for the wheelsets of other wagons;
  - at least 1415 mm for wheels with a diameter of less than 840 mm;
- 1.1.2 Distance between the inner faces of tyres or rims of monobloc wheels:
- maximum 1363 mm<sup>1)</sup>
  - minimum 1357 mm for wheels with a diameter of 840 mm or more<sup>1)</sup>
  - minimum 1359 mm for wheels with a diameter of less than 840 mm;
- 1.1.3 Wheels must show no signs of displacement along the axle;
- 1.1.4 Thickness of the flange of one wheel, measured 10 mm below the running circle:
- minimum 22 mm for wheels of diameter up to 840 mm,
  - minimum 27.5 mm for wheels of diameter less than 840 mm but at least 630 mm.
- 1.2 The diameter of the wheel running circle must not be less than:
- 840 mm for a nominal diameter of 920 to 1000 mm;
  - 760 mm for a nominal diameter of 840 mm when new;
  - 680 mm for a nominal diameter of 760 mm when new;
  - 630 mm for a nominal diameter of 680 mm when new.
- 1.3 The width of the tyre or rim of monobloc wheels must be:
- maximum 140 mm<sup>2)</sup>,
  - minimum 133 mm.
- 1.4. The height of the wheel flanges in relation to the measuring circle must be no more than 36 mm.
- 1.5. The wheel flange, measured with a gauge, must have a qR value that is always greater than 6.5 mm, with no sharp edges or burrs on the outside profile of the flange, at a distance of more than 2 mm from the upper edge (Appendix 9, Annex 4).
- 1.6 The wheel tread must not
- be partly crushed,
  - have wheel flats of more than 60 mm in length for a wheel diameter ≥ 630 mm,
  - have wheel flats of more than 30 mm in length for a wheel diameter < 630 mm,
  - display metal build-up of more than 60 mm in length or 1 mm thickness for a wheel diameter ≥ 630 mm,

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<sup>1)</sup> These rules also apply to the intermediate axles of wagons with a 3-axle articulated underframe, but not to the intermediate axles of vehicles other than bogie wagons, nor to the intermediate axles of the bogies themselves.

<sup>2)</sup> Including the projection formed by the outer edge of the running tread.

- display metal build-up of more than 30 mm in length or 1 mm in thickness for a wheel diameter < 630 mm,
  - have cracks at the edge of the tread.
  - Tread surface defects (shelling, cavities, exfoliation) must be no more than 60 mm long.
- 1.7 The lateral face of the wheel and the inner part of the rim or tyre (active face) must not be gouged or marked with sharp-angled notches.
- 1.8 For monobloc wheels, the wear limit of the tyres must be indicated by the bottom of a circular groove concentric with the wheel and traced on the outside surface.<sup>1)</sup> This groove must always remain fully visible. It may however be partially obscured by dirt providing this does not detract from the possibility of assessing the wear state of the wheel.
- 1.9 The thickness of the wheel tyre measured in the plane of the running circle – defined as the circle where a vertical plane 70 mm from the inner surface of the tyre intersects the wheel tread – must be at least:
- for wagons authorised to run at 120 km/h  
(wagons marked SS or "\*\*\*") ... 35 mm
  - for other wagons<sup>2)</sup> ..... 30 mm
- 1.10 On a wheel with tyre:
- 1.10.1 the tyre must not be loose.  
A tyre is considered loose if at least one of the following conditions is met:
- the tyre has been displaced by rotation on the rim in the plane of the running circle (visible from the fact that the check marks on the tyre and those on the wheel rim are not longer aligned);
  - dull sound when struck;
  - loose tyre clip;
  - presence of rust between the tyre and the rim over more than 1/3 of the circumference;
- 1.10.2 The tyre must show no signs of sideways movement (a tyre can only move sideways if the tyre clip is missing or has become loose, broken or clearly deformed);
- 1.10.3 The tyre clip must not be cracked. When the tyre clip is held in place with a wedge, the wedge must not be missing;
- 1.10.4 Tyres must not be cracked or fissured in the transverse or longitudinal directions.
- 1.11 The wheel hub must not be cracked.
- 1.12 The rim of a spoked wheel must not be broken across.
- 1.13 None of the spokes of a wheel may be broken or cracked.
- 1.14 A solid or monobloc wheel must not show:
- any defects repaired by welding,
  - any cracks.
- Minor defects in the wheel body resulting from the casting process are acceptable.
- 1.15.1 Axles must not:
- show any cracks or any defects repaired by welding;
  - be warped;
  - have any part worn by friction showing sharp edges (sharp-edged notches);
  - show any kind of wear by friction exceeding 1 mm in depth.
- Brake rods or other parts must not rub on the axles.
- 1.15.2\* The prescriptions of Annex 3 are to be applied.

<sup>1)</sup> If exceptionally there are two grooves on a wheel, the outer groove shall indicate the minimum thickness.

<sup>2)</sup> Including wagons suitable for 120 km/h only when empty.

- 1.16\* Each time the wagon is in the [workshop](#), the wheel+tyre assembly of all wagons fitted with tyres must be checked. The dates on which this verification and the one before it take place are entered in the maintenance plate specified in Appendix 11, point 7.5 against the initials of the RU and [workshops](#) that conducted the check in question.
- 1.17 If a check is required on the distance between the inner faces of the tyres or rims of monobloc wheels, then this distance shall be measured with a gauge at rail level in at least three points on the wheel, at 120° intervals.
- 1.18 If a monobloc wheel is suspected to have sustained a thermal overload from braking, as characterised by:
- a paint burn of 50 mm or more at the connection between the rim and wheel centre or recent traces of rust on the tyre (unpainted wheels) or
  - fusion of brake blocks or
  - deterioration of wheel tread with build-up of metal,
- the distance between the inner faces of the tyres of axles must be measured as indicated in points 1.1.2 and 1.17.
- If this distance is within the specified tolerances, the air brake must be isolated and the vehicle fitted with labels R1 and K (Appendix 9, annex 11) marked "Brake and bearing surface to be verified for thermal overload".
- These checks are not to be carried out on wheels that are able to withstand high thermal stresses and which are marked on the axle-box casing with a solid vertical white line (Appendix 11, point 6.1).
- 1.19 Wheels shall be tested for out-of-roundness when
- at least two signs of out-of-roundness and wheel tread defects as defined in Appendix 10, annex 1 are detected on a wagon wheel or its immediate environment,
  - on the wheels of the axle in question, if there are no signs on the second axle,
  - on the wheels of both axles, if there is at least one sign on the second axle,
  - they are indicated "Substantial irregular crushing on the edge of the tyre", as defined in Appendix 10, annex 1, Figure 9 (indication of a particular flat point), irrespective of the presence of any other indication.

In this respect a bogie is to be considered as an axle wagon.  
The degree of wheel out-of-roundness must not exceed 0.6 mm.

### **Axle-boxes**

- 1.20 Axle-boxes must not be damaged to the point of no longer being able to hold their lubricant or of allowing dust and water infiltration.
- 1.21 The sides of the axle-box must cover the guiding surface of the axle guard or of the corresponding bogie parts in all positions of the box, with an overlap of at least 5 mm.

### **Indications – Accepted and prohibited practices**

- 1.22 Axles must not be repaired by welding.
- 1.23 The side faces of the tyres or rims of monobloc wheels must not be painted or covered over with oily or greasy substances, with the exception of the four painted control markings at 90° intervals used to identify tyred wheels (Appendix 11, point 6.2.).
- 1.24 Brake rods and other parts must not rub against the axles. If this fault cannot be corrected, the parts in question must be removed or suspended so as to prevent contact. The brake must then be isolated and fitted with labels R1 and K (as per Appendix 9).
- 1.25 Sharp edges on a flange may be removed on the lathe or by grinding.



Any flats or build-up of metal on the running tread may be removed on the lathe with the keeper's agreement.

- 1.26 When an axle is replaced, a wheelset or wheelsets with tired wheels may not be fitted to a wagon equipped with monobloc wheels.  
Tank wagons and wagons loaded with tank containers for the carriage of Class 2 RID products must be fitted with monobloc wheels.
- 1.27 To position the wheelsets on a lathe, the workshop of the user RU may only remove the axle-box covers if they are not fitted with centring holes. All other work on axle-boxes is reserved for the keeper alone.
- 1.28 When reprofiling monobloc wheels with the authorisation of the keeper:<sup>1)</sup>
- identify any cracks along the edge of the wheel tread and any sharp-edged dents on the flange and remove by reprofiling,
  - remove any severe radial marks left by the lathe clamping jaws.
- Wheels with an out-of-roundness of  $\geq 0.6$  mm (see point 1.19) may not be reprofiled. They must be removed and returned to the keeper, suitably marked.
- 1.29 Existing wheelsets fitted with monobloc wheels of steel grades R2, R3, R8 and R9 must be tested by the keeper to check for the absence of cracking and lathe clamp jaw marks. After the test a triangular metal plate embossed with the steel grade is fixed to one of the bolts of the axle-box cover.
- 1.30 Wagons with load-proportional tread brakes for running under SS conditions may not be fitted with monobloc wheels of steel grades R2, R3, R8 or R9.  
If thermal overloading is suspected, the provisions of point 1.18 shall apply.
- 1.31 Oil seepage between the axle and wheel hub does not constitute absolute proof of loosening. Displacement must be shown to have occurred.
- 1.32 If there is any sign or suspicion of a hot axle-box, the axle must be replaced.
- 1.33 Axle-boxes may only be lubricated by the keeper.
- 1.34 No repairs may be carried out on axle-boxes.
- 1.35 If a replacement axle is requested using Form H<sup>R</sup> (see Appendix 7), the form shall include an indication of the diameter of the previous axle's running circle (bogie or axle wagon) so that the keeper can supply an axle with a running circle whose diameter is within the difference range permitted by the applicable regulations.  
If an axle is replaced without making use of the Form H<sup>R</sup> procedure and with no specific indication from the keeper, the difference in the diameters of the running circles must not be greater than:
- 10 mm between the two axles of a bogie
  - 20 mm for axle wagons.

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<sup>1)</sup> This authorisation may be permanent or issued on a case-by-case basis

## 2. SUSPENSION

### Minimum condition and limit values for dimensions

- 2.1 The leaves of a suspension spring must not become longitudinally displaced by more than 10 mm in relation to the buckle.
- 2.2 None of the leaves must be missing, broken or cracked. This provision applies both to parabolic springs and trapezoidal springs.
- 2.3 **No helical spring must be broken.**
- 2.4 None of the parts necessary for fastening the springs must be missing or broken.  
None of the spring buckles must be loose.
- 2.5 On wagons fitted with leaf spring suspensions, the distance between the buckle of the suspension spring and any parts of the vehicle body, underframe or bogie frame which may be liable to come into contact with it must be at least 15 mm.
- 2.6 There must be no recent traces of contact between:
  - the spring buckle or other parts of the suspension and the wagon underframe or bogie;
  - the wheels and the body or underframe.Once the causes have been remedied, the traces of contact shall be painted over.
- 2.7 The boss of the leaf spring buckle must be properly engaged in its housing (axle-box case or plug). The axle-box case must not be in an abnormal position (twist) as a result.
- 2.8 The component parts of the elastic suspension (rings, rods, intermediate bearings, suspension pins) must not be displaced, missing or broken. The suspension pins must be properly secured.

### Indications – Acceptable and prohibited practices

- 2.9 The minimum distance **between the buckle of the suspension spring and any parts of the vehicle body, underframe or bogie frame which may be liable to come into contact with it** may not be restored by:
  - placing sheet metal shims between the suspension brackets or bearings and the links, even if these sheets are welded;
  - building up the suspension brackets or bearings by welding.
- 2.10 In the event of damage to the suspension spring of a wagon with a rigid underframe (marked as shown in Appendix 11, point 7.4), both springs of the same axle must be replaced by two others with equivalent deflections. The request for spare parts using Form H (see Appendix 7) must therefore specify that the springs are to be used on a wagon with a rigid underframe.

For springs with progressive stiffness, it is not necessary to replace both springs. When requesting springs of this kind, the type of spring must be mentioned specifically on Form H.
- 2.11 Repairing suspension springs by welding is prohibited.
- 2.12 Standard parabolic suspension springs for 22 or 22.5 tonne axle-loads can be freely interchanged in the event of damage.

### 3. BRAKE

#### Minimum condition and limit values for dimensions

##### Compressed air brakes

- 3.1 On wagons with compressed-air brakes, the handle of the brake isolating valve must be turned vertically downwards when the brake is operational. It must be possible to isolate the brake by a 90° turn on the handle at the most. This handle must satisfy the conditions set out in Appendix 9, annex 10.
- 3.2 The function of the brake position changeover controls must be easily identifiable in accordance with the stipulations of Appendix 11, point 4.3.
- 3.3 The main brake pipe must be in proper working order, to ensure a continuous air supply along the train.

##### Brake blocks, shoes, disc brakes and brake rigging

- 3.4 The disc brake indicator device must clearly display the "brake on" and "brake released" positions.
- 3.5 None of the brake rigging safety stirrups must be broken, loose or missing.
- 3.6 Wagons with protruding brake blocks must be dealt with in accordance with Appendix 9. A brake block shall be considered protruding if its outer face is level with the outer edge of the tyred wheel. This check shall be carried out with the brakes applied.
- 3.7\* Cast-iron brake blocks that are worn, broken or missing must be replaced.  
The minimum thickness of brake blocks, measured at the thinnest point as seen from the outside, must be 10 mm.  
Brake blocks
  - with an incipient crack shall not be considered as broken,
  - shall be considered broken if they are only held in place by their metal reinforcement layer.
- 3.8\* Composite [brake blocks](#)
- 3.8.1 Composite brake blocks **are to be replaced** when the following defects/damage are observed:
  - [blocks](#) are missing;
  - [blocks](#) are broken radially from the friction surface to the [plate](#)/edge of the plate;
  - [friction material](#) shows visible signs of crumbling over more than ¼ of the length of the block;
  - [blocks](#) display metal inclusions [in the friction surface](#) (Annex 4, Figure 1);
  - [friction material](#) has become detached from plate over a length of > 25 mm (Annex 4, Figure 2);
  - [friction material](#) has cracked parallel to the wheel circumference over a length of > 25 mm (Annex 4, Figure 3);
  - [blocks](#) are less than 10 mm thick, [measured at the thinnest point seen from the outside](#) (Annex 4, Figure 4).
- 3.8.2 Composite brake blocks **are not to be replaced if:**

- they are partially cracked or cracked straight across at the designated breaking-point;
- there is incipient radial cracking in the block material (Annex 4, Figure 5);
- there are indications of heavy thermal stress such as “white film” on the surface of the the contact area and down to a depth of around 10 mm (Annex 4, Figure 6);
- there is a branched thermal crack pattern, mainly axial, and a carbonised layer (Annex 4, Figure 7).

### **Brake hose couplings**

- 3.9 All wagons must be fitted with brake hose semi-couplings. Wagons with two brake coupling connections at each end for the same main brake pipe must also have two brake semi-couplings at each end.
- 3.10 Brake semi-couplings must not be defective (not airtight).
- 3.11 No part of the brake coupling system (whether connected or disconnected) must hang down within 140 mm of the top of the rails.
- 3.12 The stop cocks must be operable and function correctly. Each air stop cock must be fitted with a stop device in its extreme position that functions correctly.

### **Indications – Acceptable and prohibited practices**

- 3.13 Damaged or loose brake parts that could constitute a safety hazard or cause other damage must be removed or securely fastened. Damage of this kind should be examined in conjunction with point 1.19. In this case, the compressed air brake must be isolated and the wagon fitted with labels R1 and K.
- 3.14 Work on the pneumatic parts of the brake system (distributors, relay valves, load-weigh valves, brake cylinders) and their replacement by workshops shall not be authorised without the agreement of the wagon keeper.
- 3.15 Wagons with platform-operated or ground-operated hand brakes / parking brakes that are inoperable must be repaired. Otherwise they must be dealt with in accordance with Appendix 9.
- 3.16 Disc brake pads may be replaced exclusively by the keeper, who shall ensure that the brake is in correct working order without needing to be monitored by the user RU.
- 3.17\* Missing or damaged brake semi-couplings must be replaced.
- 3.18 Safety stirrups may not be repaired by welding.
- 3.19 All brake tests in application of Appendix 12 of the GCU shall be carried out in accordance with UIC Leaflet 543-1.

#### **4. Wagon underframe and bogies**

##### **Minimum condition and limit values for dimensions**

##### **Underframe**

- 4.1 The underframe must not be visibly deformed or warped.
- 4.2 The flanges of solebars, headstocks and intermediate cross-bars subject to stress from the coupler must not have cracks (transverse cracks) starting at the edge of the flange and extending over more than half the flange width. Longitudinal cracks up to 150 mm are acceptable, except at the points where the suspension brackets are fixed to the solebars. At these points, longitudinal cracks between the flange and the web of the solebar must not exceed 100 mm in length.
- 4.3 Welded joints on underframe crossbars and solebars, and on axle guards and solebars, must not have cracks, nor must any cracks in these parts originate in the joints.
- 4.4 Two handrails for use by shunting staff (during coupling) must be fitted below each headstock.
- 4.5 Steps and handles must be fit for use. Steps and their brackets must not have cracks.
- 4.6 [Wagons with inflammable floors](#), even if lined with a metal sheet underneath, must be fitted with spark arrestors above the braked wheels. Spark arrestor plates mounted directly beneath the floor are not acceptable.  
This stipulation also applies to flat wagons that have no floor or with a skeletal floor, intended for carrying containers or semi-trailers.  
The spark arrestor plates must not be dislodged or pierced through by rust.
- 4.7 Axle wagons carrying the sign specified in Appendix 11, point 2.10 must be fitted with special spark arrestors.
- 4.8 Axle guards must not be dislodged or broken. They may not have cracks over more than ¼ of their cross-section or that are extending towards or close to a fastening point.
- 4.9 No guide-pieces (wear liners) must be missing from the axle guards.
- 4.10 Axle-guard ties must not be missing or broken.
- 4.11 Suspension spring brackets must not be loose, broken, cracked or visibly deformed.

##### **Bogies of all types**

- 4.12 Welded joints on bogie frame crossbars and solebars must not be cracked, nor must any cracks in these parts originate in the welded joints. Solebars, crossbars and bolster swing-links must not have any cracks.
- 4.13 The friction surfaces of damping systems acting on the axle-box or bolster guides must not be lubricated.
- 4.14 No side bearers, side bearer parts or springs must be missing or broken.
- 4.15 The bogie must not be lying in an abnormal position in relation to the frame.

- 4.16 The centre casting must not be broken or loose.
- 4.17 The centre casting kingpin must not be missing, broken or loose.
- 4.18 No guide pieces (wear liners) may be missing.  
The total length of cracks in the weld beads of the wear liners may not exceed 50% of the total length of the welds.
- 4.19 Missing earth connections (straps or cables) must be replaced. It must however be possible to see that an earth connection existed before.

#### **Y 25 bogies and their derivatives (derivatives (see Annex 2))**

- 4.20 No tare springs must be cracked or broken. Damage of this kind should be examined in conjunction with point 1.19.
- 4.21 No load springs must be displaced or broken. Damage of this kind should be examined in conjunction with point 1.19.
- 4.22 All the tare springs of the bogie must coil in the same direction.
- 4.23 All the pairs of helical springs on a bogie (tare spring/load spring) must coil in opposite directions.
- 4.24 No outer or inner damper ring may be missing, broken or loose. **No tappet must be missing (e.g. following a derailment).**
- 4.25 No damper cover may come into contact with the bogie frame (faulty damper).
- 4.26 No lifting T must be missing or loose. Damage of this kind should be examined in conjunction with point 1.19.

#### **Indications – Acceptable and prohibited practices**

- 4.27 Cracked steps must be replaced by the workshop of the user RU. **Repairs involving welding are prohibited.**
- 4.28 When the spark arrestor plates of a wagon are missing or damaged without the possibility of proper repairs being carried out, the brake must be isolated and the wagon dealt with in accordance with Appendix 9 (labelling).
- 4.29 Breakages, damage and cracks on solebars, intermediate crossbars, underframe headstocks (wagon or bogie) and welded joints must only be repaired by welding at a workshop selected by the keeper. However, the workshop of the user RU may, exceptionally, be authorised to carry out welding work for the sole purpose of repairing cracks or breakages on underframe profiles, to make it possible for an empty wagon to be returned home.
- 4.30 Wagons whose underframe is warped or deformed and which are not fit to run must be specially treated, in agreement with their keeper.
- 4.31 Damaged axle guards and suspension spring brackets riveted to the underframe can be straightened or replaced by the workshops.
- 4.32 If the rivets or bolts used to fix the axle guards in place are loose or missing, they shall be replaced by the workshops with self-locking screw bolts or bolts locked by split pins.
- 4.33 The friction surfaces of damping systems acting on the guides of the axle-boxes or swivelling bolster must not be lubricated. Any grease must be removed insofar as possible without demounting. In this case the wagon must be fitted with a Label M.

- 4.34 Welding of wear liners on bogies is only authorised after the axles have been demounted and following instructions from the keeper. [Re-welding of cracks on wear liners is not allowed.](#)
- 4.35 Welding and oxygen-cutting are strictly prohibited during the mounting of screw assemblies using high-resistance screws (class 8.8 or above) or bolts (class 8 or above) to attach steps, handles and centre castings.  
Screw assemblies are to be executed in compliance with the rules (e.g. sufficient projection of screw, tightening torque, self-locking screws etc).  
Welding and oxygen-cutting are prohibited on self-locking screws, irrespective of the type of locking (synthetic or metallic).
- 4.36 During the mounting of screw assemblies with normal-resistance screws (below class 8.8) or bolts (below class 8) to attach steps, handles and centre castings, welding and oxygen-cutting are only permitted if authorised by the keeper. Screw assemblies are to be executed in compliance with the rules (e.g. sufficient projection of screw, tightening torque, self-locking screws etc).  
Welding and oxygen-cutting are prohibited on self-locking screws, irrespective of the type of locking (synthetic or metallic).

## **5. Buffing and draw gear**

### **Minimum condition and limit values for dimensions**

#### **Buffing gear**

- 5.1 The height of the centre of the buffing gear, measured vertically from rail level and at rest, must be:
  - for empty wagons ..... maximum 1 065 mm
  - under maximum load.....minimum 940 mm.
- 5.2 In abeyance.
- 5.3\* No buffer or buffer fixing bolt must be missing. All fixing bolts must be tight. This also applies to permanent couplings.
- 5.4 The locking or fastening devices holding the buffer plungers in place must not be missing or damaged.
- 5.5 The buffer spring and the other parts of the buffer must not have cracks or damage liable to impede the proper working of the buffer. It is acceptable for one buffer at each end of the wagon to be compressible by hand by a maximum of 15 mm.
- 5.6 Buffer casings must not be damaged to the extent that their fastenings are no longer sufficiently robust or that buffer plunger guidance is no longer sufficiently guaranteed.  
The buffer casings and plungers must not be cracked.
- 5.7\* There must be no missing or loose rivets or fixing bolts on the buffer heads. This also applies to permanent couplings.
- 5.8\* The contact surfaces of the buffer heads must be sufficiently lubricated. This also applies to permanent couplings.
- 5.9\* The steel contact surfaces of buffer heads must not have sharp-edged grooves that could prevent the heads from sliding. This also applies to permanent couplings.
- 5.10 On wagons fitted with anti-crash devices, these devices must not show signs of having been triggered, nor any trace of deformation.  
The anti-crash devices have been triggered if
  - the arrow marker is not fully visible,
  - the deformation marker is missing or deformed,
  - the length of the buffer is visibly shortened,
  - the buffer casing is deformed or destroyed.

#### **Draw gear**

- 5.11 No part of the screw coupling gear (coupled or uncoupled) must hang down within 140 mm of the top of the rails.
- 5.12 The length of the screw coupler must be such that the buffers can at least be brought into contact.
- 5.13 The screw couplers and draw hooks must not be missing.
- 5.14 The screw couplers and draw hooks must not be cracked. Nor must they have sustained any damage liable to prevent the vehicle from being coupled to another vehicle or to stop them performing properly.
- 5.15 Draw bars must not be broken or cracked. Sleeves, bolts or cotter pins must not be broken or missing.



- 5.16 Draw hook rods and guides must not be worn to such an extent that the draw hook is able to rotate on its axis within the guides.
- 5.17 If non-continuous draw gear is used, none of the following types of damage may occur:
- fracture or defect on a volute or ring spring;
  - deterioration of a rubber or elastomer spring.
- 5.18 If continuous draw gear is used, none of the springs must not be fractured or damaged. The draw gear guides must not have cracks that are liable to prevent the draw gear from functioning properly.
- 5.19 The draw hook pin on the screw coupler must be at least 50 mm in diameter.
- 5.20 When the suspension device on the screw coupler is inoperable or missing, it must be repaired or replaced.

#### **Indications – Acceptable or prohibited practices**

- 5.21 Use of welding to repair draw gear is prohibited. However, electric welding may be used for temporary repairs to broken or cracked draw bars. The wagons concerned must be handled in accordance with Appendix 9 and transported at the rear of the train.
- 5.22 Wagons fitted with long-stroke shock absorbers whose sliding part is visibly not in the middle position must be dealt with in accordance with Appendix 9.
- 5.23 When a buffer at one end of the wagon is damaged, both buffers must be replaced. The replacement buffers must be identical. In the case of buffers with a stroke of 105 mm, 130 mm or 150 mm, the replacement buffers must however belong to the same category as the buffers removed. Also, for buffers with a stroke of 130 or 150 mm, the replacement parts must have the same design characteristics as the buffers removed. **Buffers with wear inserts in the buffer heads must only be replaced in accordance with the keeper's instructions.**
- 5.24 Missing buffer head fastening rivets may be replaced using appropriate screw fasteners. Any sharp edges on the buffer head contact surfaces shall be removed by grinding.
- 5.25 It is forbidden to carry out welding or blowtorch work on or near buffers marked on the casing with a yellow dot (see Appendix 11, point 7.9.4).
- 5.26 Damaged or deformed anti-crash devices shall be dealt with in accordance with the keeper's instructions. Buffers fitted with anti-crash devices must, in principle, be replaced by identical buffers. If anti-crash devices are not available, standard buffers may, exceptionally, be fitted to enable the wagon to continue its journey to be unloaded or sent to the workshop for repairs. In this case, a K Label as shown in Appendix 9, annex 11 shall be affixed, together with the sign shown in Appendix 11, points 5.4 or 5.5.

- 5.27 Permanently-coupled wagons must be coupled and uncoupled in line with the keeper's instructions.
- 5.28 Welding and oxygen-cutting are strictly prohibited during the mounting of screw assemblies using high-resistance screws (class 8.8 or above) or bolts (class 8 or above) to attach steps, handles and centre castings. Screw assemblies are to be executed in compliance with the rules (e.g. sufficient projection of screw, tightening torque, self-locking screws etc.).  
Welding and oxygen-cutting are prohibited on self-locking screws, irrespective of the type of locking (synthetic or metallic).
- 5.29 During the mounting of screw assemblies with normal-resistance screws (below class 8.8) or bolts (below class 8) to attach steps, handles and centre castings, welding and oxygen-cutting are only permitted if authorised by the keeper. Screw assemblies are to be executed in compliance with the rules (e.g. sufficient projection of screw, tightening torque, self-locking screws etc.).  
Welding and oxygen-cutting are prohibited on self-locking screws, irrespective of the type of locking (synthetic or metallic).

## **6. Vehicle body**

### **Minimum condition and limit values for dimensions**

#### **Provisions applicable to all wagons:**

- 6.1 The wagon body, superstructures and all additional devices must not be damaged in a way that could lead to deterioration or loss of the load or constitute a safety hazard for railway operations and/or a risk for persons or the environment.
- 6.2 The wagon body and its parts must not foul the loading gauge.
- 6.3 No part of the heating coupling and other coupling devices (coupled or uncoupled) must hang down within 140 mm of the top of the rails.
- 6.4 Moving parts of the wagon and the devices used to control them must not have visible damage that prevents them from functioning normally.
- 6.5 None of the wall or floor boards must be missing, broken, split or damaged to the point where the load might be lost or damaged as a result of damp.
- 6.6 The sliding doors must be mounted in such a way that they cannot come off their runners. Drop sides must be secured so they cannot part from their hinges or fastenings.
- 6.7 It must be possible to close and lock all doors and sliding walls completely and securely. They must not be missing or have come out of their runners.
- 6.8 The doors must have no deformation or holes that could lead to loss of the load.
- 6.9 No guiding or locking systems (door frames, hinges, bolts, latch hooks or handles) must be missing or be dislodged, broken or deformed.
- 6.10 All steps, handrails, ladders and walkways must be safe to use and free from cracks. This provision also applies to their fastenings and supporting structures.
- 6.11 Steps may be twisted, deformed or tilted to a maximum of 20 mm.
- 6.12 The clearance between handrails and the nearest part of the wagon must be at least 60 mm.
- 6.13 Plates carrying markings, folding panels and label-holders must not be missing and must be properly secured.
- 6.14 The following markings as specified in Appendix 11 must be fully present and legible:
  - wagon number and signs as depicted in ~~a~~Appendix 11 points 2.1 and 2.2;
  - tare;
  - braked weight of the hand brake;
  - load limits;
  - capacity of tank wagons;
  - goods for which tank wagons are used;
  - length over buffers of wagon;
  - the high voltage warning sign "Caution – Electrical hazard" on wagons fitted with steps or ladders placed at a height of more than 2 m;
  - maintenance (overhaul) plate;
  - signs indicating the presence of anti-crash devices;
  - diagonal stripes for wagons with long-stroke shock absorbers.

**Additional provisions for covered wagons:**

- 6.15 Ventilation flaps must not be missing or damaged.
- 6.16 Control gear, shutters and retaining brackets must not be unhooked, dislodged or deformed.
- 6.17 The roof cover and weatherboard must not be loose or deformed.
- 6.18 It must be possible to close and lock opening roofs to prevent them from coming open unexpectedly. None of the controls must be missing, deformed or inoperable. The roofs must lie in their runners.
- 6.19 It must be possible to use roof hatches correctly.

**Additional provisions for open wagons:**

- 6.20 It must be possible to close and lock the side walls to prevent them from opening unexpectedly.
- 6.21 It must be possible to close and lock the end flaps to prevent them from opening unexpectedly.
- 6.22 The locking systems for the end flaps (pins, camshafts, rings, shafts) must not be missing, broken or cracked. They must be fit for use.
- 6.23 The cantrails must not be deformed, broken or cracked so as to foul the gauge.

**Additional provisions for flat wagons:**

- 6.24 It must be possible to lift and secure the drop sides.
- 6.25 The hinges, pins and securing devices of the drop sides must not be missing or broken. They must be fit for use.
- 6.26 Detachable, swivelling and retractable stanchions must not be missing, broken or cracked. They must not be deformed, broken or torn to the extent of fouling the loading gauge. This provision also applies to the stanchion mountings and securing devices. The stanchion fastenings must be effective.
- 6.27 Folding bolsters must not be loose.

**Additional provisions<sup>1)</sup> for tank wagons<sup>2)</sup>:**

- 6.28\* Tanks must not have sharp-edged deformations (even if there is no loss of the goods carried).
- 6.29\* Cracks in tank cradles are not accepted. If the tank is fastened to the underframe using bolts or rivets, none of these must be missing.
- 6.30\* The welded joints on the tank and the underframe must not be cracked.
- 6.31\* Ladders, platforms and guard rails must be safe to use and must not be loose.
- 6.32\* Tank cladding, sun-roofs and insulation must not have come loose.
- 6.33 The tanks and their filling and emptying devices must not leak. It must be possible to seal them hermetically, with the exception of the automatic ventilation devices (Appendix 11, point 6.3).
- 6.34\* Screw caps must not be missing.

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<sup>1)</sup> The points indicated by a \* are mandatory only for RID tank wagons (visual inspections)

<sup>2)</sup> Tank wagons are wagons used for transporting liquids, gases, powdered or granular goods (visual inspections)

- 6.35\* The blind flanges must not be missing or loose. All the fastening screws must be in place.
- 6.36 The emergency control screw for the emptying valve must be unscrewed.
- 6.37\* The indicator on the emptying valve must be in good condition and legible.
- 6.38 The dome hatch must be present. It must be possible to close it hermetically.

**Additional provisions for mechanically sheeted wagons:**

- 6.39 It must be possible to close and lock the mechanical sheeting correctly (indicator visible). This requirement also applies to the locking system for the end hoops.

**Additional provisions for wagons with telescopic hood:**

- 6.40 It must be possible to close and lock the hoods correctly, keeping them in the guide rails provided.

**Additional provisions for flat bogie wagons for carrying road and rail vehicles:**

- 6.41 The moving headstocks at each end must not be damaged. It must be possible to lock them from both sides.
- 6.42 The sealing plates, plate bolts, securing chains and chain eyes must be fit for use.

**Additional provisions for ACTS carrier wagons:**

- 6.43 The swivel frames must not be damaged to the extent that they cannot be properly fastened and locked.
- 6.44 The snap locks must function properly.
- 6.45 The central lock must function and clearly show the "locked" position.
- 6.46 It must be possible to erect the stanchions correctly.

**Additional provisions for car-carrying wagons:**

- 6.47 It must be possible to raise and secure the end boards and crossing gangways.
- 6.48 The upper loading deck must rest on the supporting brackets and be properly secured. The indicator device must function.
- 6.49 None of the accessories must be loose (scotches, wheel scotch guide-pieces, crank handles, lifting or lowering device, end boards, crossing gangways).

**Additional provisions for self-discharging wagons:**

- 6.50 It must be possible to close and lock all valves and hatches.
- 6.51 No part of the locking and discharging system must be loose.

### **Indications – Acceptable and prohibited practices**

- 6.52 When deformation has occurred and the vehicle gauge profile must be verified, the provisions of point 4, Section 1 of the Loading Guidelines shall be applied.  
Exception: for wagons built in accordance with UIC Leaflet 505 and whose width exceeds that obtained by application of point 4, Section 1 of the Loading Guidelines (these wagons are not specially marked), the wagon keeper should be contacted to find out the permitted width of the wagon.  
Failing a reply from the keeper, point 4 of Section 1 of the Loading Guidelines shall be applied for safety reasons.
- 6.53 Parts made from plastic or plywood (e.g. roof covers and side wall panels) must not be repaired with nails. These wagons carry the sign specified in Appendix 11, point 2.14.
- 6.54 Rivets used for fastening the tanks of tank wagons may be replaced by bolts when missing.
- 6.55 Welding work on tanks may only be carried out by approved workshops with the keeper's agreement.

## **B – HANDLING OF WAGONS AFTER SPECIFIC INCIDENTS**

### **0 Principle**

After specific incidents, the user RU must ensure that any damage or presumed damage that the wagon has suffered will not give rise to consequential damage. To this end, this chapter sets out a number of additional provisions to be complied with when returning the wagon to running order. These additional tests are designed to ensure that damage such as deformation of the bogie and/or underframe or cracking, which can jeopardise the wagon's fitness for use, has not occurred. If workshops are unable to restore the wagon to the minimum condition specified, the vehicle shall be referred to the keeper for a decision on what action to take (in accordance with Appendix 9).

### **1 Derailment**

When a wagon has derailed, the distance between the inner faces of the tyres (or rims for monobloc wheels) must be measured on the wheelsets that derailed, as specified in Chapter A, point 1.17. If the difference in the dimensions is greater than 2 mm, the wheelset must be replaced.

Derailed wheelsets that have been replaced must be clearly marked before being sent back so that the keeper or the keeper's workshop can recognise that the wheelset has derailed (Model H<sup>R</sup>).

### **2 Exceptional impacts**

When a wagon has suffered an exceptional impact, it is assumed that the speed of impact was greater than 12 km/h. In this case, the following tests shall be carried out:

- measure buffer height and check for visible damage to the buffers,
- ensure buffer longitudinal clearance is less than 15 mm,
- ensure twist clearance is less than 5 mm (only for non-rotating buffers),
- visual inspection of headstock compression in the buffer area and the underframe members immediately behind it.

### **3 Overloading (recommendation only)**

When a wagon is brought in because it has been overloaded (whole wagon, bogie or wheelset), the vehicle should first be unloaded and the following inspections and measurements carried out:

- visual inspection of suspension springs for ruptures, cracks and deformation,
- visual check for traces of contact on the springs and parts of the underframe or bogie,
- inspection of the wheelset(s) for excessive thermal stressing or other damage.

In case of doubt, the wheelset(s) should be replaced and marked as having been subject to overloading (Model H<sup>R</sup>) before being sent back to the wagon keeper.

### **4 Flooding (recommendation only)**

The following inspections and measures shall be performed on wagons that have stood with all or part of their underframe under water in order to return them to running order, where appropriate after cleaning:

- replacement of all wheelsets,
- before they are sent back, all the wheelsets that have been subject to flooding must be clearly marked so they are recognisable to the wagon keeper or his workshop as having suffered potential damage from water (Model H<sup>R</sup>),
- visual inspection of suspension springs to check for corrosion that could lead to a rupture of the spring,
- replacement of any buffers that were below the waterline,
- draining of water from the main brake pipe. The wagon should be handled with the brake isolated in accordance with Appendix 9.

## **5 Contact with energised catenary**

When parts of the wagon body have come into contact with energised catenary wires, the axle-boxes are likely to have sustained damage from the passage of electric current.

In cases such as these, the following measures shall be taken:

- replacement of all wheelsets on the wagon,
- before they are sent back, all the wheelsets that have been affected by the electric current must be clearly marked so they are recognisable to the wagon keeper or his workshop as having suffered potential damage from electric current (Model H<sup>R</sup>),
- inspection of the vehicle body to check for other damage with potential consequences for the wagon's fitness to run.



# C – PREVENTIVE MAINTENANCE

## 0 Principle

When overhauls are carried out, the keeper must ensure that wagons are restored to a condition making them fit for normal service, in terms of load safety and conservation, until the next scheduled overhaul.

This overhaul must form an integral part of a time-based or performance-based maintenance system.

## 1 Overhaul periodicity

- 1.1 In a time-based maintenance system, overhauls are carried out after a set period defined in UIC Leaflet 579-1. With this system, the period between overhauls corresponds to the validity period indicated on the maintenance plate. The maximum validity period on the maintenance plate must not exceed the value indicated in point 1.3.
- 1.2 In a performance-based maintenance system, overhauls are carried out when the wagon reaches a performance limit expressed in tonne-kilometres and defined in UIC Leaflet 579-1. The validity period on the maintenance plate must not exceed the value indicated in point 1.3.
- 1.3 The maximum validity period on the maintenance plate (Appendix 11, point 2.3) is as follows:
  - 1.3.1 6 years, with a possible 3 month extension, for wagons meeting the following conditions:
    - distributor type Bd, Ch, O, **KE**, WE, DK, WU, WA or **MH**;
    - automatic brake-rigging adjustment facility;
    - double-link suspension for axle wagons;
    - bogies with leaf springs and link suspensions (by derogation, also the modernised "Niesky" bogies on DB wagons);
    - bogies with helical springs and UIC damper or equivalent;
    - buffers conforming to UIC Leaflets 526-1 or 526-2.
  - 1.3.2 4 years, with a possible 3 month extension, for wagons that do not meet the conditions in point 1.3.1.
  - 1.3.3 To be eligible for this 3 month extension, wagons must carry the marking "+3M" (Appendix 11, point 2.3). Wagons that are not marked "+3M" may obtain the marking at the keeper's request if the condition of the wagon permits.
- 1.4 However, the keeper must set a shorter validity period when necessitated by the type of wagon and the conditions of its operation.  
Additionally, for SS<sup>1)</sup> braked wagons with a maintenance plate validity period of more than 3 years, the keeper shall organise an intermediate inspection.  
This inspection may be confined to a random check if the results obtained are satisfactory.
- 1.5 Tank wagons for which the date (end of month) of the next tank test has become due (Appendix 11, point 6.4) shall be handled in accordance with Appendix 9.

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<sup>1)</sup> In accordance with UIC Leaflet 543

## **D – TRANSPORT AND STORAGE OF PARTS**

### **0 Principle**

When wagon parts are transported, transhipped and stored before they are fitted to wagons, after their removal and in preparation for being sent back to the wagon keeper, particular care must be taken to ensure that their inner components remain undamaged and their surfaces and anti-corrosion coatings intact.

### **1 Wheelsets**

#### **Storage**

- When stored side-by-side on the track, there must be no contact in the wheel profile area. Flange-to-flange contact is permissible.
- When stored in staggered formation (with double rail) there must be no contact between axle-box / flange or flange / axle shaft.
- When storing wheelsets in loading cradles, similar precautions must be taken.
- Storage on flat surfaces is permissible if the wheelsets are resting on suitable materials (wood, rubber, plastic) so that the surfaces in contact are not damaged.
- The wheelsets must be placed and moved in such a way that no damage can occur to the wheelset or its component parts.
- Wheelsets shall be secured against rolling away using wheel scotches, scotch blocks or hollow seats in the track.
- Stacking of wheelsets is permissible, if the above-mentioned provisions are applied for storage. Any axle-to-axle contact is forbidden.

#### **Transport**

- During transport by fork-lift truck, the tines of the fork and their ends must be fitted with protective padding. Damage resulting from wheelsets rolling off the forks should be prevented.
- If load handling attachments are used, the wheelsets must not be damaged as a result.
- Wheelsets should be transported between workshops and spare parts centres in loading cradles wherever possible. The wheelsets must be loaded and secured in such a way that there is no possible contact between them during transit.

### **2 Other parts**

- Buffers shall be stored in such a way that no water is able to penetrate between the buffer casing and the plunger.
- If parabolic springs are transported directly by fork-lift truck, the tines of the fork and their ends must be fitted with protective padding (rubber inserts) to avoid damaging the anti-corrosion coating.

Appendix 10 – Annex 1  
**Signs indicating out-of-roundness on wheels**

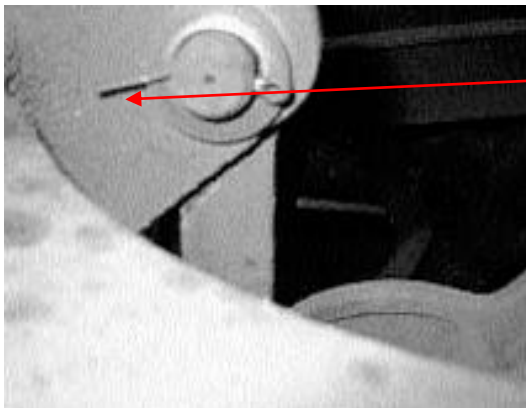


Fig. 1  
Sheared-off pin

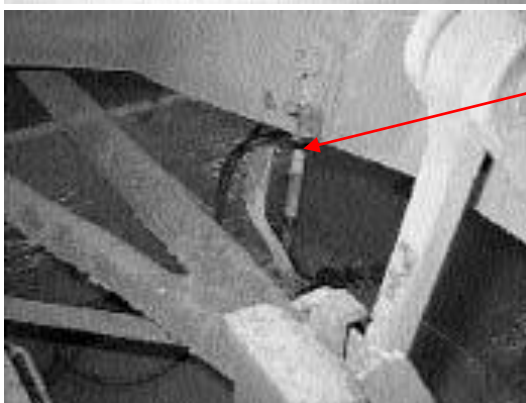


Fig. 2  
Broken safety stirrup

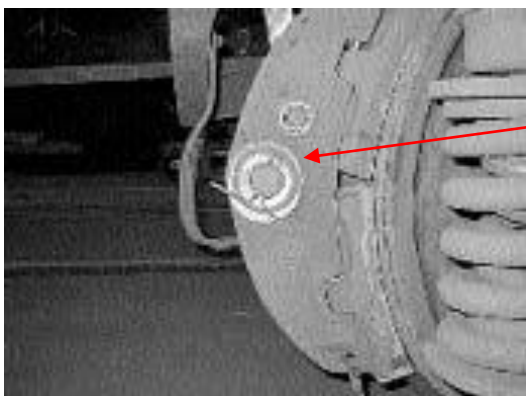


Fig. 3  
Shiny traces on the brake triangle end washer

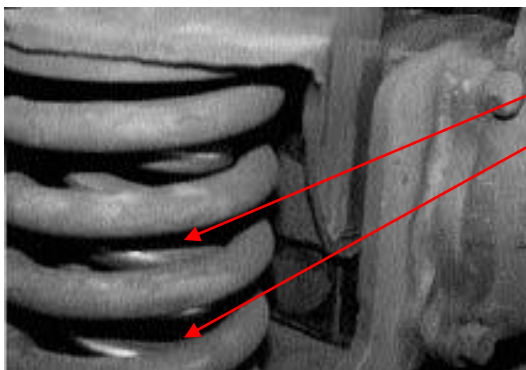


Fig. 4  
Shiny traces on the load spring

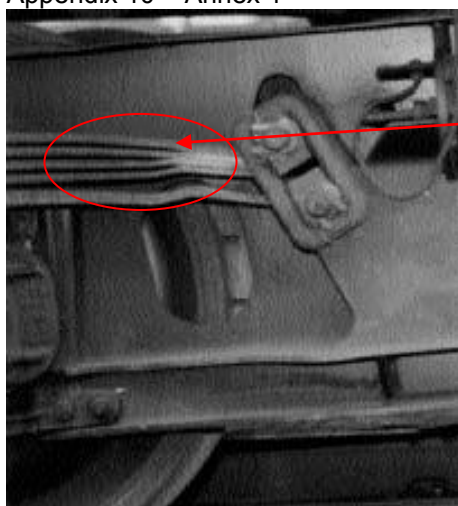


Fig. 5  
Areas shiny with wear, visible from the outside, on the friction points of the spring leaves of parabolic spring suspensions

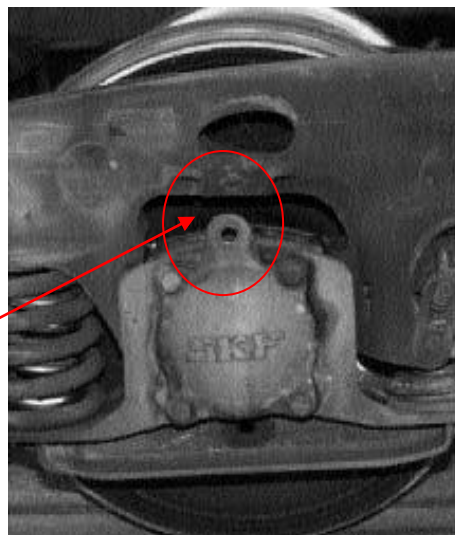


Fig. 6  
Lifting safety catch missing or loose

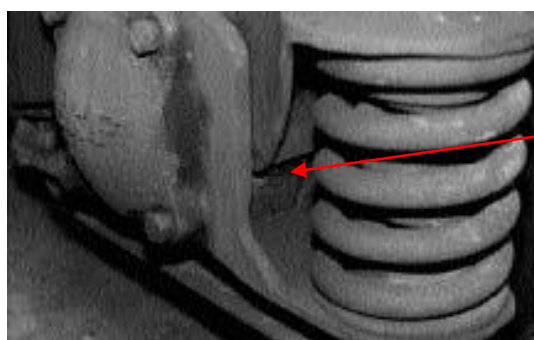


Fig. 7  
Manganese wear plates on bogies and axle-boxes detached



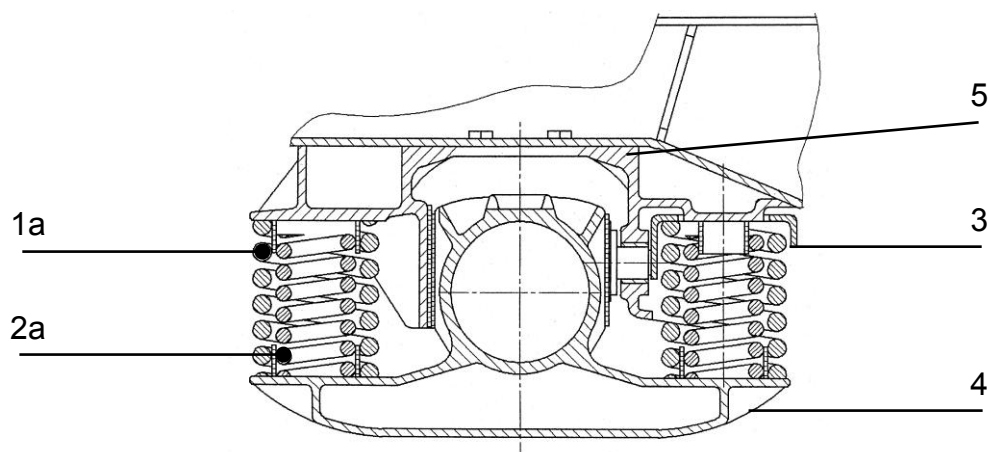
Fig. 8  
Irregular contact surface on the edge of tired wheel rim



Fig. 9  
Major irregular crushing of the edge of the tired wheel rim

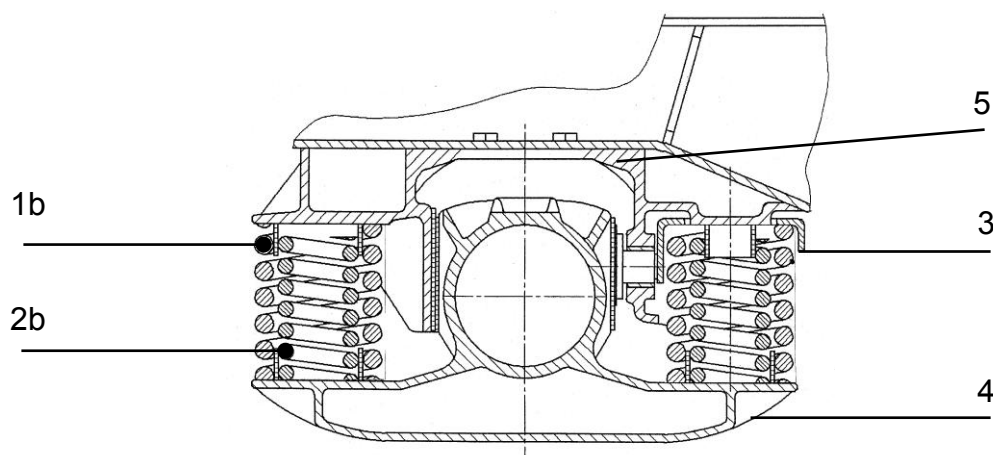
## Diagram of the Y25 bogie suspension

Figure 1 – Bogie with springs for axle-load of 20 tonnes



- 1a tare spring for 20 t axle-load, right-wound
- 2a load spring for 20 t axle-load, left-wound
- 3 spring cap
- 4 axle-box
- 5 axle-box guide piece

Figure 2 – Bogie with springs for axle-load of 22.5 tonnes



- 1b tare spring for 22.5 t axle-load, left-wound
- 2b load spring for 22.5 t axle-load, right-wound
- 3 spring cap
- 4 axle-box
- 5 axle-box guide piece

## ANNEX 3 / APPENDIX 10

### EUROPEAN VISUAL INSPECTION CATALOGUE (EVIC) FOR WHEELSETS

#### Preamble

1. The documents contained in this annex are exact copies of the procedures agreed by the Joint Sector Group for ERA Task Force on wagon/wheelset maintenance as regards the visual inspection of wagon axles, except for modifications of the wording of point 2.1 and 2.6 of chapter B hereafter due to the time lag between the finalisation of the work of the Joint Sector Group and the effective implementation of EVIC in the GCU.

**Chapter A:**

European visual inspection catalogue (EVIC) for wagon axles (version V 2.11)

**Chapter B:**

Implementation guide for the European visual inspection catalogue (EVIC) for wagon axles (version V 2.2)

**Chapter C:**

Traceability of wheelsets inspected by workshops applying EVIC (chart)

2. Axles requiring removal following EVIC must be marked in a clearly visible and indelible manner with "EVIC", the defect code and the number of the corresponding wheelset. This data must also be noted on Form H<sub>R</sub> (Appendix 7 of the GCU) when placing an order for replacement wheelsets from the wagon keeper.

3. If a wagon is sent to the workshop because of axle damage according to Appendix 9 of the GCU, the axles of the wheelsets concerned shall not be subjected to visual inspection. Only the provisions of Appendix 10 of the GCU on corrective and preventive maintenance shall be applicable to these wheelsets.

4. The cost of the visual inspection of axles according to Chapters A and B of the present Appendix shall be borne by the keeper of the wagon inspected.

5. Annex 3 in its entirety shall no longer be part of and be deleted from the GCU once the GCU signatories receive a notification from the GCU Bureau informing them that the GCU Joint Committee by unanimous decision has concluded that due to changed circumstances the application of the documents mentioned in Point 1 above is not required anymore. The decision of the GCU Joint Committee could, but not necessarily must be based on a recommendation either by the Joint Sector Group mentioned in Point 1 above or the European Rail Agency. This change shall take effect one month after the notification mentioned above has been sent out to the signatories.

## **A European visual inspection catalogue (EVIC)**

The following pages represent the complete

# EUROPEAN VISUAL INSPECTION CATALOGUE (EVIC) FOR FREIGHT WAGON AXLES

**to be applied in light maintenance of freight wagons in workshops**

*Joint Sector Group for ERA Task Force on wagon/axle maintenance*





**DAMAGE CATEGORY**




<b>Painted axles</b>		
<b>30</b>	No defects	OK
<b>31</b>	Mechanical damage sharp edged circumferential fluting	X (not ok)
<b>32</b>	Mechanical damage smooth edged circumferential groove	X (not ok)
<b>33</b>	Mechanical damage sharp edged notching	X (not ok)
<b>34</b>	Mechanical damage cracks	X (not ok)
<b>35</b>	Surface damage large and heavily corroded areas	X (not ok)
<b>36</b>	Surface damage single, deeply pitted corrosion scars	X (not ok)
<b>37</b>	Coating damage with or without corrosion	C
<b>Unpainted axles</b>		
<b>40</b>	No defects	OK
<b>41</b>	Mechanical damage sharp edged circumferential fluting	X (not ok)
<b>42</b>	Mechanical damage smooth edged circumferential groove	X (not ok)
<b>43</b>	Mechanical damage sharp edged notching	X (not ok)
<b>44</b>	Mechanical damage cracks	X (not ok)
<b>45</b>	Surface damage very heavy, deep and large corrosion	X (not ok)
<b>46</b>	Surface damage single, deeply pitted corrosion scars	X (not ok)
<b>All axles</b>		
<b>50</b>	Abutment area	X (not ok)

## CRITERIA FOR PAINTED AXLES

30 No or admissible defects found on the axle surface - smooth pitting		Painted axles
Salient information:		
	Pitting may occur either round the entire perimeter or intermittently and is characterised by smoothly rounded contours with no sharp transitions. This type of pitting may arise in the course of maintenance work. The anti-corrosion coating is undamaged.	
Decision:		
	Pitted axles whose coating is nevertheless undamaged may remain on the vehicle	
	Mark 1 at “ok” column in EVIC logging.	OK

<b>Pictorial representation:</b>			
			

31 Mechanical damage – sharp edged circumferential fluting			Painted axles
Salient information:			
	Flutes are characterised by sharp edged circumferential sharp-edged transitions.		
	Mechanical damage to the base material in the form of fluting is inadmissible.		
Decision:			
	Check on the wagon why this damage could have occurred and repair accordingly		
	Remove from service according		Case A
	Mark 1 at “X” column in EVIC logging		X

<b>Pictorial representation:</b>			
			


32 Mechanical damage – smooth edged circumferential grooves		Painted axles
Salient information:		
	Characterised by smooth transitions in the edges (GCU Annex 9, 1.6.2). Pitting that arises during operation (caused e.g. by brake lever connectors dragging) involves damaged anti-corrosion coating	
Decision:		
	Check on the wagon why this damage could have occurred and repair accordingly	
	Remove from service	Case B
	if there is damage to the base material > 1mm: (acc. GCU)	Case A
	mark 1 at “X” column in EVIC logging	X

**Pictorial representation:**

33 Mechanical damage – sharp edged notching		Painted axles
Salient information:		
	Sharp edged notches occur locally and are characterised by sharp-edged transitions.	
	Mechanical damage to the base material in the form of notching is inadmissible.	
Decision:		
	Remove from service (according to GCU criteria)	Case A
	mark 1 at “X” column in EVIC logging	X

**Pictorial representation:**

34 Mechanical damage – cracks		Painted axles
Salient information:		
	Cracks occur locally on the shaft material (not on the painting) and are characterised and visible by fine lines.	
	Mechanical damage to the base material in the form of cracks is inadmissible.	
Decision:		
	Remove from service	Case A
	mark 1 at “X” column in EVIC logging	X

<b>Pictorial representation:</b>			
			




35 Surface damage – large and heavily corroded areas		Painted axles
Salient information:		
	Surface damage to base material in form of large and heavily corroded areas (old corrosion protection) is inadmissible.	
Decision:		
	Remove from service	Case B
	mark 1 at “X” column in EVIC logging	X

**Pictorial representation:**



36 Surface damage – single, deeply pitted corrosion scars		Painted axles
Salient information:		
	Surface damage to the base material in the form of marked, local corrosion scars (resulting e.g. from chemical effects) is inadmissible.	
Decision:		
	Remove from service	Case B
	mark 1 at “X” column in EVIC logging	X





<b>Pictorial representation:</b>			
			

37 Coating damage – with or without corrosion		Painted axles
Salient information:		
	Minor lack of an anti-corrosion coating, whether corrosion is involved or not.	
Decision:		
	Leave in service acc. case C and/or repair the damage in situ on the wheelset	Case C
	mark 1 at “C” column in EVIC logging	C

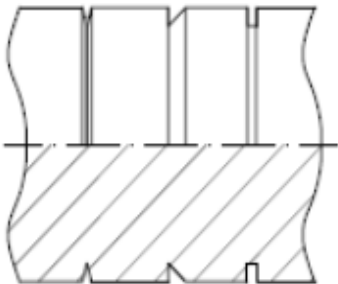

**Pictorial representation:**

## CRITERIA FOR UNPAINTED AXLES

40 No defect - admissible surface appearance		Unpainted axles
Salient information:		
	There exist maintenance rules that do not require any anti-corrosion protection. Axles and wheels stay unpainted in such cases and show a thin and uniform layer of rust on their surfaces in service.	
	SNCB return on experience proves that application of such an axle maintenance system does not lead to any fatigue caused ruptures during service of an axle.	
Decision:		
	Deep corrosion is not accepted.	
	Leave in service wheelset “as new”, “very good”, “good” and “acceptable”	
	mark 1 at “ok” column in EVIC logging	OK



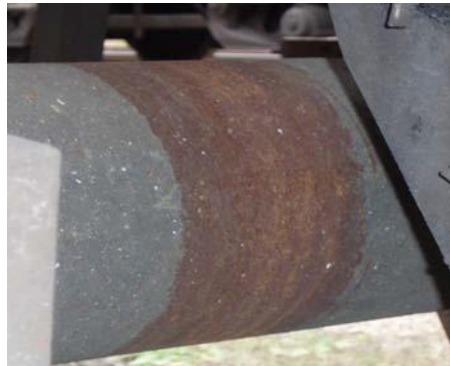

<b>Pictorial representation:</b>			
As new	Very good	Good	Acceptable
			

41 Mechanical damage – sharp edged circumferential fluting		Unpainted axles
Salient information:		
	Flutes are characterised by sharp edged circumferential sharp-edged transitions.	
	Mechanical damage to the base material in the form of fluting is inadmissible.	
Decision:		
	Check on the wagon why this damage could have occurred and repair accordingly	
	Remove from service according	Case A
	mark 1 at “X” column in EVIC logging	X

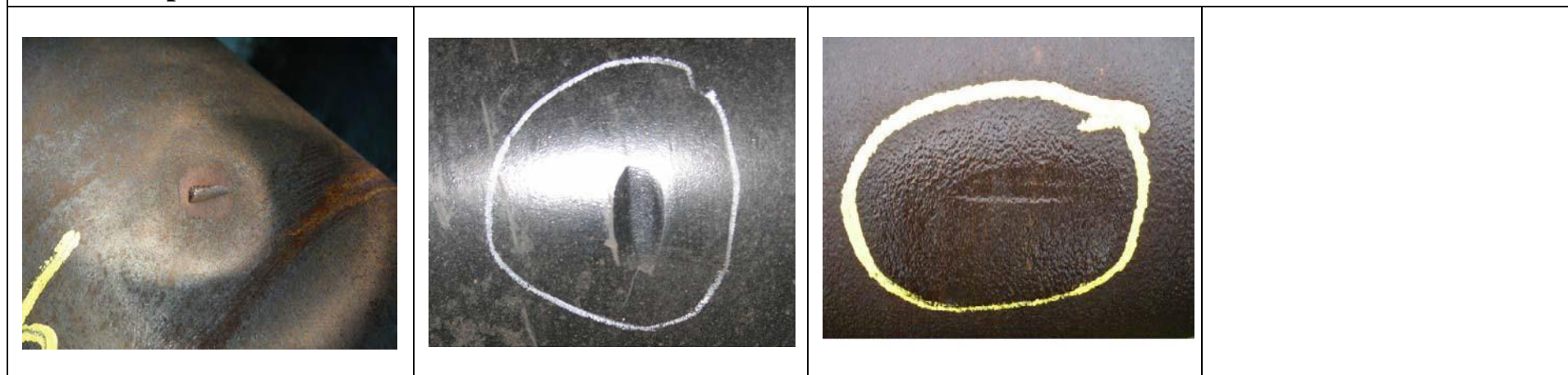
<b>Pictorial representation:</b>			
			




42 Mechanical damage – smooth edged circumferential grooves		Unpainted axles
Salient information:		
	Characterised by smooth transitions in the egdes (GCU Annex 9, 1.6.2). Pitting that arises during operation (caused e.g. by brake lever connectors dragging) involves damaged anti-corrosion coating	
Decision:		
	Check on the wagon why this damage could have occurred and repair accordingly	
	Remove from service	Case B
	if there is damage to the base material > 1mm: (acc. GCU)	Case A
	mark 1 at “X” column in EVIC logging	X

<b>Pictorial representation:</b>			
			

43 Mechanical damage – sharp edged notching		Unpainted axles
Salient information:		
	Sharp edged notches occur locally and are characterised by sharp-edged transitions.	
	Mechanical damage to the base material in the form of notching is inadmissible.	
Decision:		
	Remove from service (according to GCU criteria)	Case A
	mark 1 at “X” column in EVIC logging	X

**Pictorial representation:**

44 Mechanical damage – cracks		Unpainted axles
Salient information:		
	Cracks occur locally and are characterised and visible by fine lines.	
	Mechanical damage to the base material in the form of cracks is inadmissible.	
Decision:		
	Remove from service	Case A
	mark 1 at “X” column in EVIC logging	X


<b>Pictorial representation:</b>			
			



45 Surface damage – large and heavily corroded areas		Unpainted axles
Salient information:		
	Surface damage to base material in form of large and heavily corroded areas (old corrosion protection) is inadmissible.	
Decision:		
	Remove from service	Case B
	mark 1 at “X” column in EVIC logging	X



**Pictorial representation:**

46 Surface damage – single, deeply pitted corrosion scars		Unpainted axles
Salient information:		
	Surface damage to the base material in the form of marked, local corrosion scars (resulting e.g. from chemical effects) is inadmissible.	
Decision:		
	Remove from service	Case B
	mark 1 at “X” column in EVIC logging	X

<b>Pictorial representation:</b>			
			

## ABUTMENT AREA

50 Abutment area		All axles
Situation:		
	Normally, the abutment area cannot be inspected sufficiently for wheelsets mounted in the wagon	
Recommendation:		
Only if there is a clear indication on mechanical or corrosion damages		
	Take wheelset out	Case A
	Mark 1 at “X” column in EVIC logging	X
If not judgeable		
	Leave wheelset in service	
	Mark 1 at “OK” column in EVIC logging	OK

<b>Pictorial representation:</b>			
Not acceptable		Not judgeable	
			

## **B      Implementation guide**

The following pages represent the complete implementation guide

## IMPLEMENTATION GUIDE

## FOR THE

## EUROPEAN VISUAL INSPECTION CATALOGUE (EVIC) FOR FREIGHT WAGON AXLES

*Joint Sector Group for ERA Task Force on wagon/axle  
maintenance*

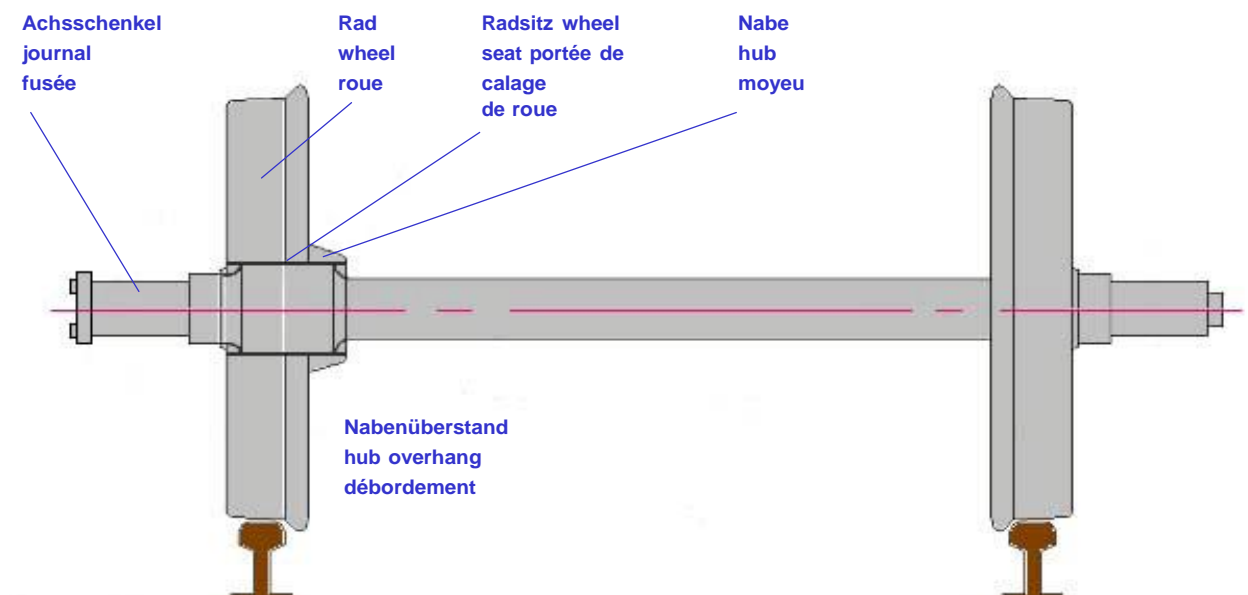
## Table of Contents

1. Definitions
2. Basics and preparing inspections
3. Conducting the Visual Inspections
4. Recording the Visual Inspections

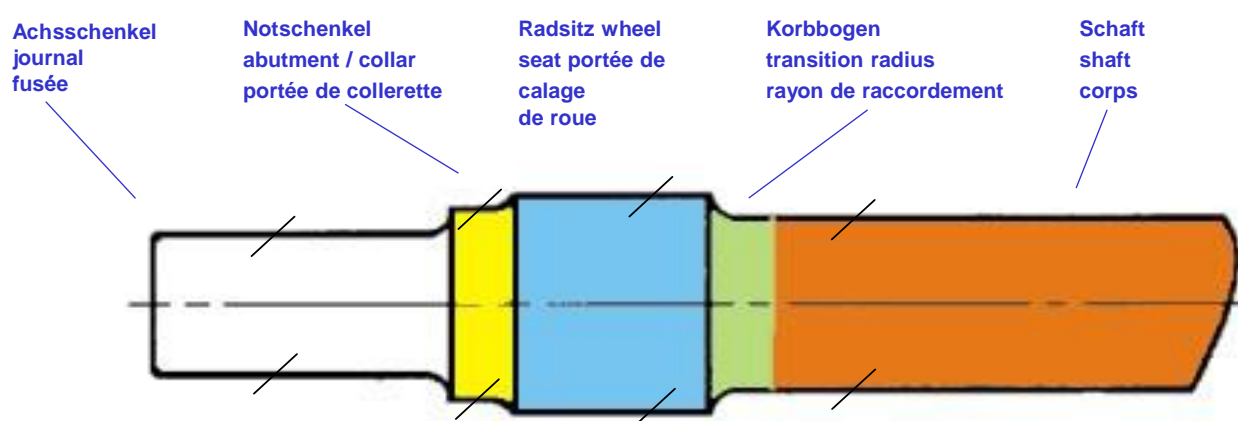
This version replaces all previous versions of the EVIC Implementation Guide

Brussels, 10.03.2010

## 1. Definitions



Radsatz  
Wheelset  
Essieu monté



Radsatzwelle  
Axle  
Essieu-axe



In the EVIC procedure instructions, the meaning of several expressions is as follows:

**Replace** = take the wheelset out of the wagon (and repair it in a suitably competent workshop, if possible)

**Repair** = repair the damage in situ (wheelset mounted) according to the relevant rules

**Remove from service** = replace or repair (in situ if possible) according to the criteria

## 2. Basics and preparing inspections

### 2.1 Reasons for the EVIC program

European wagons keepers have developed since many decades a maintenance system assuring a safety which allowed to become the safest land freight transport.

However, after the tragic accident in Viareggio,

- the European Railway Agency
- the European NSAs and
- the Joint Rail Freight Sector (CER, ERFA, UIP, UIRR, UNIFE)

agreed to investigate in the frame of the ERA Task Force the possibilities for a European approach for harmonised criteria and immediate and mid-term measures ascertaining an even enhanced railway safety in an appropriate way.

The Joint Sector Program worked out in the ERA Task Force was fully adopted in Viareggio in december 2009. The European Action Program consists of a:

- **Visual Inspection of the European wheelset/axle population (according to EVIC)**
- more in-depth investigation of samples of wheelsets from defined operating areas
- European-wide implementation of systematic traceability of wheelset maintenance (for the EVIC campaign and for general wheelset maintenance)

The Joint Sector program was approved by all EU authorities and NSAs. It is up to the Sector to implement now what has been decided. The implementation of the program (especially EVIC) is done as a self-commitment in the Sector Association's companies in fulfillment of the Sector's Safety responsibility. There is no legal obligation but a clear commitment of the Sector to the European and National Authorities to implement the Action program. On the Sector level, the EVIC program was integrated in the GCU (new annex 3 of Appendix 10) as from May 1<sup>st</sup> 2011.

The European NSAs are invited to audit the execution of the decided measures.

### 2.2 Objectives of the EVIC program

In execution of the first element of the European Action program, the **Visual Inspection of the European wheelset/axle population**, the European freight wagon fleet will be subject to a Visual Inspection of the axle status with the objectives

- to judge the axle status according the criteria in the European Visual Inspection Catalogue (EVIC)
- to remove from service axles in a not admissible state (immediately / after unloading)
- to record a set of minimum data for the inspected axles
- to hand over removed axles to heavy maintenance with appropriate treatment and NDT

### 2.3 Timeframes for the EVIC inspection

The EVIC program starts in Europe **from 01.04.2010 onwards**.

From then on,

- **all wagons**
  - for dangerous goods (only RID tank wagons) and
  - operating under corrosive conditions

will be checked under EVIC conditions to **100% in a 4 years period**

- **all standard wagons** will be checked under EVIC conditions to **100% in a 6 years period**

In case of removal of the wheelset, the wheelset must be handed over by the keeper to regular heavy maintenance with NDT in accordance to the relevant maintenance systems.

After having checked the fleet to 100%, the EVIC will be applied continuously and/or amended depending on the return of experience (to be discussed in the Task Force).

Recommended priorities for standard wagons are:

- high loading factor (e. g. 50%, F-, T-wagons)
- impact due to drop loading (e. g. some E-types)

## 2.4 The tasks of the Joint EVIC body per country

**The Joint EVIC body** consists of members nominated by the Railway Associations UIP, CER and ERFA per European country (see table) and is responsible for the EVIC implementation in its respective Member State (plus Switzerland).

The Joint EVIC body will:

- organize the translation in the national language and the issueing of the EVIC
- organize joint central training session(s) per country for all associations, all keepers, all related workshops (and Railway Undertakings for information)
- manage all information of all concerned parties (workshops, keepers,...)
- collect the traceability of EVIC from the keepers
- condense the collected data from the keepers (per country) for the Joint Sector Group
- monitor the implementation of EVIC in the respective companies (e.g. by a checklist)

The collected results will be exploited and monitored by the Joint Sector Group for survey of the implementation process and for report in the ERA Task Force.

Country	Lan- guag es	UIP / Rivière	CER / Müller	ERFA / Heimig
France	FR	David Tillier dtillier@ermewa.fr	Lafaix SNCF bernard.lafaix@sncf.fr	
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Germany	DE	Albert Hartmann VPI hartmann@vpihamburg.de	Manfred Bergmann DB manfred.bergmann@ dbschenker.eu	Mallikat VDV mallikat@vdv.de
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Greece	GR			
Luxembourg	FR, DE		Gaston Zens gaston.zens@cflcargo.lu	
Estonia	EST			

as per begin march 2010

## 2.5 Preparing the working documents

The conditions for the EVIC program are laid down in this **EVIC Implementation Guide 2.2**.

The criteria for inspections, illustrations and required actions are laid down in the **EVIC 2.11 document**.

The reference is the English language version. All documents (English and translated) will also be published officially on **xxx website** (to be defined by the Joint Sector Group)

**The Joint EVIC body** per country delivers the EVIC documents in the national language.

**The Joint EVIC body** per country issues the EVIC documents to the countries' keepers (and, for information, to the RUs).

**The keepers** (ordering the Visual Inspection from the workshops) hand over the documents to the executing workshops.

**The executing workshop** adds the required national and local working rules as well as all supporting further instructions on/for application on the workshop level.

## 2.6 Mandating and invoicing the EVIC inspection

**The keeper must take over the costs** for executing the EVIC program (inspection and tracing) and potentially for a required change of the wheelset.

**The workshops** must give the results of the EVIC tracing to the **keeper**

- with the corresponding invoice (maximum after one month) or
- separately with the monthly separate summary sending

**The workshops must register** the wheelset IDs/number(s) of the new mounted wheelset(s) (replacement for "EVIC failed" wheelset) **in the invoices/reporting document to the keeper** (normally already done in the maintenance documentation)

## 2.7 Staff qualifications

The inspections have to be conducted by staff qualified in application of this Visual Inspection Catalogue.

It is not necessary for the operatives conducting such visual inspections to be qualified as NDT visual inspectors pursuant to EN 473.

The staff involved in this inspection **should be trained one day** for the correct use of this procedure. It is under the responsibility of the workshop to update a list of trained workers for the use of the present procedure.

### 3. Conducting the Visual Inspections

#### 3.1 Execution of the Visual Inspections

The Visual Inspection of the freight wagon's axle shafts for damage to material and coating (if existing) is mandatory

- during light maintenance
- each time the wagon is in a workshop (not mobile team)

and if one of the following conditions is fulfilled:

- the wagon is on a pit or
- the wagon is lifted

In case of non judgeable defects (not sufficiently detailed by the descriptions in the EVIC), the executor of the EVIC inspection must contact the keeper for further instructions.

**A replacing wheelset for a sorted out axle must be in an “EVIC ok” status.**

The EVIC doesn't replace existing maintenance rules. First, existing maintenance rules must be applied, then the EVIC check. If an axle is sorted out with current maintenance rules, it is not necessary to apply the EVIC

*(Remark: the visual axle inspection is also mandatory in case of wagon heavy maintenance events)*

The visual inspection **covers the complete area of the axle-shaft surface between the wheels.**  
See special instructions for the **abutment area** in the EVIC 2.11.

**The inspection area is to be examined for**

- **mechanical damage** (fluting, pitting and notching, cracks)
- **surface damage** (areas eaten away, corrosion scars)
- **coating damage** (with and without corrosion) *if coating system existing*

**Reference images in EVIC 2.11** (typical damage features) are used for identifying inadmissible forms of damage.

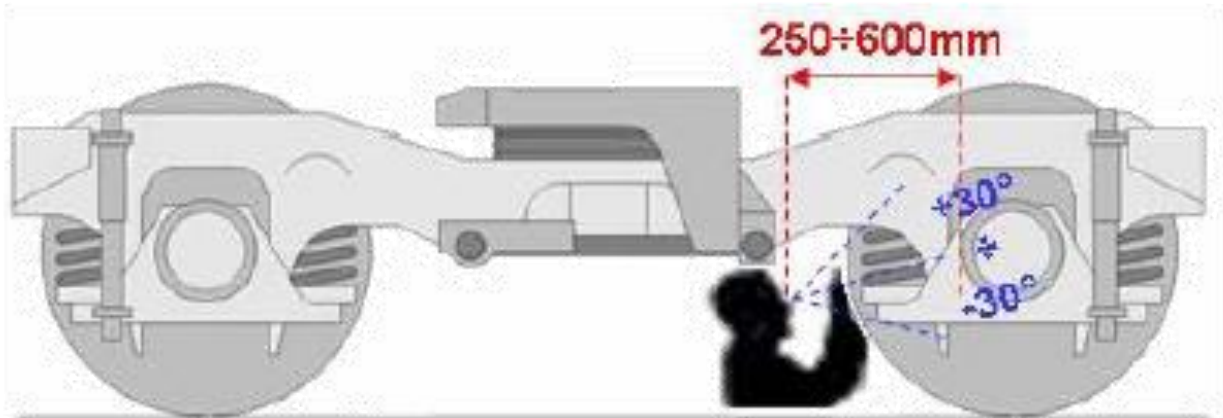
**It is not foreseen to clean the axle.** In case of doubt, clean axle (locally) to allow examination

If natural light intensity is too poor, a supplementary white light source must be used in order to obtain an adequate visibility on the axle.

Axle shafts with inadmissible forms of damage are to be repaired according to the prescriptions, if possible. Otherwise, the axles must be replaced.

An example for an adequate position for the staff conducting the visual inspection is given in the figure below.

If the wheelset cannot rotate (if the wagon is not lifted up), the visibility of the full surface of the axle must be assured in a different way.



**Figure 2 – Inspection angle and distance**

### 3.2 Actions to be taken after inspection (cases)

The following **cases** describe the actions to be taken after a Visual Inspection of the axle:

- A Remove the wheelset from service without delay
- B Remove the wheelset from service after unloading the wagon and/or sending back to home workshop
- C Leave wheelset in service until the next revision/overhaul of the wagon or repair the damage in situ on the wheelset.  
In the next revision/overhaul, the remove from service is mandatory

**Remove from service** = replace or repair (in situ if possible) according to the criteria

**For wheelsets operated in wagons under heavy corrosive conditions, only the categories A and B are allowed.**

## 4. Recording the Visual Inspections

The results of the Visual Inspection program must be recorded / traced after the inspection in the workshop.

### 4.1 Overview on EVIC categories and logging

Painted and unpainted axles			Category for EVIC logging	
30	No defects		ok	
40	No defects		ok	
<b>Painted axles</b>				
31	Mechanical damage	sharp edged circumferential fluting	X	(not ok)
32	Mechanical damage	smooth edged circumferential groove	X	(not ok)
33	Mechanical damage	sharp edged notching	X	(not ok)
34	Mechanical damage	Cracks	X	(not ok)
35	Surface damage	large and heavily corroded areas	X	(not ok)
36	Surface damage	single, deeply pitted corrosion scars	X	(not ok)
37	Coating damage	with or without corrosion	C	
<b>Unpainted axles</b>				
41	Mechanical damage	sharp edged circumferential fluting	X	(not ok)
42	Mechanical damage	smooth edged circumferential groove	X	(not ok)
43	Mechanical damage	sharp edged notching	X	(not ok)
44	Mechanical damage	Cracks	X	(not ok)
45	Surface damage	very heavy, deep and large corrosion	X	(not ok)
46	Surface damage	single, deeply pitted corrosion scars	X	(not ok)
47	---			
<b>All axles</b>				
50	Abutment area		X	(not ok)



The roles and TO DOs of the several parties involved are as follows:

#### 4.2 Workshops tasks

##### The workshops must

- record the results of the Visual Inspection
- **for each keeper**
- **in paper or**
- **in electronic file format**

according to the “EVIC keeper traceability 2.2” format (xls file):

##### DATA ARE ONLY EXAMPLES:

Workshop  Year

Country  Month

of the workshop

Keeper  (as written on the wagon)

				enter only 1 result per wheelset			
		- as far as identifiable - enter NI if not identifiable		Other check result	EVIC check result		
				e. g. GCU check	enter 1 where appropriate		
wagon number (set wagon number only once for all axles)	Date	wheelset N°	wheelset type	enter 1 where appropriate	"ok"	"X"	"C"
338712345689	02.05.10	12345	9056		1		
		12312	9052		1		
		345621	9052			1	
		41414	9056				1
338700000002	12.05.10	19	9076		1		
		287	9076		1		
		NI	NI	1			
		294	9076		1		
338700000123	12.05.10	13213213	9076			1	
		1232131414	NA	1			
338701231123	13.05.10	34562133	9052				1
		34562132	9056				1

“EVIC keeper traceability 2.2”

### 4.3 Keepers tasks

#### The keepers must

- collect the monthly results from the contracted workshop (per country)  
**1st week of next month**
- keep the records
- condense the received monthly results from all workshops (per country) in electronic file format according to the **“EVIC monthly keeper report 2.2”** format,

Nota: the name of the keeper has to be set according to VKM or registration in NVR.

- report monthly electronically the condensed “EVIC monthly keeper report” to the Joint EVIC bodies (details to be defined by the Joint EVIC bodies themselves):

(Example Germany: **evic.germany@vpihamburg.de**)

#### DATA ARE ONLY EXAMPLES:

Country

FRANCE

ID of the keeper to be formatted according to VKM or NVR registration

keeper	Month	Year	No of wagons checked	No of axles sorted out for other reasons	No of EVIC axles	No of EVIC axles	No of EVIC axles
					„ok“	„X“	„C“
XYZ	5	2010	400	“EVIC monthly keeper report 2.2”	100	80	120

#### 4.4 Joint EVIC bodies tasks

The Joint EVIC bodies must

- collect the “EVIC monthly keeper reports” from the different keepers
- summarize electronically the monthly results of all keepers per country according to the “**EVIC monthly country report 2.2**” format **2nd week of next month**
- send this report monthly electronically to the JSG: **evic.europe@deutschebahn.com**

**DATA ARE ONLY EXAMPLES:**

Country

FRANCE

ID of the keeper to be formatted according to VKM or NVR registration

keeper	Month	Year	No of wagons checked	No of axles sorted out for other reasons	No of EVIC axles „ok“	No of EVIC axles „X“	No of EVIC axles „C“
UVW	5	2010					
XYZ	5	2010					
Sum			700	90	1800	120	200

Only summarized data are reported in the ERA Task Force



## **C      Traceability of wheelsets inspected by workshops**



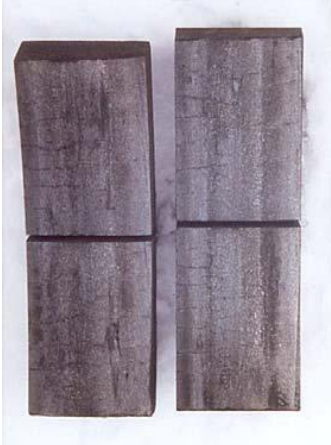
The traceability must be done according to the chart on de next page

Workshop	TERGNIER			Year	2010			
Country	France			Month	5			
of the workshop								
Keeper	ERMEWA			(as written on the wagon)				
				enter only 1 result per wheelset				
				Other check result	EVIC check result			
				e. g. GCU check	enter 1 where appropriate			
wagon number (set wagon number only once for all axles)		Date	wheelset N°	wheelset type	enter 1 where appropriate	"ok"	"X"	"C"
338712345689		02/05/10	12345	9056		1		
			12312	9052		1		
			345621	9052			1	
			41414	9056				1
338700000002		12/05/10	19	9076		1		
			287	9076		1		
			NI	NI	1			
			294	9076		1		
338700000123		12/05/10	13213213	9076			1	
			1232131414	NA	1			
338701231123		13/05/10	34562133	9052				1
			34562132	9056				1

## **C      Traceability of wheelsets inspected by workshops**

The traceability must be done according to the chart on de next page

		<p>Incipient cracking of &gt; 25 mm parallel to the wheel circumference</p>
<p>Figure 3: replace</p>		
		<p>Significant difference in the block's thickness at the top and bottom ends (one-sided wear). Exchange if smallest thickness is below 10 mm</p>
<p>Figure 4: replace</p>		

		<p>Incipient radial cracking in friction material</p>
<p>Figure 5: do not replace</p>		
		<p>"White film" on surface of contact area and to a depth of 10 mm  <b>or</b>  significant shelling on the contact surface and heavy carbonisation</p>
<p>Figure 6: do not replace</p>		
		<p>Branched thermal crack pattern, mainly axial (not thermal cracks, cf. vitrification) and carbonisation</p>
<p>Figure 7: do not replace</p>		