

Final report
on the activities of the
Task Force Freight Wagon Maintenance

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Contents

1. Introduction
 2. Risk assessment
 3. Survey: situation of broken axles in the European Union
 4. The deliverables
 - 4.1. Continued High Performance Operation of UIC type A wheelsets
 - 4.2. The European Visual Inspection Catalogue (EVIC) for freight wagon axles
 - 4.2.1. The sampling
 - 4.2.2. Implementation
 - 4.3. The European wheelset Traceability Catalogue (EWT) for freight wagon axles
 - 4.4. The European Common Criteria for Maintenance (ECCM) for freight wagon axles
 - 4.5. Adaptation of EN standards for wheelset design and maintenance
 5. Challenges faced by the Task Force
 6. Conclusions
 7. Continuation
- Annex 1: Terms of reference
Annex 2: Survey
Annex 3: EVIC
Annex 4: EWT
Annex 5: ECCM

1 Introduction

Following the accident in Viareggio (Italy) and the Agency's Preparatory Meeting on 20th August for the EC Conference on "Railway Safety: the way forward" held on 8th September in Brussels, the Agency agreed with the European Commission to set up a Task Force (TF) to discuss issues and propose measures on maintenance of freight wagons and in particular of wheelsets. The Task force should be made up of experts in the field of freight wagon maintenance and railway axles and coming from all stakeholders: Railway Undertakings (RU), keepers, Entities in Charge of Maintenance (ECMs), suppliers of railway components, National Safety Authorities (NSA), etc. The idea was supported and accepted by the NSAs and representatives of the sector organisations (CER, ERFA, ETF, UIP, UNIFE).

The TF had 7 meetings (18 September 2009, 27 October 2009, 24 November 2009, 16-17 December 2009, 2 February 2010, 20 April 2010 and 22 June 2010), of these only the December 2009 meeting was held in Viareggio (Italy), all the others were held in the Agency's premises in Lille.

An intermediate report was addressed to the European Commission in January 2010.

The objective of the task force was to address and develop maintenance and if necessary design measures as a follow-up to information on problems with broken axles of freight wagons (cases in AT, DE, IT).

The detailed objectives as stated in the terms of Reference are to:

- discuss relevant actions/information resulting from the EC Conference;
- exchange and analyse information relating problems with broken axles/fatigue and relevant testing methods;
- assist the sector and NSAs to establish sound evidence and advice on the causes of the problems with broken axles;
- propose/develop appropriate controls and monitoring tools;
- propose measures to review the different maintenance regimes existing across Europe and draw up a programme for further harmonization; and
- evaluate the role of standards for wheel-sets in the different countries.

For this purpose the sector set up a Joint Sector Group (JSG) composed of representatives of sector organisations and experts in standardisation (CEN) and focused on the following tasks:

- Establishing a risk assessment of the situation of problems with broken axles/fatigue
- Developing an inspection scheme of axles valid for the European Union
- Proposing an harmonised solution for overloaded UIC type A axles
- Harmonising the exchange of relevant data of wheelsets
- Harmonising the maintenance plans regarding the types of inspections and used NDTs

Nine NSAs joined also the Task Force: Austria, Belgium, France, Germany, Italy, Latvia, The Netherlands, Sweden and United Kingdom.

This final report on the activities of the Task Force focuses on the following results:

- The risk assessment performed by the JSG
- The Survey on the situation of broken axles in the European Union performed by the Agency
- The continued High Performance Operation of UIC type A wheelsets (Axle load above the nominal design load of 20 T)
- The European Visual Inspection Catalogue of axles including the sampling initiative
- The European Wheelset Traceability Catalogue
- The European Common Criteria for Maintenance
- The conclusions and continuation proposals.

2 Risk assessment

The current population of freight wagon axles is estimated by JSG to be 1.6 million in service, running 50 billion kilometres/year (average of 30.000 km/year/wagon).

The experts of the JSG studied 16 cases of broken axles that occurred between 1994 and 2009 for which they could gather accurate and sufficient detailed information.

Based on this study, no evidence of correlation has been found between broken axles and:

- UIC types A and B axle.
- Mechanical design:
 - Axle: no cracks in critical regions¹ have ever been observed and number of accidents remains too limited to have doubts on the design methods.
 - Running gear: design more or less equivalent on the Continent. The bogies Y 25 have been mounted for more than 50 years on the great majority of wagons. It will remain the standard bogie for lots of years.
- Age of axles: It means the age of the axle calculated since its manufacturing. The age of broken axles varies greatly.
- Maintenance plan.
 - Wheel wear: high mileage vehicles are more often in maintenance.
- Methods for non-destructive testing (NDT method).
- High Performance Operation (permanent overloading)

Nevertheless, the following conditions are still considered to have a possible impact on the state of an axle:

- Specific transport and operational regimes:
 - Dangerous goods: even if no correlation has been observed, wagons transporting dangerous goods are concerned because of the potential huge impact of an accident.
 - Wagons used in corrosive environment: transport of salt, potash, fertilizers,...

¹ Critical region is a term of mechanical engineering and means here areas of the axle where concentration of mechanical stresses may appear. Basically these areas are the transition between two different diameters (e.g. transition axle –wheel seat) or the junction wheel-axle

- High loading factors such as bulk transport or High Performance Operation (permanent overloading)²
- Impact due to drop loading (transport of containers, clay or scrap).
- Surface conditions: corrosion should be considered
- Derailment
- wheel tread damage caused for instance by vibrations caused by the state of the rails.
- Lack of traceability of wheelsets that may have as consequences the use of wheelsets that are not fit, out of maintenance or damaged.

The JSG was not capable to address more in detail the risks due to lack of time and resources and availability of additional accurate and sufficient information. Nevertheless, even if these observations have not been verified by the participating NSAs, they provided valuable information for the development of other activities within the Task Force.

In addition, the Agency made a survey on broken axles with the collaboration of the sector, of the NSAs and of the National Investigation Bodies that confirms the results of the risk assessment performed by the JSG.

3 Survey: situation of broken axles in the European Union

The Agency launched a survey to collect information on cases of broken axles through questionnaires addressed to NSAs. The NIBs were not addressed directly but it was asked to the NSAs to collect the national information and by the way to request to NIBs and national RUs (see details in annex 2).

The first part of the survey considered the period 2006-2009 to make possible the comparison between the values of the Common Safety Indicators provided by NSAs in annual reports. The second part of the survey considered the period 1990-2005.

Design standards are now commonly used for new wheelsets. Applicable standards vary from national standards such as in Poland to EN 13103/4 in many western and central European countries and specific industry standards in UK.

Regarding traceability of maintenance of wheelsets only 9 Member states have centralised databases.

Regarding the axles failures, 38 cases were reported between 2006 and 2009. Failures caused/due to hot axle boxes represent 80% of all failures (30/38). Fatigue is the other identified cause but always in conjunction with other factors such as metallurgic default or corrosion.

In the second part of the survey it was asked to NSAs to provide information on broken axles related to causes other than hot axle box between 1990 and 2005. 29 cases have been identified where corrosion appears 10 times³.

² Even if no correlation has been found with broken axles.

Therefore corrosion may be seen as certainly not the main factor but requires further clarifications. The data collected during the second phase were transferred to the JSG after Agency's suggestion to analyse them in details. The Agency suggested also that research activities should be performed to define in detail and accurately the real role of corrosion in failures of axles.

4 The deliverables

The following sections report briefly on the developments of the JSG as part of this Task Force and the way they have been implemented.

These developments concern:

- Continued High Performance Operation (axle load above the nominal load of 20 T) of UIC type A wheelsets
- The European Visual Inspection Catalogue (EVIC)
- The European Wheelset Traceability catalogue (EWT)
- The European Common Criteria for Maintenance (ECCM)

4.1. Continued High Performance Operation of UIC type A wheelsets

A first possible cause of problems that has been investigated by JSG was related to the overloading of UIC type A axles. It appears that many operators/keepers have allowed these types of axles to be loaded above the nominal load of 20 tons, i.e. from 20,6 tons (e.g. France and Belgium since 1990) up to 22,5 tons (Sweden) without experiencing problems.

This overloading remains in conformity with the former design rules, so still within the design limits of the axles. For new axles, new rules were introduced in 1979 (ERRI B 136 RP 11)

No evidence of correlation has been found between broken axles and:

- the allowed minimum diameter of the wheel-seat which varies widely from country to country; or
- the design specifications (UIC type A design or older national rules).

Nevertheless, to increase operational safety further and in anticipation of new, more accurate calculation methods, the JSG proposed to the members of the respective sector associations to commit to continuously reduce loading of the type A I+II and A III-(1) axles from 21t to 20t axle load.

Additionally, when changing wheels and if the wheelset is operated at 20 tons axle load, the worn diameter of the wheel-seat will be limited to 182 mm, this will also mean the continuous phasing out of axles with wheel-seat diameters of 180 mm (mainly belonging to Trenitalia, ÖBB, SBB) and a greater harmonisation and interchangeability of wheels and axles.

³ In 14 of 17 cases that are known by NSA Germany, corrosion was identified at least partially as potential cause together with other reasons.

4.2. The European Visual Inspection Catalogue (EVIC) for freight wagon axles

The EVIC is a harmonised maintenance program of inspection of axles that was developed by the JSG in 2009 and has been in force since April 2010.

The EVIC provides to maintenance staff the criteria to visually inspect axles against corrosion and mechanical damages.

EVIC inspections are carried out in maintenance workshops during wagon light maintenance (i.e. without dismantling the wheelsets from the wagon). Only the section between the wheels is concerned as the only easily visible. Nevertheless provisions for the area between wheel and bearing are given if the area can be inspected.

An axle which doesn't meet the EVIC-criteria will be removed from service and handed over to medium or heavy wheelset maintenance to undergo non-destructive tests (NDTs) on axle surface after surface treatment according to the existing heavy maintenance rules. This will be extended to the full axle surface after full implementation of the European Common Criteria for maintenance

Additionally, a sampling process has been put in place. See further details in section 4.2.1. of this report

The TF agreed in December 2009 to start the EVIC campaign in April 2010.

It covers all wagons including the wagons for which specific transport or specific loading conditions may have an impact according to section 2 of this report.

For two of the four different operational regimes defined afterwards, in 4.2.1., (i.e. wagons used in corrosive environments and wagons transporting dangerous goods), inspections of all axles against the EVIC rules have to be completed within 4 years delay.

The delay is extended to 6 years for the other wagons. These delays were defined taking into account the availability of resources in maintenance workshops.

As a result of the implementation of the EVIC programme, overall, the JSG estimates that there will be a 30-40% increase of NDT checks during maintenance operations of reprofiling wheels and in medium and heavy wheelset maintenance in the next years.

The JSG has also set up a centralized logging of performed inspections, follow-up and documentation of the EVIC and intends to report and discuss as soon as possible the results with the Agency, the participants to the task force and all NSAs through the NSA network.

The consolidated version of the EVIC may be found in annex 3

4.2.1. The sampling initiative

As part of the EVIC programme, the JSG has also set up a sampling initiative. The objective of this sampling is to check the efficiency of the EVIC through comparisons of the NDT results of “EVIC failed” and “EVIC passed” axles.

According to the risk assessment performed by the JSG the sampling considers specifically the operational regimes that are considered as potential high risk domain for development of corrosion and damages:

- Wagons transporting dangerous goods
- Wagons used in operations in corrosive environment
- Wagons with a high loading factor (mainly full loaded in service, e.g. bulk traffic)
- Wagons for which drop load is current

24.000 axles are involved in the sampling, 6.000 for each potential high risk domain

Axles which fulfil the EVIC-criteria will also be subject to NDT.

The results will also be compared to the results obtained from heavy maintenance currently undertaken.

The sampling will take place over a 12 month period from June 2010 onwards.

The Agency, the JSG and the participating NSAs in the TF will evaluate jointly in November 2010 the intermediate results of the sampling program. For the case that an analysis of the „normal operation“ domain should be necessary, the JSG will prepare in advance the checking of 3000 additional axles (1/2 share of a potential high risk domain) within the foreseen timeframe for the sampling. The „normal operation“ domain considers the wagons not belonging to the four potential high risk domains.

The intermediate results will then be presented to the NSA Network.

4.2.2. Implementation

The JSG started the implementation of EVIC beginning of 2010. EVIC bodies are established in each Member states⁴ and in Switzerland. They are the national central points for supporting the implementation of EVIC.

By May 2010, more than 52 training sessions had been organised with the documentation translated in 11 languages.

By the end of June 2010, more than 130.000 axles had been checked by 86 keepers in 11 Member states and in Switzerland. According to the first results 2.3 % of the axles were immediately removed from service. Nevertheless the results of NDTs will be gathered from the sampling.

⁴ End of June 2010 EVIC bodies were established in 21 Member States AT, BE, CZ, DE, DK, ES, FR, HU, IE, IT, LU, LT, LV, NL, PL, SK, SL, RO, PT, SE, UK and in Switzerland

The EVIC rules will be implemented in the General Contract of Use⁵ (GCU) from October 2010 onwards.

4.3. The European Wheelset traceability catalogue (EWT) for freight wagon axles

Lack of traceability has been seen as having a potential impact on safety in particular when wagons are continuously exchanged between RUs. Exchanges of wheelsets under wagons are mainly performed by maintenance services of RUs with wheelsets belonging or not to keepers. This situation leads also to important exchanges of wheelsets between railway actors. Therefore lack of traceability leads to a loss of control and by the way may impair safety.

Traceability of relevant information is today available by physical marking on the wheelset and in the documentation of the production and the maintenance in case of necessity.

To improve and to harmonize traceability further, and to reduce the time for analyzing in case of incidents/accidents, the JSG proposed and the Task Force agreed to identify the data that needs to be collected in a European Wheelset Traceability Catalogue (EWT).

The objectives of the EWT are to:

- Trace wheelsets involved in incidents/accidents and therefore to reduce the risk for further incidents/accidents due to similar reasons.
- Trace in case of incidents/accidents the service conditions of an involved wheelset in the past and also its core item, the axle.
- Trace the applied maintenance regime and which non destructive tests have been done on the wheelset.

In case wheelset defects are detected, the EWT facilitates the keepers to select concerned wheelsets and allows them to carry out appropriate measures.

The EWT contains (details in annex 4):

- identification data of wheelset;
- manufacturing data of axle, wheels and bearings.; and
- data of maintenance performed.

The Task Force agreed on the content of the EWT and supported its implementation in autumn 2010.

4.4. The European Common Criteria for Maintenance (ECCM) for freight wagon axles

The JSG presented the elements to be harmonized. Nevertheless more restrictive requirements may be used based on return on experience or existing national rules.

⁵ The General Contract of Use (GCU) is a harmonised contract between keepers and RUs regulating the exchange of wagons in Europe. 640 keepers and RUs apply the GCU. It covers 90% of the commercial wagons

The maintenance system of freight wagons is divided in two parts:

- Light maintenance of freight wagons
- Heavy maintenance of freight wagons

The maintenance system of wheelsets is divided in three levels:

- Operations of reprofiling (wheels)
- Medium wheelset maintenance with/without changing wheels with bearing overhaul
- Heavy wheelset maintenance, including changing wheels

In light wagon maintenance the JSG decided to introduce the EVIC as common visual inspection means. In heavy wagon maintenance all axles with EVIC defects cases A, B or C will be removed from wagons.

In reprofiling the JSG imposes the treatment and withdrawal of axles with:

- all EVIC defect cases A, B and C;
- local and severe defects according to UIC category 4 (roughness aspect).

In medium maintenance the JSG has proposed to impose the treatment and withdrawal of axles with:

- all EVIC defects A, B and C;
- local and severe defects according to UIC category 4; or
- large and heavily corroded areas, strongly and uniformly pitted surface.

The treatment will necessitate confirming NDT.

It was also agreed that NDT will apply to the full axle through ultrasonic test (automatic or manual) and magnetic particles test.

In heavy maintenance the JSG decided to apply the same harmonized rules as in medium maintenance but:

- the minimum wheel seat diameter for all UIC type A axles operated at 20 T will be limited at 182 mm (see section 4.1.);and
- magnetic particles test is imposed for the full axle.

The harmonization of NDT methods has not been undertaken by the JSG as it is in the scope of several international projects of research programs such as the program EURAXLE that is now under negotiation for European funding. These programs are not in the scope of the JSG nor the TF. But they should include at least studies on ultrasonic, magnetic particles and eddy current tests. Other new methods will also certainly be studied. They should also consider painted axles as well as non painted axles as an alternative solution.

The JSG will start also an investigation project on the effects on wheelsets and axles caused by severe events such as derailments. No program has been provided up to now.

The JSG introduced also common rules for wheelsets operated above the nominal axle load.

The Task Force agreed in June 2010 on the content of the ECCM but then the Agency considers that the work is not fully accomplished because research studies should be developed and NDTs should also be harmonised.

The details of this ECCM programme may be found in annex 5

4.5. Adaptation of EN standards for wheelset design and maintenance

Two standards were considered in the development of the activities of the Task force:

- EN 13103:2009 Railway applications. Wheelsets and bogies. Non-powered axles. Design method
- EN15313:2010 Railway applications. In-service wheelset operation requirements - In-service and off-vehicle wheelset maintenance

The JSG considers that the results presented here above in section 4.1. to 4.4. should be integrated in both above relevant standards. This will provide them greater visibility and may avoid through self commitment that NSAs or the European legislation impose too prescriptive design and maintenance rules that must be kept in the hands of railway actors for enhanced flexibility and cost efficiency.

As consequences of the proposal regarding the Continued High Performance Operation (axle load above the nominal design load of 20 T) of UIC type A axles (section 4.1) the JSG proposes to reflect on an a revision of the EN 13103:2009 to include a new calculation method that would be closer to the lived experience of the last 40 years.

The EVIC, the EWT and the ECCM will be proposed to be included in the EN 15313:2010 at a next revision.

5 Challenges faced by the Task Force

An important achievement of the task force is that for the first time the institutional representatives and all stakeholders from the freight transport business were represented and constructively worked together around the same table to discuss common measures for the European freight wagon fleet.

It was also not easy to unify the resources of sector organisations whose members are often in competition. The JSG put in place by sector organisations performed with success the necessary works and discussions to listen and understand concerns of participating NSAs and to provide the results presented in this report. The efforts developed must certainly not be neglected.

But the activities and the positive and constructive mood of the TF have been partly irritated by unilateral, independent initiatives (request for detailed information on vehicle maintenance) of some National Safety Authorities, namely Italy and Germany, towards their freight actors (railway undertakings as well as keepers).

In the case of Italy the request to freight operators was addressed through a letter from the Italian NSA to operators in Italy. After negotiations between Italy and sector organisations, a consensus was found.

In the case of Germany the request for information was published by the German NSA (EBA) through an “Allgemeinverfügung” (Public announcement).

In both cases the Agency has received requests from the Commission to deliver an opinion. Therefore the Agency will not comment on it in this report.

A challenge for ERA has been the additional, unplanned increased workload for the Safety Unit/SafeCert Sector as well as other Units and Sectors.

6 Conclusions

A general agreement was reached and the conclusions of the activities of the TF were unanimously adopted.

Given the expectations and short deadline to deliver these results The Agency can conclude that the work for the TF has been very intense, productive and with high motivation and encourages the sector to continue to work together for the development of optimal harmonisation in the area of freight transport.

The Agency supports the commitment of the JSG to introduce results in EN standards to let full responsibility in the hands of railway actors. The Agency is now reflecting on how to help the sector through the introduction of general requirements in the TSI freight wagons and through the possible request to develop/revise EN standards.

The survey made by the Agency shows that the main cause of broken axles is hot axle boxes. The Agency considers that this should be investigated in the future with high priority.

Nevertheless corrosion seems to remain a non negligible risk factor. Future research programs should focus on the real importance and effects of different types of corrosion associated and not associated to other risk factors before developing improvements and harmonisation of the design methods, systems of protections of axles and NDTs.

Non painted axles should also be more considered in research programs and in harmonisation activities than today as it seems from the survey that their safety performance may be better than the ones of painted axles.

The European program EURAXLE should take into account the results of the TF and should in particular consider better understanding of the role of fatigue and corrosion, harmonisation of NDTs and development of innovative technical solutions for painted and non painted axles.

In the meantime before research results are available, the results of the EVIC and of the sampling will be the basis for the reflection about necessary future measures.

7 Continuation

In short term it was agreed to have two meetings end of 2010 and in 2011 to assure follow-up of the Task force.

On the long term the sector organisations and the participating NSAs expressed the explicit wish to create a permanent structure to deal with future optimal harmonisation in the area of freight transport. Harmonisation must be considered here as in addition to the development of TSIs. In particular the working process of the task force should be continued.

The Agency fully supports the sector organisations and the participating NSAs in this view.

Today the railway freight transport is changing following opening of markets and implementation of railway interoperability and safety directives, TSIs, ECM certifications,...

As railway freight transport is mainly international, there is also strong need to avoid new national rules that could impair interoperability by interrupting movement of freight wagons at the borders. Innovations find their way with enormous difficulties. Research programs and immediate or middle term needs are disconnected or seem to be.

Finally the system is mainly working in reactive mode: for instance all actions put in place after the Viareggio accident aimed at avoiding unilateral local measures that could harm badly the competitiveness of freight transport.

The Agency considers that a better connection and coordination of different initiatives is crucial and proposes the setting up of a Freight Platform that aims to connect railway actors including research bodies and NSAs, and also to coordinate freight transport developments on a pro-active way, with a long term view (target system) and while promoting and supporting innovation.

The scope of the freight platform will certainly not be limited to maintenance of freight wagons but must be extended to all necessary aspects relevant to railway freight transport.

The Agency is reflecting on the best way to organise this Freight Platform.

Terms of Reference

For the Task Force on

Freight Wagon Maintenance

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0.2	Chapter 3, 1§	Change of reimbursements rules for TF participants. Interpretation services (FR, DE, EN) now provided by the Agency.

Content

1	Introduction	4
2	Scope and objectives of the Task Force	4
3	Working methods, resources and work programme.....	4

1 Introduction

Following the accident in Viareggio (Italy) and the Agency's Preparatory Meeting on 20th August for the EC Conference on "*Railway Safety: the way forward*" held on 8th September in Brussels, the Agency proposed to set up a Task Force (TF) made up of experts in the field of freight wagon maintenance and railway axles and coming from all stakeholders (RUs, keepers, ECMs, suppliers, NSAs, etc.). The idea was supported and accepted by the NSAs and representatives of the sector organisations (CER, ERFA, ETF, UIP, UNIFE).

2 Scope and objectives of the Task Force

The objectives of the Task Force are to (this list may not be exhaustive):

- discuss relevant actions/information resulting from the EC Conference;
- exchange and analyse information relating problems with broken axles/fatigue and relevant testing methods;
- assist the sector and NSAs to establish sound evidence and advice on the causes of the problems with broken axles;
- propose/develop appropriate controls and monitoring tools;
- propose measures to review the different maintenance regimes existing across Europe and draw up a programme for further harmonization;
- evaluate the role of standards for wheel-sets in the different countries.

3 Working methods, resources and work programme

This Task Force is not set under the provisions of Article 3 of the Agency Regulation, setting the legal basis for Working Parties, and its activities are not part of the Agency's agreed work programme. As a general rule the Agency does not reimburse participants in these cases, however, to ensure the widest participation possible of relevant experts and in consideration of the importance of the activities to be carried out by the TF, the Agency will reimburse expert's expenses in accordance to its rules of reimbursement and provide, for each TF meeting, translation services for English, French and German.

The Agency will chair the meetings and have a role of coordinator and facilitator of the work to be carried out by the TF. To best carry out its activities and to ensure that the TF meets the objectives and deadlines set in the work programme, sub-task force groups may be established to carry out parallel work-streams; these sub-task force groups may be chaired by a sector representative approved by the other participants to the TF.

As a means of collecting relevant information, the Agency may develop and use surveys or questionnaires to be addressed to the NSAs or other interested parties.

A dedicated web space will be available (by mid October 2009 at the latest) on the Agency's EXTRANET, under the activities of the Safety Unit – Safety Certification Sector, where

information and documentation relating the TF meetings will be available to the members having an authorised access (LOGIN and PASSWORD).

In consideration of the relevance of the subject and of the scope of the Task Force, which cross-cuts different areas of the Agency's work, the Agency will ensure the participation of experts its other Units (Cross Acceptance, Interoperability and Safety).

Vital interest in this work is assumed to come from the National Safety Authorities, as being part of the SMS and ECM certification system, and from the mainly concerned sector associations, as:

- Community of European Railway and Infrastructure Companies (CER),
- European Infrastructure Managers (EIM),
- European Rail Freight Association (ERFA),
- International Union of Private Wagons (UIP),
- International Union of combined Road-Rail transport companies (UIRR),
- International Association of Public Transport (UITP)
- Association of the European Rail Industry (UNIFE)

There shall be two phases in the work carried out by the TF with a final report delivered to the Agency by July 2010. The two phases shall address the following issues:

- 1. Urgent measures as a follow-up to information on problems with broken axles (cases in AT, DE, IT)**
- 2. Further measures to review the different maintenance regimes existing across Europe and draw up a programme for further harmonization**

Step 1 (September 2009 to December 2009)

- Investigate further and with urgency the width and character of the problem with broken axles, based on information from NSAs and the operators and study the need to reduce the maximum permitted axle load for wagons with certain types of axles that may have been overloaded without adequate maintenance supervision
- Review the relevant actions in the sector action plan and develop the necessary accompanying measures (European Visual Inspection Catalogue – EVIC, etc.)
- Based on information (collected by the NSAs through the NVR) from all relevant ECM:s across Europe assess whether further immediate actions need to be taken and, in such case, recommend a European action plan with clear deliverables, requirements and time frames
- Review ongoing standardization activities and identify further areas for standardization and/or the need for review of standards

Step 2 (January 2010 to July 2010):

- Propose a programme for development of a minimum maintenance criteria catalogue, starting with axle and wheel set criteria
- Assess effectiveness of different NDT methods used for axle inspections and, in case it is judged necessary, take the initiative for development of a harmonized standard

- Review the different main maintenance regimes for freight wagons established in Europe and identify, where necessary, areas for further harmonization
- Assess the need and feasibility of a European sector system for traceability of critical components
- Assess the feasibility of organizing exchange of information and return of experience on the use of freight wagons

WORK PLAN TIMETABLE

Seven meetings have been planned altogether, 4 in 2009 and 3 in 2010. The complete schedule, submitted for approval of the participants at the 1st meeting on 18 September, is presented below:

Because of the detail and amount of work envisaged, it is necessary that the TF meets on a monthly basis in 2009 and have 3 meetings in 2010: the provisional dates for 2009 and 2010 have been sent out to the nominated experts for approval at the first meeting.

2009		2010	
1 st meeting:	18/09	5th meeting:	02/02
2 nd meeting:	27/10	6th meeting:	20/04
3 rd meeting:	24/11	7th meeting:	22/06
4 th meeting:	17/12		

REPORTS

An intermediate report on the outcome of the activities carried out by the TF in the first phase (Step 1 – Sept. – Dec. 2009) will be finalized by the Agency, in cooperation with the TF, by December 2010.

A final report will be delivered by the Agency to the Commission (DG TREN) by July 2010, i.e. after the end of the second phase of activities.

The final report shall focus, amongst others, on the:

- findings of the TF in relation to the relevant issues outlined in step 1 and 2 of its activities, as well as those emerged during the meetings;
- deliverables of the activities of the TF (European Visual Inspection Catalogue, Minimum Maintenance Criteria Catalogue, etc.);
- measures/proposals to address other relevant issues/problems, and
- conclusions and the way forward.

Survey on broken axles

1. The purpose of the survey

The purpose of the survey was to collect information on:

- cases on broken axles and broken wheels in freight/ passenger/locomotives (DMUs/EMUs);
- the axle design specification regime throughout Europe;
- causes of axle failures on freight wagons;
- measures that have been implemented by the member states to monitor:
 - o relevant maintenance information;
 - o precursors to accidents;
- identify possible correlations between axle failures and operational/design/maintenance regimes.

2. Methodology

In order to receive this information the Agency made a survey last November through a Questionnaire¹. The Questionnaire was sent to all NSAs (27 NSAs) on the 26/11/2010. The NSAs were requested to provide information from the period: 2006-2009. After receiving feedback from the NSAs the submitted data were processed within the Safety Certification Sector in order to reach conclusions. The Agency requested additional information wherever it was necessary.

3. Presentation of the results

Of the 27 member states in which the Questionnaire was sent, 24 member states replied. The Agency did not receive data from the following member states: Bulgaria, Spain, Finland, while from the Netherlands only partial information has been made available.

Presentation of results regarding cases on broken axles and broken wheels in freight/ passenger/locomotives

The Agency requested information regarding the number of cases on broken axles and broken wheels in freight, passenger & locomotives for the years 2006-2008

The received data were checked against the data the member states had submit to the Agency in their Annual Reports.

Inconsistency of data has been identified in more that 50% of the cases. The Agency believes that this inconsistency is due to:

- lack of harmonization in the definitions of precursors to accidents (National versus EU definitions);
- different interpretations in the Agency's definitions between the member states.

Presentation of results regarding the axle design specification regime

The Agency requested from the member states to report which standard for the design on broken axles they apply, information regarding the maximum permissible stresses and the security coefficient value S

- the Standard EN 13103/4 seems to apply in most of the member states throughout Europe. More specifically, this standard applies in: Austria, Belgium, Channel Tunnel, Czech Republic, Germany, France, Hungary, Ireland, Italy, Luxembourg, Norway, Portugal, Romania, Slovenia, Slovak Republic;
- the GOST series apply in: Latvia, Lithuania, Estonia (the 1520 track gauge exist in these countries);
- national standards apply in Poland;
- the standard UIC810-1 in combination with SJF 436.360.1 apply in Sweden;
- the Railway Group Standard GMRT2466 apply in the United Kingdom.

¹ The Questionnaire is provided in the attachments

Note: The Agency did not receive feedback regarding this question from: Spain, Greece, Bulgaria

The Security Coefficient values S by which the fatigue limits have to be divided to obtain the maximum permissible stresses is the following:

S=1,2 in: Austria, Belgium, Czech Republic, Germany, France, Italy, Norway, Portugal, Slovenia;
S=1,33 in Ireland.

Note: The Agency did not receive feedback regarding this question from: Chanel Tunnel, Greece, Luxembourg, Romania, Sweden, , Slovak Republic, Latvia, Lithuania, Estonia.

The maximum permissible stresses that apply are the following:

Zone 1: 166Mpa/ Zone 2: 100Mpa : in Austria, Belgium, Czech Republic, Germany, France, Norway;

Zone 1: 180Mpa/ Zone 2: 110Mpa : in Ireland (S=1,33);

Zone 1:700Pma/ Zone 2:550Mpa : in Poland.

Presentation of measures that have been implemented by the member states to monitor relevant maintenance information & information regarding precursors to accidents

In the question regarding the existence of a centralized database for wheel-set maintenance information, the Agency received the following answer:

Yes in: Belgium, Chanel Tunnel, Czech Republic, Hungary, Ireland, Latvia, Luxembourg, Portugal & Slovenia.

No in: Austria, Germany, Estonia, France, Lithuania, Latvia, Norway, Poland, Sweden & Slovak Republic.

In the question regarding the existence of a centralized database for wheel-set maintenance information, the Agency received the following answer:

Yes in: Chanel Tunnel, Czech Republic, France, Hungary, Ireland, Luxembourg, Portugal, Slovenia

No in: Austria, Belgium, Germany, Estonia, Italy, Latvia, Lithuania, Norway, Poland, Sweden, Slovak Republic.

Presentation on the causes of axle failures on freight wagons

The Agency asked the member states to define for the years 2006-2009 the number of broken axles on freight wagons which were attributed to: (a) Hot Axle Boxes, (b) overheating, (c) corrosion, (d) fatigue and (e) other.

In total 38 cases were reported, which are distributed to the categories (a-e) as follows:

Causes	%	Number of cases
Hot Axle Boxes	79%	30/38
Fatigue & corrosion	5%	2/38
Fatigue & metallurgic fault	8%	3/38
Fatigue (with no further information)	8%	3/38

According to the results:

- Hot axle boxes seems to be the most important cause of failure (appears in 79% of the cases);
- Fatigue seems to be important causes of axle failures but always in conjunction with others;
- Corrosion is very often present factor in accidents and it could be linked with other causes;
- Maintenance is only one of the factors that need to be taken into account. The technical design and the safe use are the others. For instance unsafe situations (like overloading, unsafe weight distribution during loading and transportation, etc) are also important.

2nd Phase of the survey

After the analysis of the first results the members of the Task Force, taking into account that corrosion can be an important factor to broken axles, proposed to continue the survey. More specifically, the members of the Task Force proposed the following:

- to further analyze the information of accidents by asking from the member states additional information regarding accidents on broken axles from 1990-2005;
- to further investigate how corrosion is connected to broken axles;
- to contribute to the analysis of data in order to consult experts.

In connection to the JSG's proposal, the Agency asked the member states last Mai (18/05/2010) the following:

(a) to provide the Agency with further information, regarding accidents on broken axles connected to causes other than hot axle boxes (like corrosion, fatigue or metallurgical fault) and investigation reports from 1990 until 2005;

(b) their approval to address the JSG the information they have submitted for the purpose of the survey.

So far the Task Force has studied information provided by: Austria, Czech Republic, Germany, the Netherlands, Sweden & United Kingdom.

According to the first results:

- 29 cases have been reported so far;
- corrosion clearly appears in 10 of the cases so far;
- there are still unclear conditions of how corrosion has contributed in 11 cases.

At this point the members of the Task Force study the submitted information, trying to discover the mechanism of the contribution of corrosion to broken axles. The first results will be provided to the Agency after the completion of the investigation.

Note: During the 2nd phase of the survey only cases connected to causes other than hot axle boxes (like corrosion, fatigue or metallurgical fault) are investigated.

Attachments

(1) Questionnaire

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

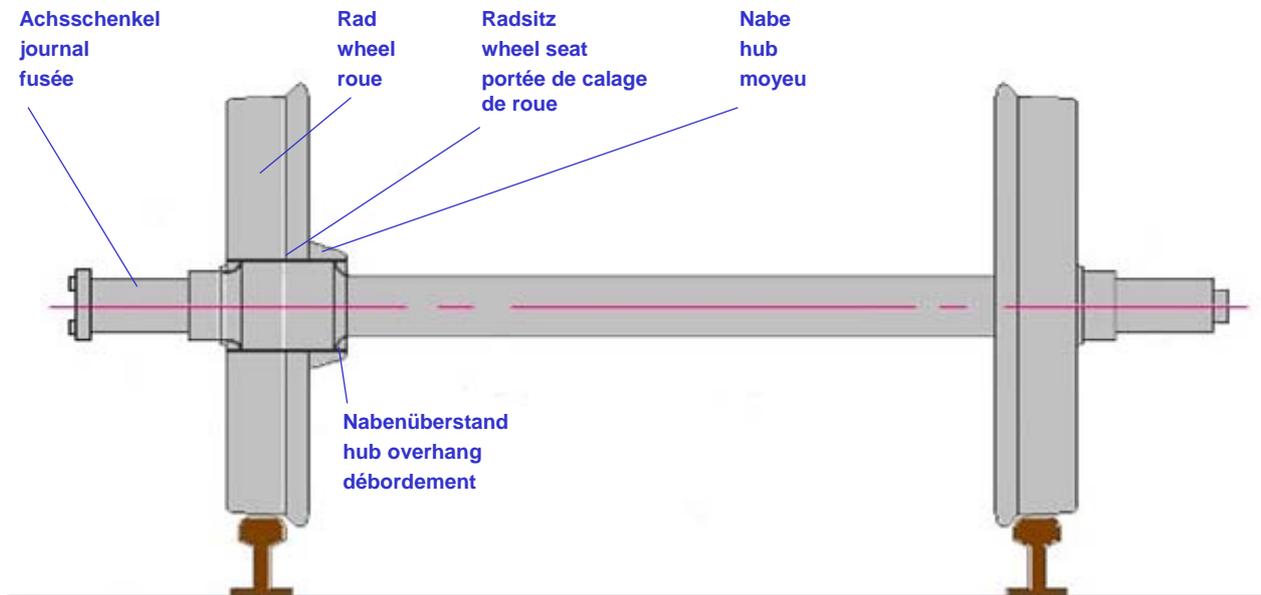
Version control / amendments:

2.3 all EVIC mail addresses updated as per 31.07.2010

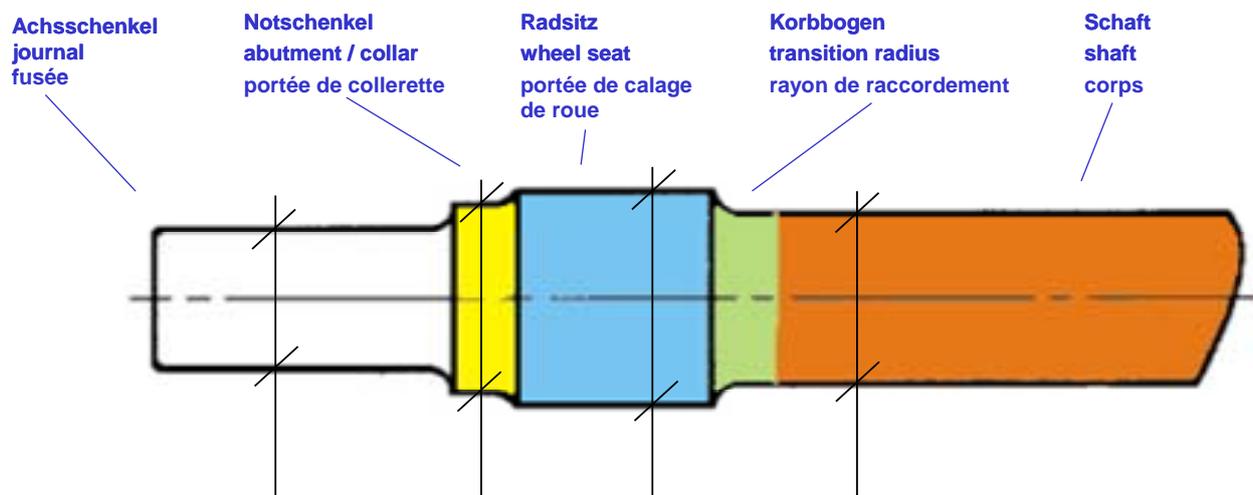
This version replaces all previous versions of the EVIC Implementation Guide

Brussels, 31.07.2010

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 is currently being integrated in the GCU.

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 issuing 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	Lang.	UIP / Rivière	CER / Müller	ERFA / Heiming
France	FR	David Tillier AFWP dtillier@ermewa.fr	Lafaix SNCF bernard.lafaix@sncf.fr evic.france@sncf.fr	
Switzerland	DE, FR, IT	Olga Wisniewska VAP tech@cargorail.ch	Bernet SBB thomas.bernet@sbbcargo.com evic.ch@sbb.ch	Dr. Johannes Nicolin AAE johannes.nicolin@aae.ch
Germany	DE	Jürgen Tüscher VPI tuscher@vpihamburg.de evic.germany@vpihamburg.de	Manfred Bergmann DB manfred.bergmann@ dbschenker.eu	Mallikat VDV mallikat@vdv.de
Italy	IT	Mauro Pacella ASSOFERR Mauro.pacella@assoferr.it evic.italy@assoferr.it	Paolo Fusarpoli TI p.fusarpoli@trenitalia.it	D.ssa Maria Francesca Ricchiuto ricchiuto@asstra.it
Netherlands	NL	Don van Riel NVP@trimodal-europe.nl	(Jaspers DB SR NL)	
Poland	POL		Krzysztof Buszka PKP k.buszka@pkp-cargo.pl Miroslaw Szczelina RailPolska miroslaw.szczelina @railpolska.pl	Dr. Ireneusz Gójski IGTL igojski@aster.pl 0048.601.387.516
Austria	DE	Günter Heindl VPI office@vpirail.at evic.austria@vpirail.at	Andreas Schachner ÖBB andreas.schachner@oebb.at	
Belgium	FR, NL	Vincent Bourgois vincent.bourgois@trw.be	Maenhout SNCB etienne.maenhout@b-rail.be evic.belgium@b-rail.be	Monika Heiming monika.heiming@erfa.be
Hungary	HON	Gyöző Czitó nagy@pultrans.hu evic.ungary@pultrans.hu	Miklos Kremer MAV kremer@mav.hu Mihály Drotos MAV Cargo drotosm@mavcargo.hu	
Luxembourg	FR, DE		Stefe Friedgen steve.friedgen@cfcargo.lu	
United Kingdom	EN	Geoffrey Pratt geoffrey.pratt@btconnect.com	Paul Antcliff paul.antcliff@dbschenker.com	Lord Tony Berkeley tony@rfg.org.uk
Ireland	EN		Damien Lambert IrishRail damien.lambert@irishrail.ie	Lord Tony Berkeley tony@rfg.org.uk
Czech Republic	CZ	Martin Vosta sekretariat@sdruzeni-spv.cz	Martin Vosta sekretariat@sdruzeni-spv.cz	
Slovak Republic		Jaroslav Miklanek zvkv@zelos.sk	Roman Sklenar Sklenar.Roman@zscargo.sk	
Latvia	LAT		Dainis Zvaners LDz dainis.zvaners@ldz.lv	
Lithuania	LIT		Kęstutis Rakauskas k.rakauskas@litrail.lt	Edita Gerasimoviene e.gerasimoviene @transachema.lt
Romania	ROM	Nucu Morar nmorar@ermewa.ro	Gheorghe Avram gheorghe.avram@irsgroup.eu	Gheorghe Avram gheorghe.avram@irsgroup.eu
Spain	E	Alfonso Ynigo Alfonso.Ynigo@transfesa.com	Javier Fernández-Pello jfpello@renfe.es Ignacio Hernández Vallhonrat ignaciohv@renfe.es	
Sweden	SWE	Staffan Rittgard info@privatvagnar.com		(Stephan Aström Stephan.astrom@ hectorrail.com)
Slovenia	SLO		Viktor Sinkovec viktor.sinkovec @slo-zeleznice.si	
Portugal	POR		Paulo Jorge de Oliveira pjoliveira@cpcarga.pt	
Greece	GR			
Estonia	EST			

as per end July 2010

2.5 Preparing the working documents

The conditions for the EVIC program are laid down in this **EVIC Implementation Guide 2.3**.

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 country's 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 implementation of the EVIC in the GCU (including traceability) has already started (annex 10, new appendix 3)

The EVIC execution must be mandated to the contracted workshops by the keepers (in the meantime until the full EVIC implementation in GCU)

The keeper must take over the costs for executing the EVIC program (inspection and tracing) and potentially for a required change of the wheelset (future amendment in GCU annex 12)

In a first step, the workshops must not execute the EVIC inspections in a wagon GCU repair if not specifically ordered by the keeper (implementation in GCU is in progress). **This point is under urgent clarification in the GCU technical committees.**

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.

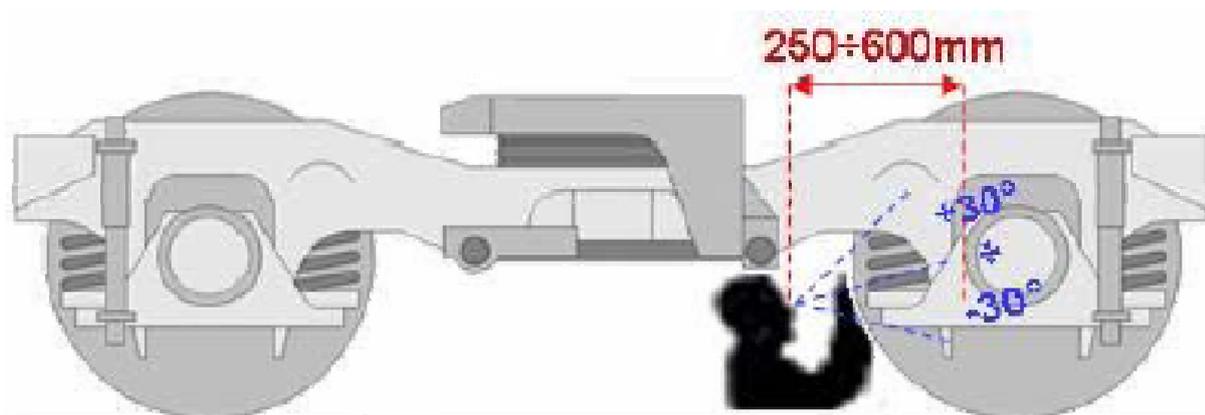


Figure 2 – Inspection angle and distance

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 cases 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	
Painted axles				
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	
Unpainted axles				
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	---			
All axles				
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)

wagon number (set wagon number only once for all axles)	Date	wheelset N°	wheelset type	enter only 1 result per wheelset			
				Other check result	EVIC check result		
				e. g. GCU check	enter 1 where appropriate		
				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 „ok“	No of EVIC axles „X“	No of EVIC axles „C“
XYZ	5	2010	400	100	1000	80	120

“EVIC monthly keeper report 2.2”

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	No of EVIC axles	No of EVIC axles
					„ok“	„X“	„C“
UVW	5	2010					
XYZ	5	2010					
Sum			700	90	1800	120	200

Only summarized data are reported in the ERA Task Force

“EVIC monthly country report 2.2”

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

Painted axles

30	No defects	OK
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

Unpainted axles

40	No defects	OK
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)

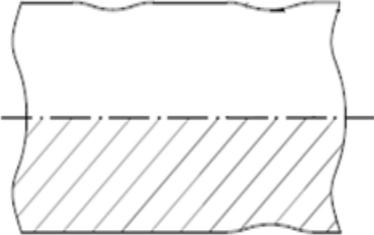
All axles

50	Abutment area	X (not ok)
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CRITERIA FOR PAINTED AXLES

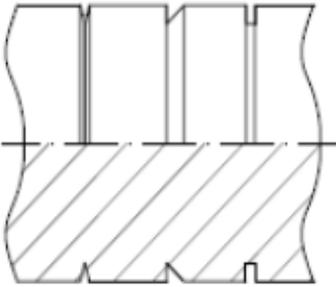


30 No or admissible defects found on the axle surface - smooth pitting		Painted axles
Salient information:		
	Pitting may occur either round the entire perimeter or intermittently and is characterised by smoothly rounded contours with no sharp transitions. This type of pitting may arise in the course 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

Pictorial representation:			
			

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

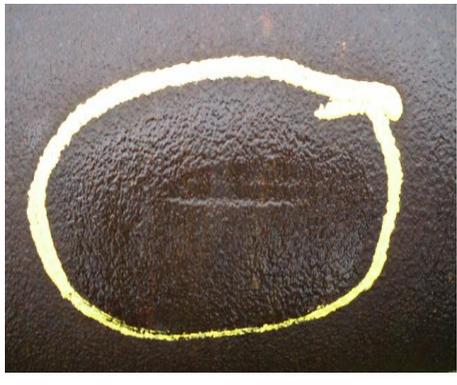
Pictorial representation:

			
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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



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

Pictorial representation:			
			

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

Pictorial representation:			
			

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



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

Pictorial representation:			
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

Pictorial representation:			
			

42 Mechanical damage – smooth edged circumferential grooves		Unpainted 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



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

Pictorial representation:			
			

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

Pictorial representation:			
			

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

Pictorial representation:			
Not acceptable		Not judgeable	
			

IMPLEMENTATION GUIDE

FOR THE

EUROPEAN WHEELSET TRACEABILITY (EWT) FOR FREIGHT WAGON AXLES

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

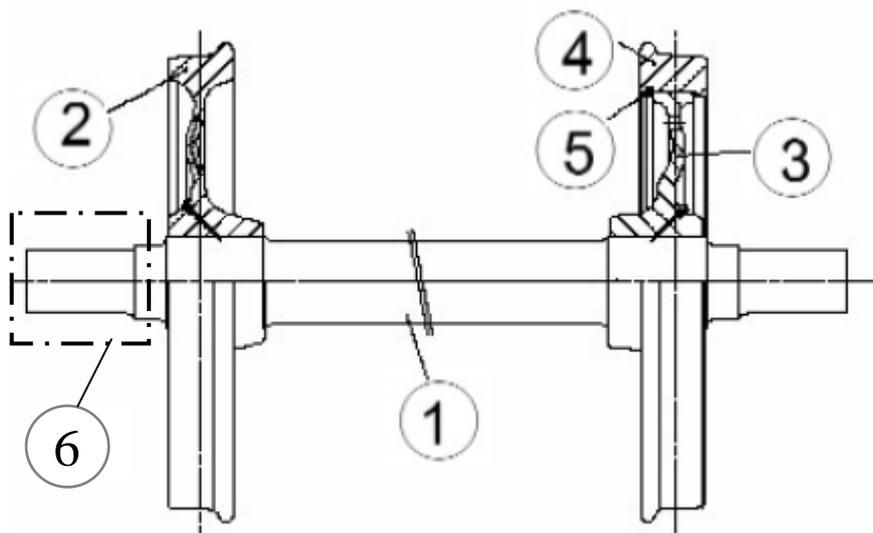


Table of Contents

1	Definitions	3
2	Reasons for the EWT	4
3	Objectives of the EWT	5
4	Timeframes	5
5	Boundary conditions	6
6	The tasks of the Joint EWT bodies	6
7	The tasks of the keeper	8
8	The tasks of the workshop	8
9	Data to be collected	9
9.1	Wheelset in general.....	9
9.2	Wheelset axle.....	10
9.3	Wheels	11
9.4	Bearings	12
9.5	Medium and Heavy Wheelset maintenance	13
9.6	Vehicle in which the wheelset is built in.....	13
9.7	Irregularities.....	14
10	Measures resulting from lack of traceability	15

Brussels, 26.07.2010

1 Definitions



Key

- 1 axle
- 2 monobloc wheel
- 3 wheel centre
- 4 tyre (if)
- 5 retaining ring (if)
- 6 axle box with bearing

ECCM	European Common Criteria for Maintenance (of wheelset axles)
EWT	European Wheelset Traceability
ECM	Entity in Charge of Maintenance
GCU	General Contract of Use (CUU, AVV)
NDT	Non Destructive Testing
NSA	National Safety Authority

2 Reasons for the EWT

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 (EWT)**

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 (here especially: EWT) 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. The European Wheelset Traceability will be integrated in the updated version of EN 15313.

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

3 Objectives of the EWT

To improve and to harmonize traceability further, and to reduce the time for analyzing in case of incidents, the sector will collect the data listed in this document.

The aim of the EWT is to:

- √ trace wheelsets in case of incidents and to reduce the risk for further incidents due to similar reasons.
- √ trace in case of incidents the service conditions of a wheelset in the past and also its core item, the axle.
- √ trace the applied maintenance regime and which non destructive tests have been done on the wheelset.

In case wheelset defects will be detected, the keeper is able to select concerned wheelsets by the aid of EWT. This allows the keepers and NSA's to carry out appropriate measures.

4 Timeframes

From August 2010 onwards, the sector will begin to collect the data listed below:

- √ The data of the group "a" have to be collected at the first time the wheelset enters a suitable workshop (the "suitable" workshop will be defined by the ECM) and at the latest at the next reprofiling maintenance level.
- √ The data of the group "b" have to be collected at latest at the next maintenance of the wheelset with overhaul of the bearing.
- √ The data of the group "c" have to be collected at latest at the next mounting and dismounting of the wheelset from the wagon.
- √ For the data of the groups "a" and "b" which couldn't be determined, the notice "not available" has to be entered.
Measures to be taken in this case: according to the adopted ECCM (see chapter 10; later according to EN 15313).

The collection of the data per wheelset has at latest to be completed within the next maintenance with overhaul of the bearing.

For new wheelsets, the collection of all data group a, b, c must start **from 08/2010 onwards** and before the wheelset is in service.

The data must be recorded in a filterable electronic system at **latest from 01.01.2012 onwards**.

5 Boundary conditions

- I. Collected maintenance dynamic data of category “I” of the wheelset must be stored as minimum until the next maintenance operation on the respective component (e. g. bearing overhaul to bearing overhaul).
- II. Data of the category “II” have to be stored over the lifetime of the respective component.
- III. Data of the category “III” have to be stored over the lifetime of the wheelset.

The current keeper has the responsibility to obtain the data from the previous keeper or the manufacturer and store and update the data until the change of the keeper according to the categories.

The existing wheelset data have to be given to the new keeper in case of change of the keeper.

The EWT doesn't replace existing maintenance rules. The data listed in the EWT are the minimum of data to be recorded. It is up to the Entity in Charge of Maintenance (ECM) to decide if it is necessary to record additional data.

6 The tasks of the Joint EWT bodies

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

The Joint EWT body will:

- organize the translation of the EWT in the national language
- issue the translated EWT documents to the keepers
- manage all information of all concerned parties (workshops, keepers,...)

The Joint EWT bodies per country:

Country	Lang.	UIP / Rivière	CER / Schachner	ERFA / Heiming
France	FR	David Tillier AFWP dtillier@ermewa.fr	Lafaix SNCF bernard.lafaix@sncf.fr evic.france@sncf.fr	
Switzerland	DE, FR, IT	Olga Wisniewska VAP tech@cargorail.ch	Bernet SBB thomas.bernet@sbbcargo.com evic.ch@sbb.ch	Dr. Johannes Nicolin AAE johannes.nicolin@aee.ch
Germany	DE	Jürgen Tuscher VPI tuscher@vpihamburg.de evic.germany@vpihamburg.de	Manfred Bergmann DB manfred.bergmann@ dbschenker.eu	Mallikat VDV mallikat@vdv.de
Italy	IT	Mauro Pacella ASSOFERR Mauro.pacella@assoferr.it evic.italy@assoferr.it	Paolo Fusarpoli TI p.fusarpoli@trenitalia.it	D.ssa Maria Francesca Ricchiuto ricchiuto@asstra.it
Netherlands	NL	Don van Riel NVPNG@trimodal-europe.nl	Paul Clews DB SR NL paul.clews@dbschenker.com	
Poland	POL		Krzysztof Buszka PKP k.buszka@pkp-cargo.pl Mirosław Szczelina RailPolska miroslaw.szczelina @railpolska.pl	Dr. Ireneusz Gójski IGTL igojski@aster.pl 0048.601.387.516
Austria	DE	Günter Heindl VPI office@vpirail.at evic.austria@vpirail.at	Andreas Schachner ÖBB andreas.schachner@oebb.at	
Belgium	FR, NL	Vincent Bourgois vincent.bourgois@trw.be	Maenhout SNCB etienne.maenhout@b-rail.be evic.belgium@b-rail.be	Monika Heiming monika.heiming@erfa.be
Hungary	HON	Gyöző Czitó nagy@pultrans.hu evic.ungary@pultrans.hu	Miklos Kremer MAV kremer@mav.hu Mihály Drotos MAV Cargo drotosm@mavcargo.hu	
Luxembourg	FR, DE		Steve Friedgen steve.friedgen@cfclargo.lu	
United Kingdom	EN	Geoffrey Pratt geoffrey.pratt@btconnect.com	Paul Antcliff paul.antcliff@dbschenker.com	Lord Tony Berkeley tony@rfg.org.uk
Ireland	EN		Damien Lambert IrishRail damien.lambert@irishrail.ie	Lord Tony Berkeley tony@rfg.org.uk
Czech Republic	CZ	Martin Vosta sekretariat@sdruzeni-spv.cz	Martin Vosta sekretariat@sdruzeni-spv.cz	
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Latvia	LAT		Dainis Zvaners LDz dainis.zvaners@ldz.lv	
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Romania	ROM	Nucu Morar nmorar@ermewa.ro	Gheorghe Avram gheorghe.avram@irsgroup.eu	Gheorghe Avram gheorghe.avram@irsgroup.eu
Spain	E	Alfonso Ynigo Alfonso.Ynigo@transfesa.com	Javier Fernández-Pello jfpello@renfe.es Ignacio Hernández Vallhonrat ignaciohv@renfe.es	
Sweden	SWE	Staffan Rittgard info@privatvagnar.com		(Stephan Aström Stephan.astrom@ hectorrail.com)
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Portugal	POR		Paulo Jorge de Oliveira pjoliveira@cpcarga.pt	
Denmark	DK		Benny Spangsborg Benny.Spangsborg @dbschenker.com	

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 EWT body per country delivers the EWT document in the national language

The Joint EWT body per country issues the EWT document to the countries' keepers (and, for information, to the RUs)

The keepers (ordering the EWT from the workshops) hand over the documents to the executing workshops.

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

7 The tasks of the keeper

The keeper is responsible to collect, update and keep the data from the workshops **from 08/2010 onwards**.

From 01.01.2012 onwards the keeper has to store the data in a filterable electronic system.

The execution of the EWT must be **mandated to the contracted workshops by the keepers**.

The keeper must take over the costs for executing the EWT.

In case of a replacement according to GCU, the executing workshop has to send the "**Form H_R**" according to the GCU with the information of the wagon number and the wheelset number of the wheelset to be replaced to the keeper.

8 The tasks of the workshop

The workshop has to collect the data.

The workshop has to submit the collected data to the keeper.

Any workshop (light or heavy maintenance) which executes a wheelset change must collect the data of the group "c" and submit them the keeper.

If the workshop is a heavy maintenance workshop which executes a major maintenance / overhaul level on a wheelset, additionally the data of the group "a" and group "b" have to be collected and submitted to the keeper.

9 Data to be collected

9.1 Wheelset in general

No	Time-frame	Designation	Remark	category
1	a	Wheelset number		III
2	a	Wheelset design type or alternative designation		III
3	a	Previous keeper(s) (ECM)	if applicable (if the keeper has changed) Data has to be stored from the last change of the keeper onwards. Remark: Current keeper of the wheelset is the keeper of the wagon (see number 38)	III
4	a	Certificate number and notified body from EC-declaration of conformity (TSI compliant wheelsets) Homologation number and authorising or certifying body (other wheelsets)	if available if available	III
5	a	Maximum authorised axle load (of the entire wheelset)		III
6	a	assembler of wheels (manufacturer if first assembly)	<ul style="list-style-type: none"> • for existing wheelsets already in service: if available • for new wheelsets: mandatory 	III
7	a	Date of first assembly of wheels (month/ year)	<ul style="list-style-type: none"> • for existing wheelsets already in service: if available • for new wheelsets: mandatory 	III
8	a	Date when wheelset is taken out of keepers' fleet (scrapped, selling, etc.)		III

9.2 Wheelset axle

No	Time-frame	Designation	Remark	category
9	a	Wheelset axle serial number (of the manufacturer)	if available	II
10	a	Wheelset axle design type or alternative designation		III
11	a	Certificate number and notified body from EC-declaration of conformity (TSI compliant axles) Homologation number and authorising or certifying body (other axles)	if available if available	II
12	b	Manufacturer	<ul style="list-style-type: none"> for existing wheelsets already in service: if available for new wheelsets: mandatory 	II
13	b	Manufacturing date (month/ year)	<ul style="list-style-type: none"> for existing wheelsets already in service: if available for new wheelsets: mandatory 	II
14	b	Number of cast iron	<ul style="list-style-type: none"> for existing wheelsets already in service: if available for new wheelsets: mandatory 	II
15	b	grade of steel (state of heat treatment)	<ul style="list-style-type: none"> for existing wheelsets already in service: if available for new wheelsets: mandatory 	II
16	a	Maximum permissible axle load (regarding the axle)		II
17	b	Manufacturing standard of the axle	<ul style="list-style-type: none"> for existing wheelsets already in service: if available for new wheelsets: mandatory <p>The manufacturing standard is directly related to the manufacturing date; (UIC; EN)</p>	II

9.3 Wheels

No	Time-frame	Designation	Remark	category
18	A	Design type or alternative designation		III
19	A	Tyred wheels	Yes/ No	II
20	A	Certificate number and notified body from EC-declaration of conformity (TSI compliant wheels) Homologation number and authorising or certifying body (other wheels)	if available if available	II
21	B	Manufacturer	<ul style="list-style-type: none"> for existing wheelsets already in service: if available for new wheelsets: mandatory 	II
22	B	Manufacturing date (month/ year)	<ul style="list-style-type: none"> for existing wheelsets already in service: if available for new wheelsets: mandatory 	II
23	B	grade of steel (state of heat treatment)	<ul style="list-style-type: none"> for existing wheelsets already in service: if available for new wheelsets: mandatory 	II
24	B	Number of cast iron	<ul style="list-style-type: none"> for existing wheelsets already in service: if available for new wheelsets: mandatory 	II
25	A	Maximum authorised axle load (regarding the wheel)		II

9.4 Bearings

No	Time-frame	Designation	Remark	category
26	a	Design type of axle box or alternative designation		II
27	b	Bearing geometrical type (e.g. cylinder roller bearing, ball joint bearing etc...)		II
28	b	Original manufacturer of the bearing (component contains outer ring, cage and rollers)		II
29	b	Converter of the bearing (e.g. on synthetic cage)	If applicable	I
30	b	Date of manufacture of the bearing in clear or coded form	<ul style="list-style-type: none"> • for existing wheelsets already in service: if available • for new wheelsets: mandatory 	I
31	b	Cage design type (e.g. material polyamide, brass with steel rivet, steel)		I
32	b	Type of grease		I

9.5 Medium and Heavy Wheelset maintenance

No	Time-frame	Designation	Remark	category
33	a	Date of maintenance		II
34	a	Applicable maintenance program (number of the document)		II
35	a	Maintenance level		II
36	a	Maintenance workshop / site		II
37	b	Last maintainer of the bearing (if different from maintenance workshop)		I
38	a	Date of next planned overhaul of the wheelset		I

9.6 Vehicle in which the wheelset is built in

Note: not applicable for bogies with variable gauge

No	Time-frame	Designation	Remark	category
39	c	Keeper of the wagon		III
40	c	Vehicle number		III
41	c	Vehicle UIC letter code (e.g. Shimmns)		III
42	c	Vehicle class (e.g. 708)	if available	III
43	c	Maximal authorised axle load (regarding the vehicle)		III
44	c	Date of wheelset mounting		III
45	c	Date of wheelset dismounting		III
46	c	Mileage of the wheelset respective to the period of use per vehicle if available		III

9.7 Irregularities

Note: since applying the traceability system

No	Time-frame	Designation	Remark	category
47	a	Irregularities	Special examinations in case of remarkable damages (e.g. derailments, overload, short-circuits via the axle-bearing, high water, broken wheels, broken axle, wagon collisions) (description of the cause, execution workshop, date)	III

10 Measures resulting from lack of traceability

1. If in a wheelset maintenance level (with axle boxes opened) one or two of the following information for an individual wheelset is/are missing:
 - **manufacturer**
 - **manufacturing date**
 - **manufacturing standard**

the ECM has to decide according to its experience with its axle population about the measures to be applied. At minimum, the axle has to be subject to immediate NDT (only once).

If no indication at all is given, the axle must be **scrapped**.

2. If the existence of the following data for an individual wheelset cannot be proven on paper, databases, data band... (detected during the acquisition according to the European Wheelset Traceability scheme or on special request):
 - **workshop of last maintenance activity**
 - **date of last maintenance activity**
 - **type of last maintenance activity**

then the axle has to be **subject to immediate NDT (only once)**.

NDT for the axle must be performed in all cases 1. and 2. according to the relevant existing rules and after publication (in 2010) acc. to the ECCM criteria (see below).

3. The ECM/keeper has to decide according to its experience with the operational conditions of the axles if the non traceable axle has been used in accordance with its design or with high performance parameters.

If this is not identifiable, the **most severe** NDT conditions according to the “ECCM Continued High Performance Operation” rules must be applied in the future maintenance of the axle (see below, ECCM clause 5. *special regimes*).

The above mentioned measures are communicated in advance to their publication in the ECCM which are going to be introduced in short term (2010) in the European Sector. In the step after, the measures mentioned here (and the ECCM in a whole) will be integrated in the EN 15313.

European Common Criteria for Maintenance (ECCM) of freight wagon axles

to be applied **in wheelset axle maintenance**

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

Lille

22nd June 2010

The Task Force results will be anchored in a consistent standard's architecture

Amendments / clarification for new built material

Standards for new built wheelsets (EN 13103 etc.)

Standard for wheelset maintenance (EN 15313*)
National standards (e.g. DIN 27204, NF...), enterprise's standards
GCU

Minimum Acceptance Criteria
in operation and light maintenance

Outer state: EVIC
Inner state: current results from NDT
in heavy maintenance

Bad axles sorted out quickly

Common Criteria for Maintenance (ECCM)
in heavy maintenance

which NDT and where,
axle surface status to be treated,
special regimes
traceability,....

examples

Axle maintenance quality improved further

* special reference to freight axles to be made

-
- **ECCM summary of the results**
 - **ECCM decisions to be taken outside the ERA Task Force**

ECCM results summary (1)

EU-wide harmonised requirements for...

Light Wagon Maintenance

- Visual checks of the axle surface (EU-harmonised) according EVIC catalogue
- Corrosive environments: EVIC „short“ (4y) and more severe EVIC criteria (only cases A, B)

Heavy Wagon Maintenance (revision, major overhaul)

- Remove all axles with EVIC defect cases A, B, handover to wheelset maintenance (medium or heavy)
- Remove all axles with EVIC defect cases C (replace or repair)

Higher axle maintenance levels (1)

- **Axle surface status**
 - Treatment of local and severe defects (according UIC category 4)
 - Treatment of large and heavily corroded areas, strongly and uniformly pitted surface
- **Non-Destructive Testing (NDT)**
 - Complete NDT on all axle sections in the „medium maintenance“ level (off-vehicle maintenance level w/o changing wheels). Required migration is ongoing
 - Complete MT on the total axle surface in the highest maintenance level

ECCM results summary (2)

EU-wide harmonised requirements for...

Higher axle maintenance levels (2)

- **Wear limits**

- Min. wheel seat diameter (all UIC Type A axles) limited to 182 mm when operated at 20t

Operation

- Unified rules for high performance axle operation (all UIC axle types)
- Continued operation of painted and unpainted axles under today's existing service and appropriate maintenance conditions (including Task Force results)

Traceability

- European EVIC logging
- European Wheelset Traceability + measures resulting from lack of traceability

ECCM decisions that require further investigations and that can only be taken outside/after the ERA Task Force

Topic	ongoing work in	results
<ul style="list-style-type: none"> Final results on inadmissible “UIC surface roughnesses” in maintenance levels 	UIC project	2011
<ul style="list-style-type: none"> Handling of painted / unpainted situation 	EURAXLES	2014
<ul style="list-style-type: none"> Need for Harmonisation of NDT techniques? 	EURAXLES	2014
<ul style="list-style-type: none"> Effects on WS/axles caused by special events (derailments etc.) 	investigation project	started by JSG

1.1 Light wagon maintenance level

Light wagon maintenance: activities

LM Light Maintenance	AAE	SNCF	SNCB	DBSR D	DBSR UK	SBB	ÖBB	UIP	TI	PK P	SLO -SZ
Visual checks in light maint. according GCU criteria	yes	Yes	yes	yes	Yes (acc. to UK NTR – fully meets EVIC and requires more)	yes	yes	yes	yes	yes	yes
Visual checks of the axle surface in light wagon maintenance according EVIC catalogue	Yes New: European harmonised criteria									Task Force result	
Visual checks of the axle surface in light wagon maintenance according EVIC for corrosive conditions operation (salt, potash, fertilizers,..)	<ul style="list-style-type: none"> EVIC „short“ (4 years) more severe EVIC criteria (only cases A, B) 									Task Force result	

1.2 Heavy wagon maintenance level (revision, major overhaul)

Heavy wagon maintenance level (revision, major overhaul): activities

HM Heavy Wagon Maintenance (revision, major overhaul)	AAE	SNCF	SNCB	DBSR D	DBSR UK	SBB	ÖBB	UIP	TI	PK P	SLO -SZ
Remove all axles with EVIC defect cases A, B and hand them over to wheelset maintenance (medium or heavy)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Remove all axles with EVIC defect cases C (replace or repair)	yes	yes	N.A.	yes	yes	yes	yes	yes	yes	yes	yes

Prescriptions to be inserted in all Freight Wagon Heavy Maintenance schemes (revision, major overhaul)

2. Reprofiling only level



Reprofiling only: activities

Reprofiling	AAE	SNCF	SNCB	DBSR D	DBSR UK	SBB	ÖBB	VPI	TI	PKP	SLO-SZ
Level name	IS 1	R	Repro- filing	IS1	Repro- filing	IHS 1	IS1	IS1	on cond	Not exis- ting	?
Max. Interval	depends on wheel wear										
Visual inspection free axle surface	yes	yes	yes	yes	yes	yes	yes	yes	yes		yes
Repair EVIC case C coating damages	yes	yes	N.A.	yes	yes	yes	yes	yes	yes		yes
If surface status under coating not clear: remove coating	yes	yes	N.A.	yes	rem. from serv. + overhaul	yes	yes	yes	yes		yes
Treat or withdraw axles with cracks or mechanical damage or corrosion	Yes	yes	yes	yes	rem. from serv. + overhaul	yes	yes	yes	yes		yes
Treat or withdraw axles with local and severe defects (according UIC category 4)	yes	yes	yes	yes	rem. from serv. + overhaul	yes	yes	yes	yes		yes

Task Force result

3. „Medium maintenance“ level (without changing wheels, combined with bearing overhaul)

Medium Maintenance (w/o changing wheels): activities

MM Medium Maintenance	AAE	SNCF	SNCB	DBSR D	DBSR UK	SBB	ÖBB	VPI	TI	PKP	SLO-SZ
Level name	IS 2	COP	CA / GC	IS 2	N.A.	IHS 2 and 3	IS 2	IS 2	RI/RO	P 3	(IS 2)
Max. Interval - mileage - year	600 3-(6)-9	600 (13)-19	800 10/12y	660 7/ 12 /16	700 6/ 8/ 12	500 10-12 6/8IS1	12+1 avg 6,8		600 6	4=>6	5 - 6
All mileages/years based on bearing and grease criteria => level combined with bearing overhaul											
Visual inspection free axle surface	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Repair EVIC case C coating damages	yes	yes	N.A.	yes	yes	yes	yes	yes	yes	yes	yes
If surface status under coating not clear: remove coating as far as necessary	yes	yes	N.A.	yes	N.A.	yes	yes	yes	yes	yes	yes
Treat or withdraw axles with cracks or mechanical damage	yes	yes	yes	yes	N.A.	yes	yes	yes	yes	yes	yes
Treat or withdraw axles with local and severe defects (according UIC category 4)	yes	yes	yes	yes	N.A.	yes	yes	yes	yes	yes	yes
Treat or withdraw axles with large + heavily corroded areas, strongly+uniformly pitted surface	yes	yes	yes				yes	yes	yes	yes	yes

Task Force result

Task Force result

Not applied – controlled by (a) in-service maintenance, (b) reprofile or (c) overhaul

Medium Maintenance (w/o changing wheels): NDT

Migration to full axle NDT inspection ongoing

MM Medium Maintenance	AAE	SNCF	SNCB	DBSR D	DBSR UK	SBB	ÖBB	VPI	TI	PKP	SLO-SZ
Level name	IS 2	COP	CA / GC	IS 2	NA/oper. WS OH to OH	IHS and	IS 2	IS 2	RI/RO	P 3	(IS2)
Seats	Auto or Man UT	Man UT	Man UT (inner sect)	Auto UT	N/A	Man (part)	Auto UT	Man UT	Auto UT	Man UT	Man UT
Transition radii shaft - wheelseat	Auto or Man UT	MT	Man UT (inner sect) New: both sides	Auto UT	N/A	Man (inn sect)	Auto UT	MT	Auto UT	Man UT	Man UT
shaft	Auto or Man UT	MT	New: MT	Auto UT	N/A		Auto UT	MT	Auto UT	Man UT	Man UT
Abutment	Auto or Man UT	MT	New: MT	Auto UT	N/A		Auto UT	MT	Auto UT	Man UT	Man UT
journal	Auto or Man UT	MT	New: MT	Auto UT	N/A		Auto UT	MT	Auto UT	Man UT	Man UT
Additional NDT	MT after treating defects + aft UT finding	MT	MT (loc) after treating defects	MT (loc) after treatg. defect	UT / MT / ECT in case of heavy corrosion	MT after UT finding	MT after treating defects + aft UT finding	MT	MT after treatg. corro.: Defs	MT if necessary	Man MT
Repair painting system	yes	yes	N.A.	yes	yes	yes	yes	yes	yes	yes	yes

Task Force result

4. Heavy maintenance level (with changing the wheels)

Wheel wear with time back stop to cater for mileage operated between wheelset last test and bearing in-service operation

Heavy Maintenance (with changing wheels): activities

HM Heavy maintenance	AAE	SNCF	SNCB	DBSR D	DBSR UK	SBB	ÖBB	VPI	TI	PKP	SLO-SZ
Level name	IS 3	CR 1-5	CG / AC	IS 3	Overhaul	IHS 4	IS 3	IS 3	RI/RO	P 4	(IS3)
No special interval, depends on wear of wheel	yes	yes	yes	yes		yes	yes	yes	yes	yes	yes
Visual inspection free axle surface	yes	yes	yes	yes	yes.	yes	yes	yes	yes	yes	yes
remove coating (MT related)	yes	yes	N.A.	yes	yes	yes	yes	yes	yes	yes	yes
Treat or withdraw axles with cracks or mechanical damage	yes	yes	yes	yes	Yes or scrap	yes	yes	yes	yes	yes	yes
Treat or withdraw axles with local and severe defects (according UIC category 4)	yes	yes	yes	yes	Yes or scrap	yes	yes	yes	yes	yes	yes
Treat or withdraw axles with large + heavily corroded areas, strongly+uniformly pitted surface	yes	yes	yes	yes	Yes or scrap	yes	yes	yes	yes	yes	yes
Treatment of wheelseats (turn or grind)	yes if nec	yes if nec	yes if nec	yes if nec	yes if nec	yes if nec	yes if nec	yes if nec	yes if nec	yes if ne	yes If nec
Treatment of shaft and transition radii (turn or grind)	yes if nec	yes if nec	yes if nec	yes if nec	yes if nec	yes If nec	yes if nec	yes if nec	yes if nec	yes if ne	yes
All type A axles operated at 20t	minimum wheel seat diameter 182 mm										
Treatment of abutment	yes if nec	yes if nec	yes if nec	yes if nec	yes if nec	yes if nec	yes if nec	yes if nec	yes if nec	yes if ne	yes If nec

Task Force result

Task Force result

Task Force result



Heavy Maintenance (with changing wheels): NDT

HM Heavy Maintenance	AAE	SNCF	SNCB	DBSR D	DBSR UK	SBB	ÖBB	VPI	TI	PKP	SLO-SZ
Level name	IS 3	CR 1-5	CG / AC	IS 3	Overhaul	IHS 4	IS 3	IS 3	R/RO	P 4	(IS3)
Seats	MT	MT	MT	MT	UT / MT / ECT	New: MT	MT	MT	MT	UT+ MT	MT
Transition radii shaft – wheelseat	MT	MT	MT	MT	UT / MT / ECT	New: MT	MT	MT	MT	UT+ MT	MT
Shaft	MT	MT	MT	MT	UT / MT / ECT	New: MT	MT	MT	MT	UT+ MT	MT
Abutment	MT	MT	MT	MT	UT / MT / ECT	New: MT	MT	MT	MT	UT+ MT	MT
Journal	MT	MT	MT	MT	UT / MT / ECT	New: MT	MT	MT	MT	UT+ MT	MT
Repair painting system	yes	yes	NA	yes	Yes (where required)	yes	yes	yes	yes	yes	yes

Task Force result

5. Special regimes



Continued high performance operation (*increased load limit*)

Swedish experience still to integrate

Limit for high performance operation	Limited mileage between medium or heavy maintenance (with and w/o changing wheels)	Corresponding maintenance Action
type A-I; A-II; A-III(1) 20 t	> 20 t not permitted	
Axle load exceeding design load <= 5% type A-III (2) > 20,6 t up to 21 t	- 400.000 km - ECM task is to define the equivalent time limit	NDT with mounted wheels - UT at wheel seat - UT or MT at transition radii
<div style="text-align: center; background-color: yellow; padding: 2px;">Parc SUR</div> Axle load exceeding design load >5% ->10% type A-III (2) > 21 t up to 22 t	- 200.000 km - ECM task is to define the equivalent time limit	
For type A axles operated at 21t axle load in standard maintenance plan and re-classified back to 20t operation:	re-integrate axle in standard maintenance plan with UT of the wheel seat at the next reprofiling, medium or heavy maintenance level of the wheelset	
type B > 22,5 t up to 23,5 t	Inside design limits but use to be checked case by case in accordance with wagon parameters and permitted infrastructure axle load	no special
type B > 23,5 t	not applied	

6. Limits for axle maintenance

Limits for axle maintenance

Service limit(s)

- shall only be based on condition (wear limits, **not age related**) because basic concept in dimensioning has always been the infinite life approach
- Age is not a clear indication for the status of an item (but the undergone load conditions)
- This is supported by the return of experience of the existing maintenance and monitoring systems (NDT, surface treatment,...). After maintenance/overhaul, the wheelset/axle is able to continue its operation in the foreseen maintenance plan.
- This is supported further by the Visual Inspection program with following heavy maintenance now to apply sorting out even quicker axles from operation to appropriate treatment

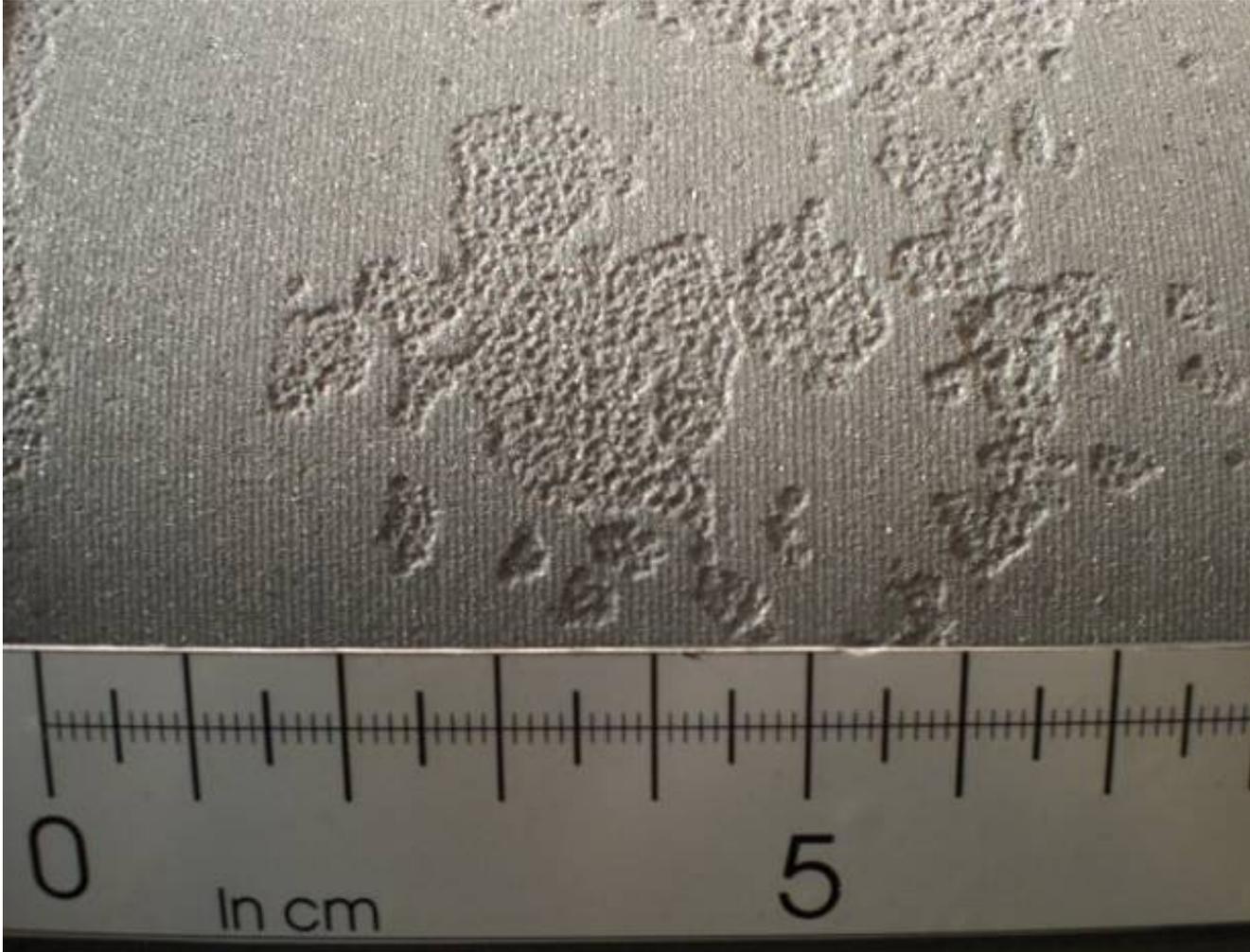
Surface status to be treated in medium and heavy maintenance: references

1) Local and severe defects (according UIC category 4)



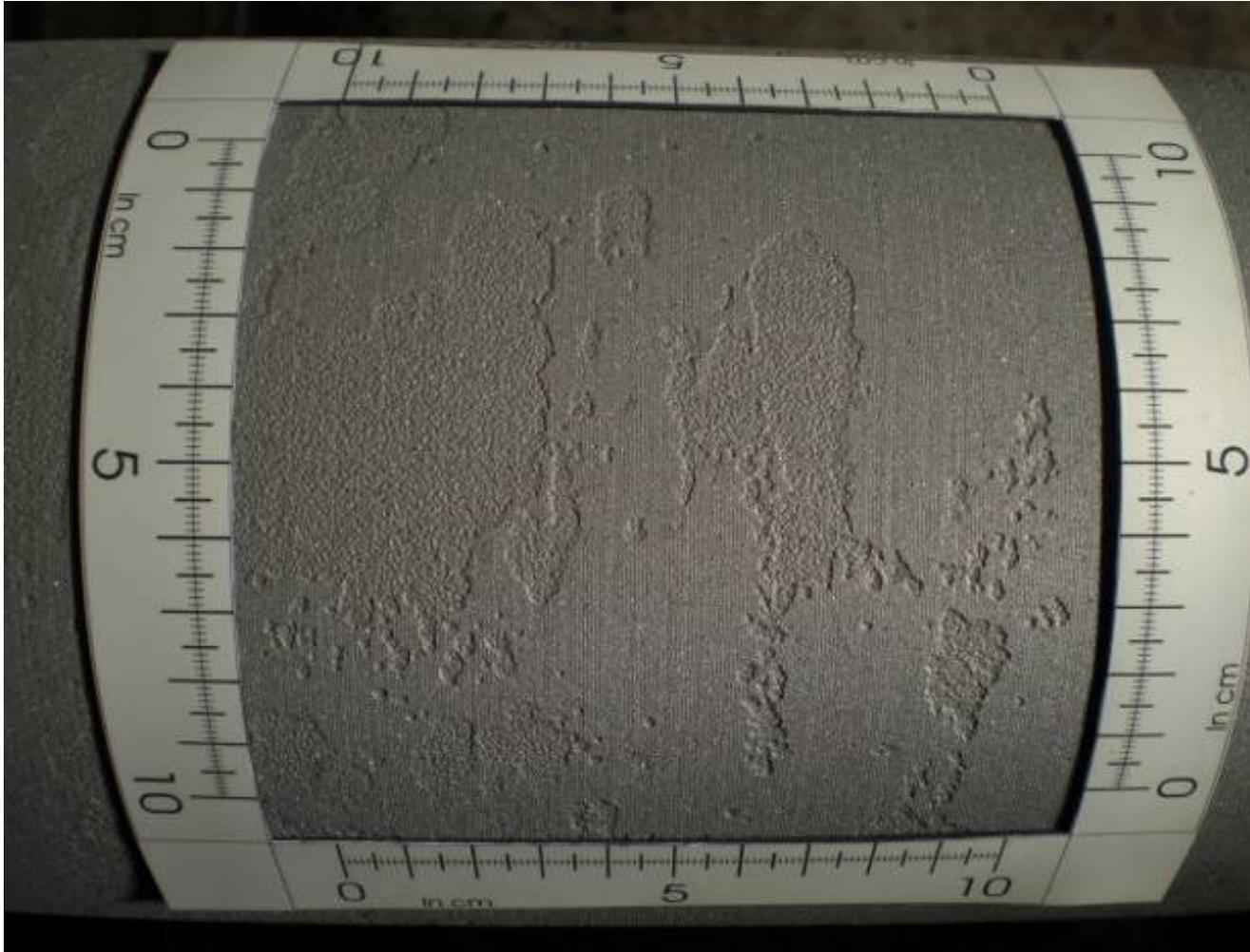
Surface status to be treated in medium and heavy maintenance: references

1) Local and severe defects (according UIC category 4)



Surface status to be treated in medium and heavy maintenance: references

1) Local and severe defects (according UIC category 4)



Surface status to be treated in medium and heavy maintenance: references

2) Large and heavily corroded areas, strongly and uniformly pitted surface



(link to prescriptions in EVIC:
“to be treated in next heavy maintenance”)

Surface status to be treated in medium and heavy maintenance: references

2) Large and heavily corroded areas, strongly and uniformly pitted surface



Surface status to be treated in medium and heavy maintenance: references

2) Large and heavily corroded areas, strongly and uniformly pitted surface



Surface status to be treated in medium and heavy maintenance: references

2) Large and heavily corroded areas, strongly and uniformly pitted surface



Surface status to be treated in medium and heavy maintenance: references

2) Large and heavily corroded areas, strongly and uniformly pitted surface



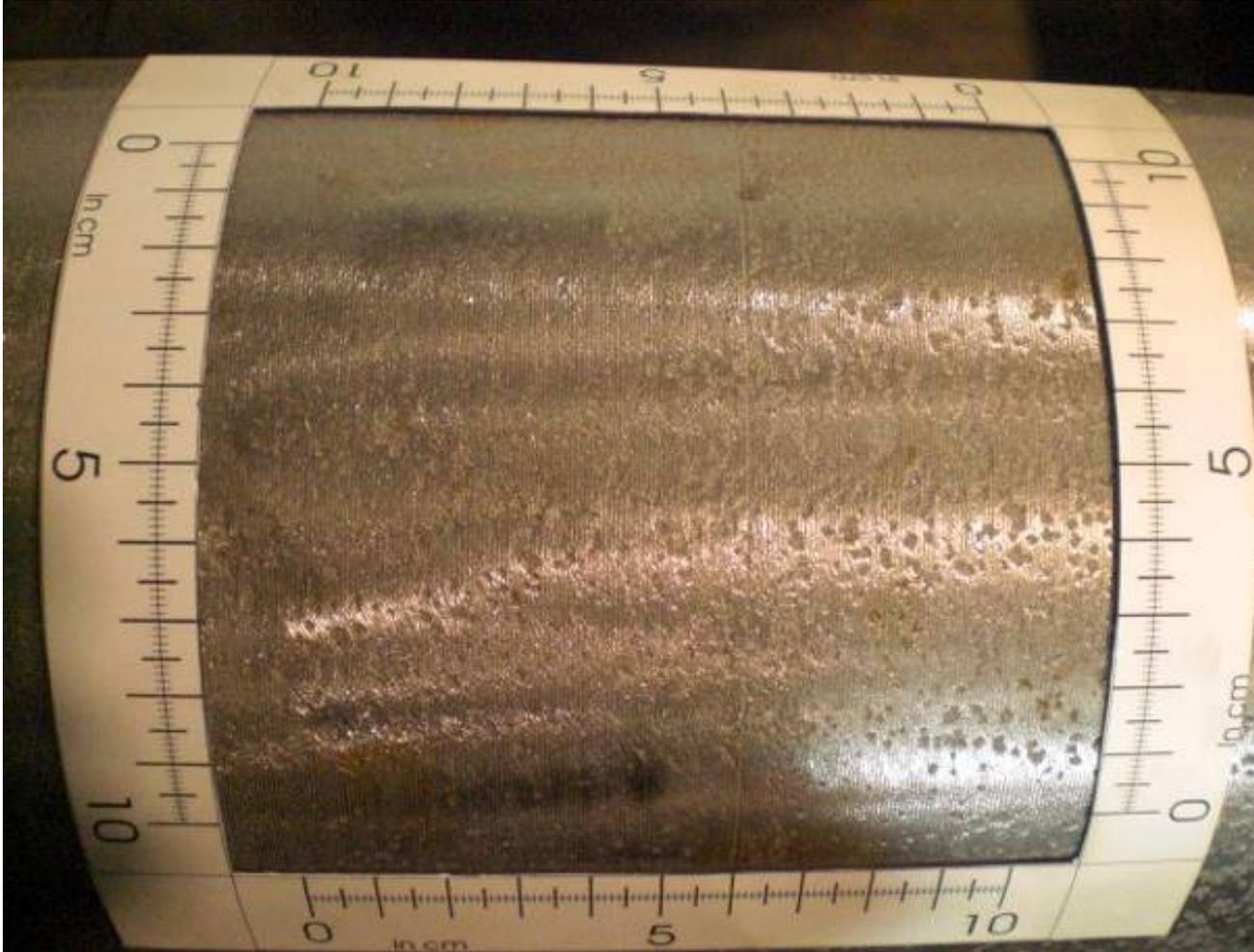
Surface status to be treated in medium and heavy maintenance: references

2) Large and heavily corroded areas, strongly and uniformly pitted surface



Surface status to be treated in medium and heavy maintenance: references

2) Large and heavily corroded areas, strongly and uniformly pitted surface



Surface status to be treated in medium and heavy maintenance: references

2) Status to be treated in transition radii and abutment area (examples)



abutment



abutment

Surface status to be treated in medium and heavy maintenance: procedure

For “medium maintenance” levels (without changing wheels, combined with bearing overhaul):

- If the surface status under coating of the axle is not clear: remove coating as far as necessary
- The surface status according to the given reference pictures must be treated or withdrawn in order to prevent potential cracks from propagation:
 - 1) Local and severe defects (according UIC category 4)
 - 2) Large and heavily corroded areas, strongly and uniformly pitted surface
- The treatment can be turning, grinding, blasting,... with subsequent NDT (according to ECCM)

The same criteria have to be applied also in the level with dismantled wheels

7. Traceability



Improved traceability of the wheelset / axle maintenance

Logging the Visual Inspection (EVIC) results

- According to EVIC decisions

General Traceability

- According to European Wheelset Traceability (EWT)

8. Measures resulting from lack of traceability

Measures resulting from lack of traceability

1. If in a wheelset maintenance level (with axle boxes opened) one or two of the following informations for an individual wheelset is/are missing:

- manufacturer
- manufacturing date
- manufacturing standard

the ECM has to decide according to its experience with its axle population about the measures to be applied. At minimum, the axle has to be subject to immediate NDT (only once).
(The timeframe is in accordance with the European Wheelset Traceability solution).

If no indication at all is given, the axle must be scrapped.

2. If the existence of the following data for an individual wheelset cannot be proven on paper, databases, data band,.. (detected during the acquisition according to the European Wheelset Traceability scheme or on special request):

- Workshop of last maintenance activity
- date of last maintenance activity
- type of last maintenance activity

then the axle has to be subject to immediate NDT (only once).

NDT for the axle must be performed in all cases 1. and 2. according to ECCM criteria.

Measures resulting from lack of traceability

3. The ECM/keeper has to decide according to its experience with the operational conditions of the axles if the non traceable axle has been used in accordance with its design or with high performance parameters.

If this is not identifiable, the most severe NDT conditions according to the “ECCM Continued High Performance Operation” rules must be applied in the future maintenance of the axle (see this document - *ECCM final, 5. special regimes*).

9. Handling and storage



GCU appendix 10: transport and storage of parts

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. Axle-boxes must be secured against rotation.

Thank you for your attention!