



## **Joint Sector Group Status on EVIC and Sampling Programme**

*2nd intermediate report for 2nd Follow-up meeting of the ERA Task Force*

*ERA, Lille  
17<sup>th</sup> March 2011*

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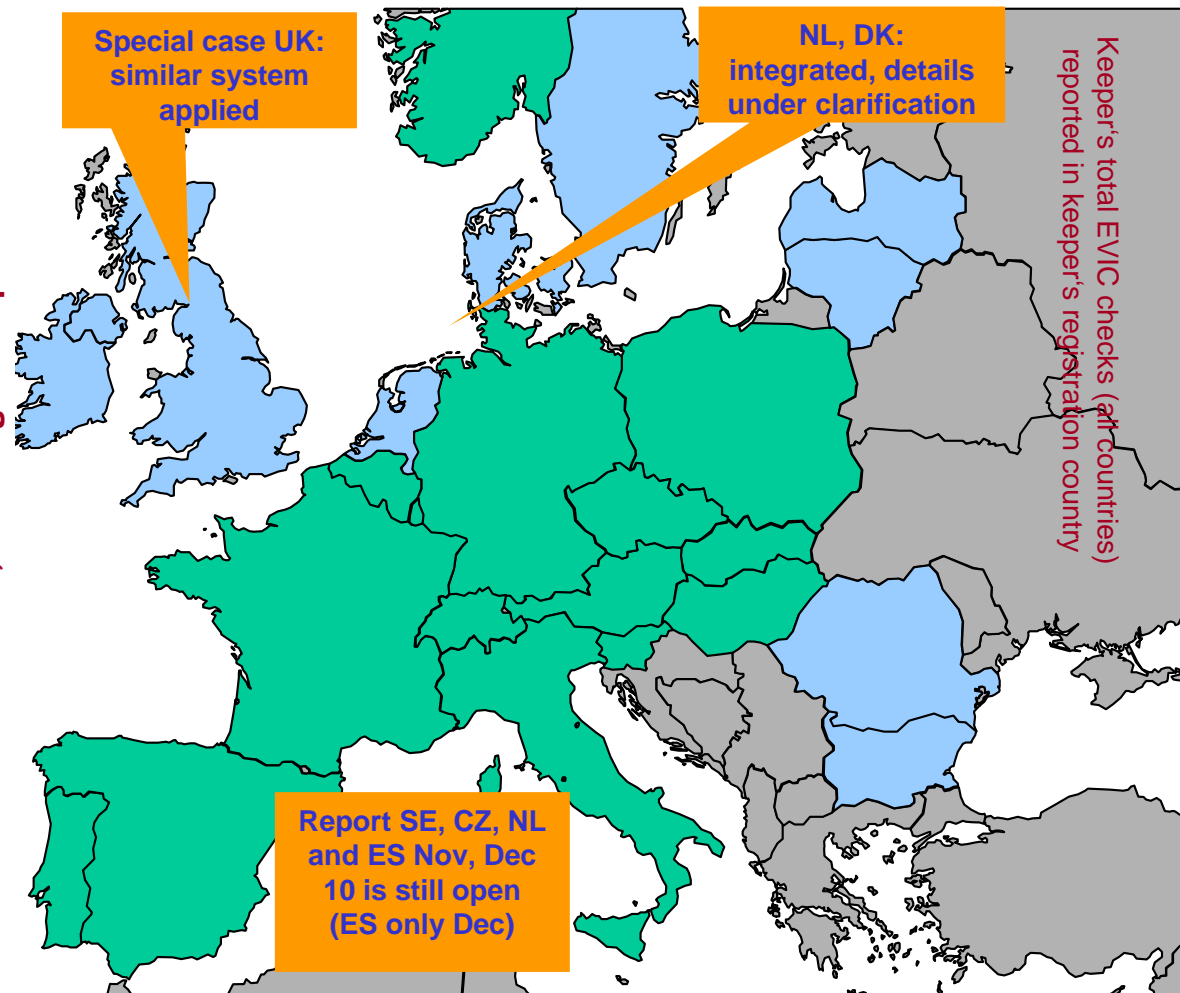
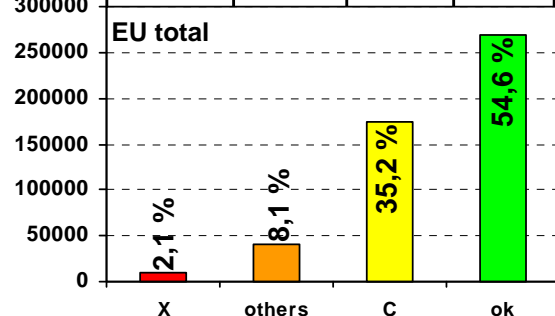
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## Status on EVIC implementation per December 2010 (data as per 07th March 2011)

# Status of the EVIC Visual Inspections total as per December 2010

|            | Wagons checked | Axles Total | Others | „ok“    | „X“    | „C“     |
|------------|----------------|-------------|--------|---------|--------|---------|
| EU total * | 126.973        | 493.924     | 39.988 | 269.709 | 10.217 | 174.010 |
| AT         | 3.514          | 13.714      | 4.812  | 5.522   | 559    | 2.821   |
| BE         | 2.350          | 9.051       | 0      | 8.951   | 80     | 20      |
| CH         | 9.167          | 32.125      | 3.256  | 15.482  | 542    | 12.845  |
| CZ         | 61             | 244         | 0      | 244     | 0      | 0       |
| DE         | 82.968         | 329.233     | 25.900 | 164.368 | 7.935  | 131.030 |
| ES         | 223            | 689         | 0      | 294     | 199    | 196     |
| FR         | 11.600         | 34.101      | 5.095  | 34.308  | 304    | 3.394   |
| HU         | 1.562          | 6.037       | 14     | 4.613   | 9      | 1.401   |
| LU         | 421            | 1.624       | 12     | 567     | 3      | 1.042   |
| IT         | 3.939          | 15.110      | 396    | 7.317   | 357    | 7.040   |
| PL         | 5.364          | 20.859      | 110    | 17.872  | 159    | 2.718   |
| PT         | 200            | 501         | 2      | 0       | 0      | 499     |
| SE         | 211            | 843         | 61     | 522     | 52     | 208     |
| SK         | 5.239          | 20.205      | 23     | 9.497   | 7      | 10.678  |
| SI         | 154            | 588         | 307    | 152     | 11     | 118     |

\* 15 countries, 117 wagon keepers



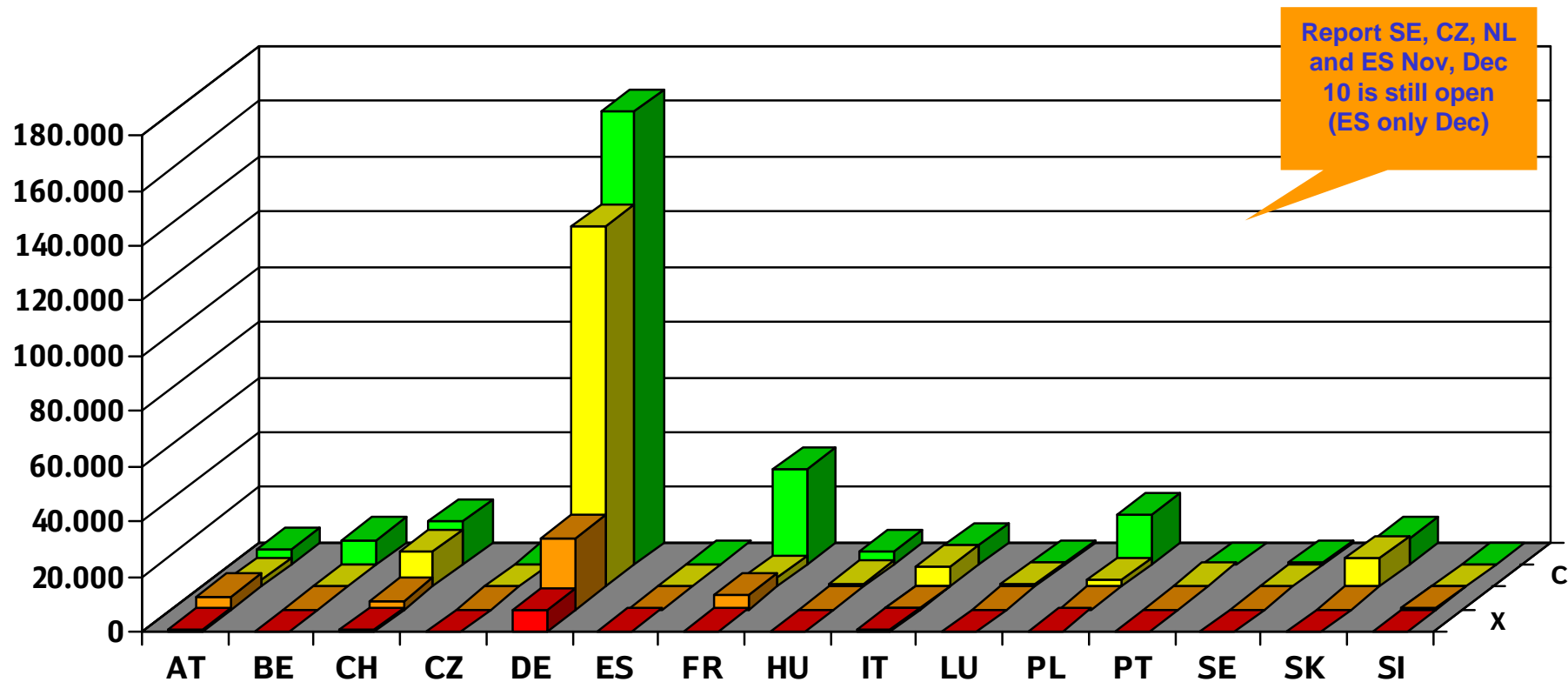
X: Remove from service without delay

others: sorted out for other reasons, e.g. reprofiling

C: Leave in service until the next EVIC check

ok: no defects, leave in service

## Status of the EVIC Visual Inspections per Member State as per December 2010 (absolute)



Report SE, CZ, NL  
and ES Nov, Dec  
10 is still open  
(ES only Dec)

X: Remove from service without delay

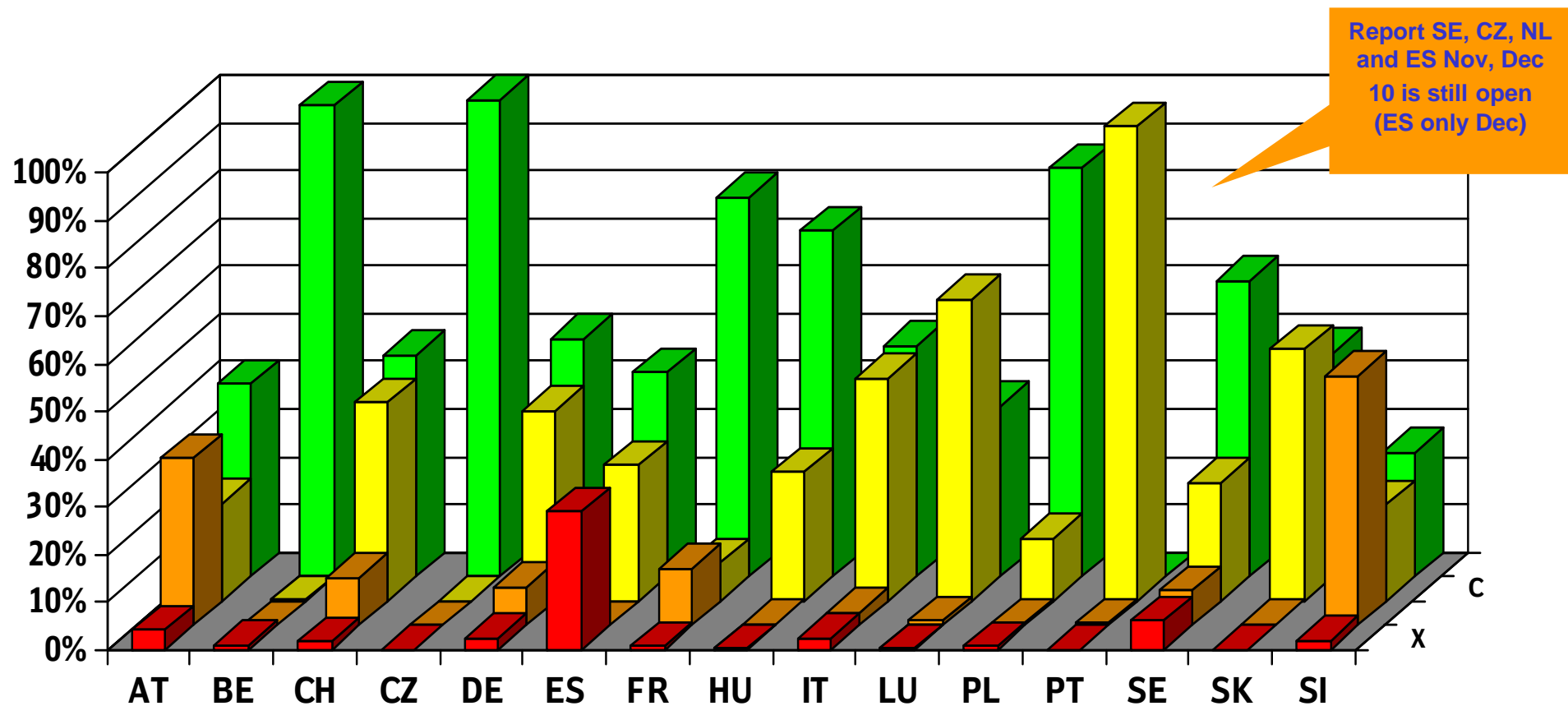
others: sorted out for other reasons, e.g. reprofiling

Keeper's total EVIC checks (all countries)  
reported in keeper's registration country

C: Leave in service until the next EVIC check

ok: no defects, leave in service

## Status of the EVIC Visual Inspections per Member State as per December 2010 (percentage)



X: Remove from service without delay

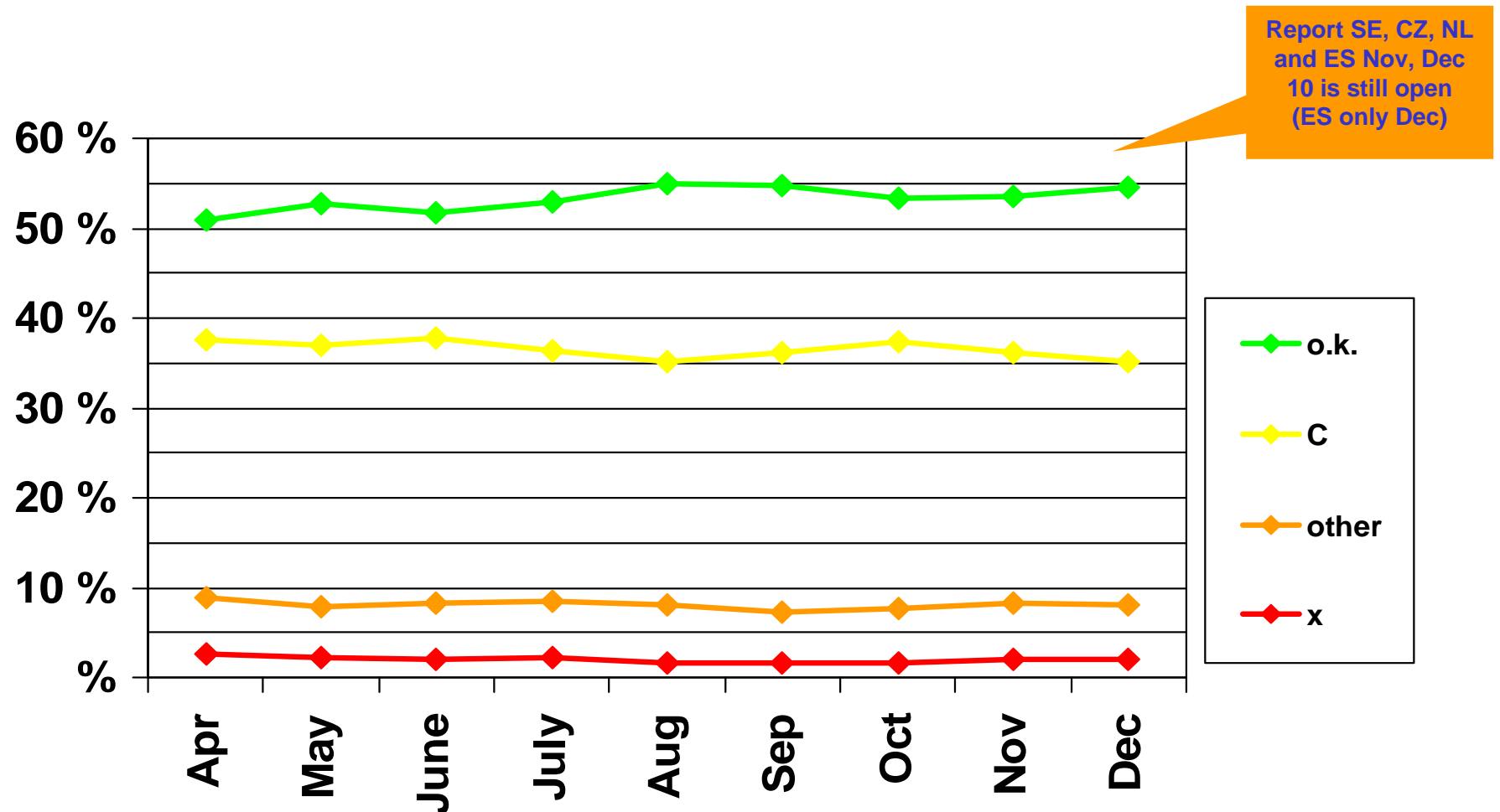
others: sorted out for other reasons, e.g. reprofiling

Keeper's total EVIC checks (all countries)  
reported in keeper's registration country

C: Leave in service until the next EVIC check

ok: no defects, leave in service

## Evolution of the EVIC categories findings over time (EU total)



X: Remove from service without delay

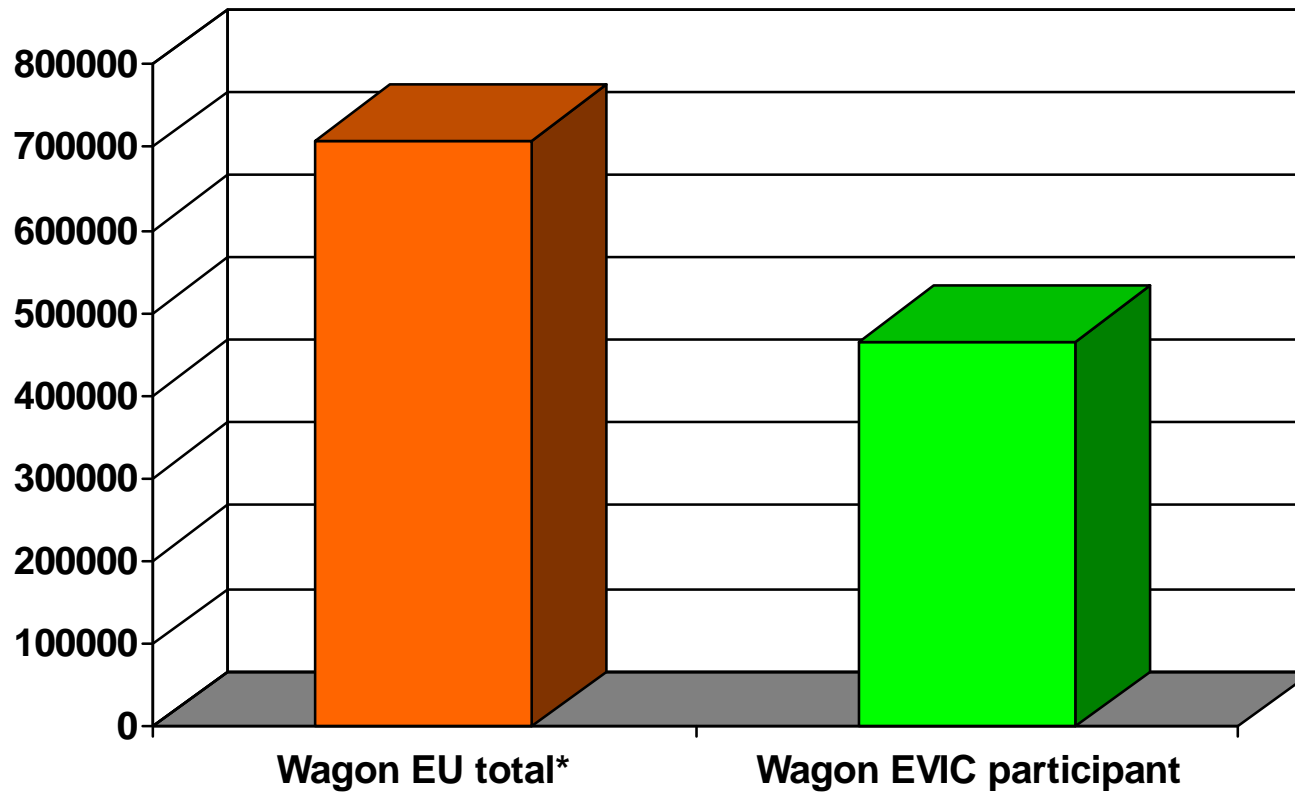
others: sorted out for other reasons, e.g. reprofiling

C: Leave in service until the next EVIC check

ok: no defects, leave in service

## Coverage of EU freight wagon keeper's fleet by EVIC checks

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- 117 wagon keepers
- as per December 2010
- share from GCU signatories

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## Status on sampling programme per begin of March 2011

# 1. Aim of the sampling and method

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- A sampling programme with more in-depth NDT investigation of axles taken from the risk domains will be performed in parallel **to prove the EVIC approach** and **to clarify the assumption of the defined risk domains**
- A sample of axles which fulfill the EVIC and a sample of them which do not fulfill the EVIC criteria will be inspected in a special monitored maintenance programme with NDT (“the sampling programme”)
- **Comparisons** of the **NDT results of “EVIC failed” and “EVIC passed”** axles will be performed. The results will be compared also to the results from heavy maintenance currently undertaken. **According to the return of experience, the sector will propose appropriate measures to deal with identified risk areas**

*from Viareggio Final Presentation 16./17.12.2009*

## 2. Programme and current situation

as per 07.03.11

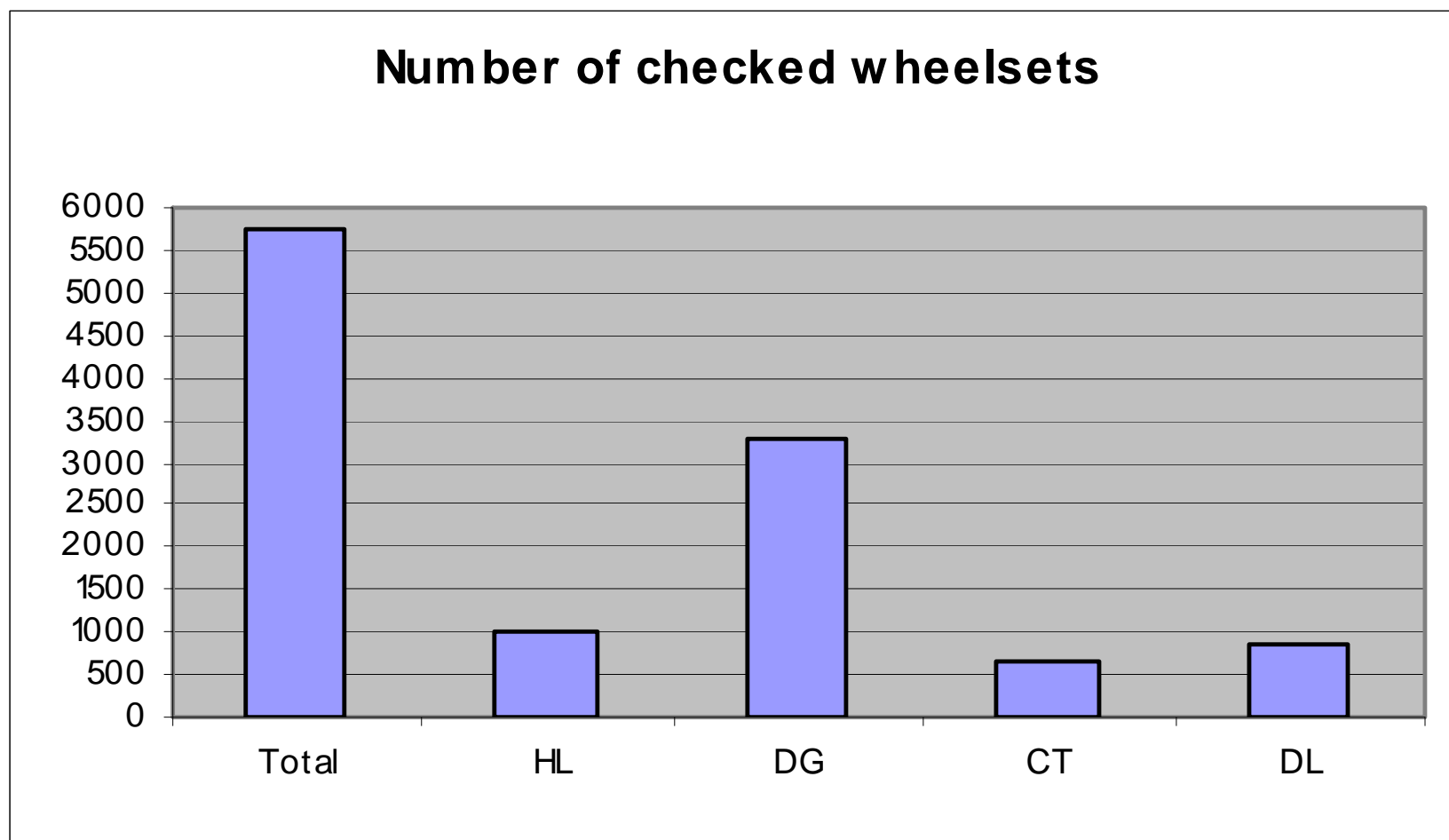
| Member       | Number of axles (total) | % of total | sampling theoretical | sampling decided | Number of wheelset already checked | NDT System | COR          | RID          | High load    | Drop load    |
|--------------|-------------------------|------------|----------------------|------------------|------------------------------------|------------|--------------|--------------|--------------|--------------|
| PKP          | 280 000                 | 17%        | 4 065                | 4 000            | 103<br>116                         | UT man     | 2000         |              | 1000         | 1000         |
| SBB          | 30 000                  | 2%         | 436                  | 600              |                                    |            |              |              | 350          | 250          |
| AAE          | 40 000                  | 2%         | 581                  | 750              |                                    |            |              |              | 50           | 700          |
| SNCB         | 60 000                  | 4%         | 871                  | 800              |                                    |            |              |              | 400          | 400          |
| HUPAC        | 16 000                  | 1%         | 232                  | 300              |                                    |            |              |              | 150          | 150          |
| <b>Total</b> | <b>426 000</b>          | <b>0</b>   | <b>6 185</b>         | <b>6 450</b>     | <b>219</b>                         |            | <b>2 000</b> | <b>-</b>     | <b>1 950</b> | <b>2 500</b> |
| DB SR D      | 370 000                 | 22%        | 5 372                | 5 000            | 1 712<br>206<br>255                | UT auto    | 3300         |              | 500          | 1200         |
| TI           | 115 000                 | 7%         | 1 670                | 1 300            |                                    |            | 200          |              | 1100         |              |
| ÖBB          | 60 000                  | 4%         | 871                  | 700              |                                    |            |              |              | 400          | 300          |
| AAE          | 80 000                  | 5%         | 1 162                | 1 000            |                                    |            |              |              | 200          | 800          |
| <b>Total</b> | <b>625 000</b>          |            | <b>9 074</b>         | <b>8 000</b>     | <b>2 173</b>                       |            | <b>3 500</b> | <b>-</b>     | <b>2 200</b> | <b>2 300</b> |
| UIP          | 300 000                 | 18%        | 4 356                | 6 000            | 3 259<br>88                        | MT         |              | 6000         |              |              |
| SNCF         | 291 000                 | 18%        | 4 225                | 3 550            |                                    |            | 500          |              | 1850         | 1200         |
| SLO          | 11 000                  | 1%         | 160                  | -                |                                    |            |              |              |              |              |
| <b>Total</b> | <b>602 000</b>          |            | <b>8 740</b>         | <b>9 550</b>     | <b>3 547</b>                       |            | <b>500</b>   | <b>6 000</b> | <b>1 850</b> | <b>1 200</b> |
| <b>Total</b> | <b>1 653 000</b>        |            | <b>24 000</b>        | <b>24 000</b>    | <b>5 739</b>                       |            | <b>6 000</b> | <b>6 000</b> | <b>6 000</b> | <b>6 000</b> |

### 3. Intermediate results

01.03.2011: 5.739 in total

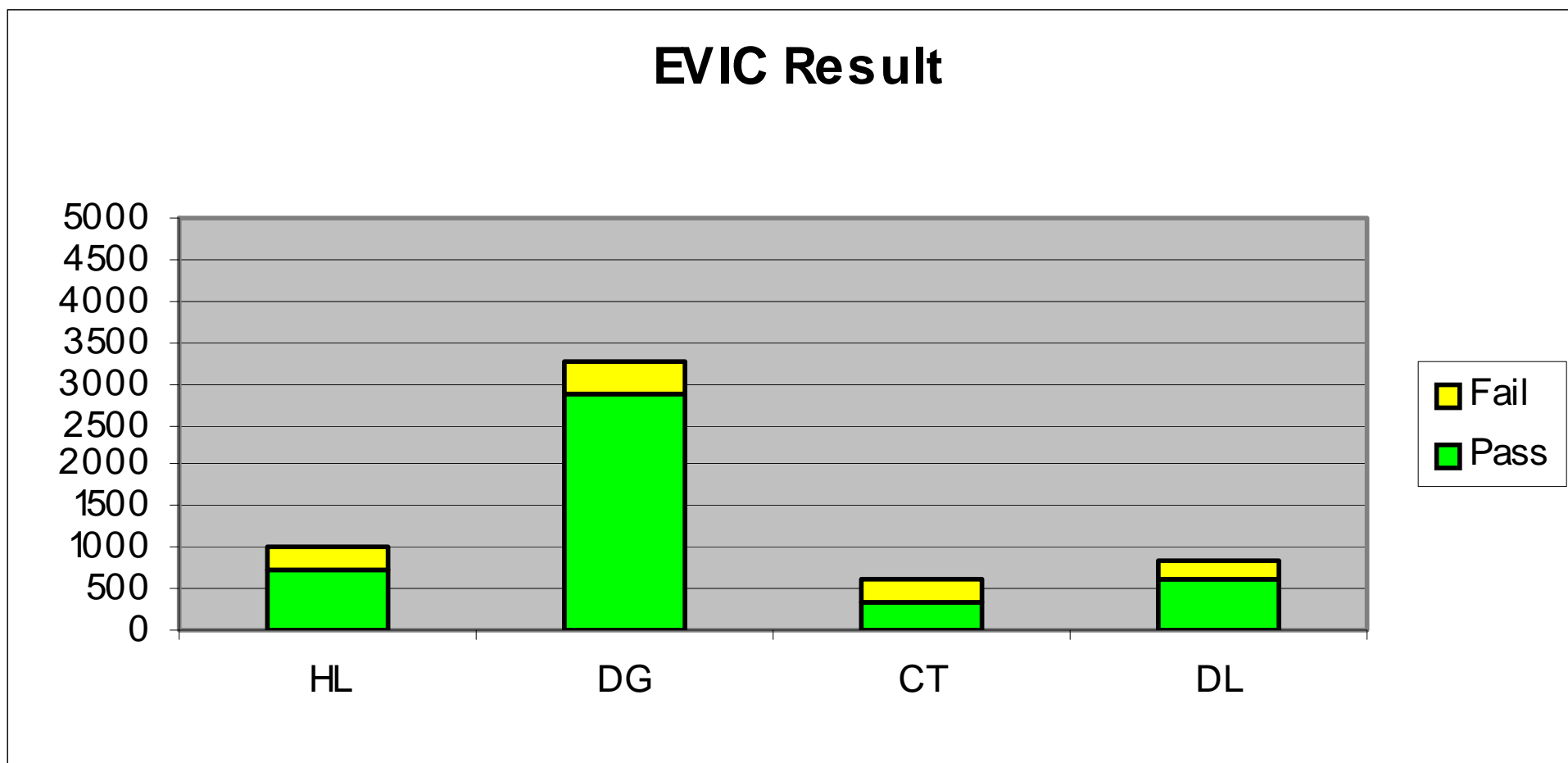
as per 07.03.11

30.11.2010: 2.930 in total



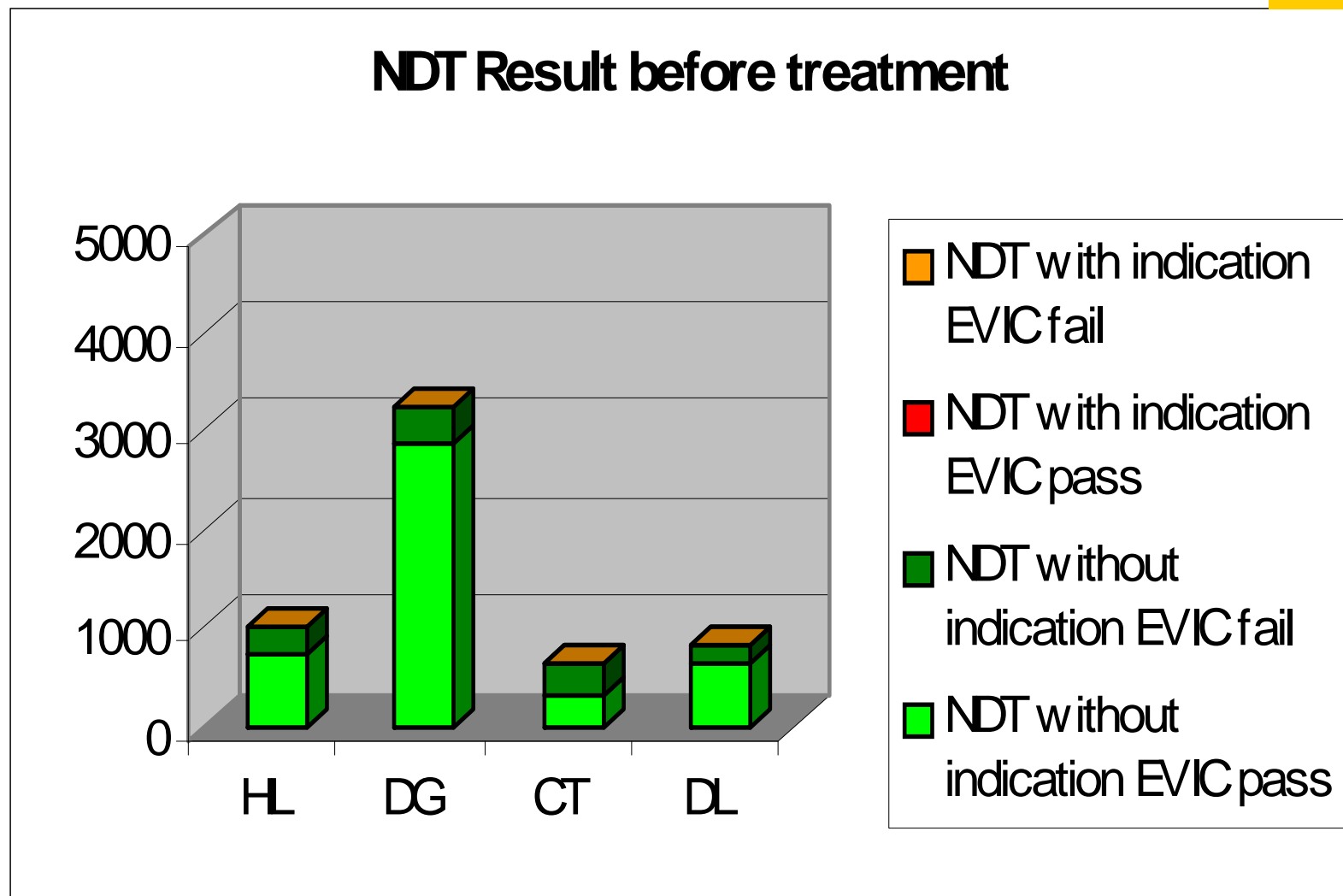
### 3. Intermediate results

as per 07.03.11



### 3. Intermediate results

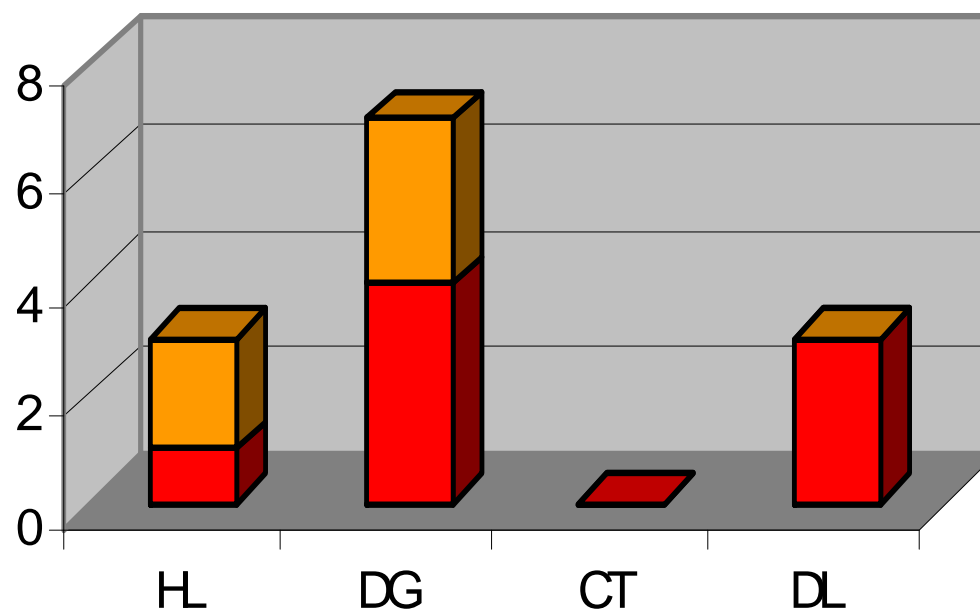
as per 07.03.11



### 3. Intermediate results

as per 07.03.11

**NDT Result before treatment  
with indication**



■ NDT with indication EVICfail  
■ NDT with indication EVICpass

### 3. Intermediate results

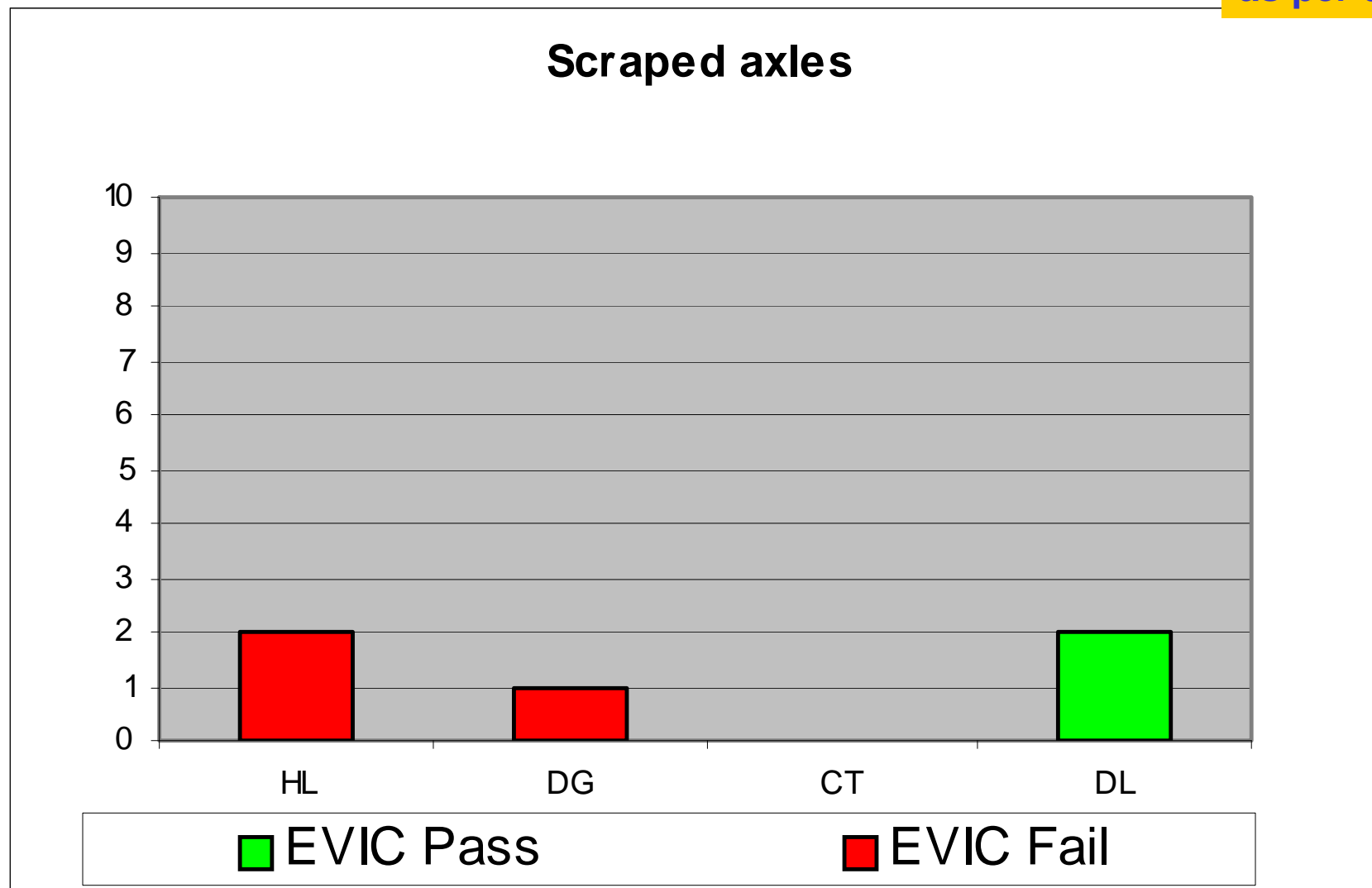
as per 07.03.11

| EVIC categories | NDT indication in visual EVIC Zone  |   |
|-----------------|---|---|
|                 | Yes   | No  |
| NOK             | <p><b>432422</b> SNCF defect 36 (deeply pitted corrosion scars on shaft) depth 1,4 mm</p> <p><b>8827</b> UIP ?</p> <p><b>603365</b> VTG defect 33 (sharp edged notching) length 10 mm on abutment</p> <p><b>85066</b> SNCF deeply pitted corrosion scars on shaft</p> | <p><b>86676</b> OBB defect 31 (sharp edged circumferential fluting) on abutment both side</p> <p><b>60360</b> VTG linear transverse indication on journal</p> <p>A length 2 and 5 mm</p> <p>B length 3 mm</p> |
| C               | <p><b>5433647</b> DB surface category 3</p> <p><b>158049</b> VTG defect 31 (sharp edged circumferential fluting) on B journal</p> <p>longitudinal indication 10 mm length on shaft</p>  | <p><b>299492</b> VTG defect 33 (sharp edged notching) on shaft</p> <p>linear indication length 3,5 mm on A journal</p> <p><b>330244</b> VTG deeply pitted corrosion scars on shaft and abutment</p>           |
| OK              | <p><b>188271</b> OBB NDT Indication on A abutment</p> <p>+ 83 wheelsets AAE EVIC OK with treatment less than 1 mm on shaft.</p>   |   |

**Preliminary, example  
under further investigation and completion  
updated slide will be sent before 17.03.**

### 3. Intermediate results

as per 07.03.11



## 4. Intermediate conclusions

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- 24% of the sampling volume has been checked up to now (11/2010: 10%)
- Some members have well progressed, some encounter severe problems in delivery
- Reasons: initial quality problems, introducing new procedures in maintenance (as 100% surface check), stabilising of the procedures, not compatible with workflow in workshops, (re)organisational problems,....
- As already announced in 1st Follow-up meeting, the completion of the programme in one year is extremely challenging
- Measures for improvement (quality and quantity) are implemented at all participants
- The number of “EVIC X” axles per risk domain is still very low (generally, few X axles found in Europe - see slide 4, EVIC status)

## 4. Intermediate conclusions

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- Sourcing EVIC X axles from other EVIC participants (but “non-sampling participants”) was analysed but still encounters problems:
  - except of Germany (high wagon number), the total number of “X” axles is very low
  - required data quality
    - link to original wagon / risk domain difficult
    - merging sampling results with the other wheelset data would be very difficult
    - this action complicates sampling procedure enormously (plus quality issue)

=> not recommended at the moment because not increasing the X number significantly
- The Sector will need a **3 month** delay for the timeframe (September 2011) for completing the EVIC OK sampling (and longer for some members).

The assumption is to come close to a completion of the EVIC OK axles in June.
- The Sector asks for a further delay for EVIC NOK axles (timeframe can not be guaranteed) because the general number of EVIC NOK axles is not sufficient all over Europe

## 4. Intermediate conclusions

### Statistical treatment of axles sampled up to now

| Before treatment | NDT Not Ok | NDT Ok | Ratio | 95% Confidence range |
|------------------|------------|--------|-------|----------------------|
| EVIC Ok          | 3          | 2236   | 1.3 ‰ | 0.46 – 3.9 ‰         |
| EVIC C           | 5          | 2308   | 2.2 ‰ | 0.92 – 5.1 ‰         |
| EVIC Ok or C     | 8          | 4544   | 1.8 ‰ | 0.9 – 3.5 ‰          |
| EVIC Not Ok      | 5          | 1174   | 4.3 ‰ | 1.8 – 9.9 ‰          |
| Total            | 13         | 5718   | 2.3 ‰ | 1.3 – 3.9 ‰          |

example

**Note:** “*NDT Not OK*” means axles that have shown NDT INDICATIONS (without any immediate risk for the component) that have been taken out from service as usually done through the current maintenance rules.

## 4. Intermediate conclusions

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### Intermediate conclusion of axles sampled up to now

- Calculation of confidence intervals
- Confidence intervals (before/after treatment) shall not overlap to show significance
- If confidence intervals overlap, more data are needed
- Variation of total numbers (until the end of the programme) cannot be excluded for the moment and can change the picture (and would have to be analysed then). Must be awaited
- No evidence on the different risk domains can be given for the moment (too small absolute numbers per domain)
- The detail analysis of the NDT NOK axles will clarify further the current situation

**=> the way for the statistical analysis and interpretation is depicted**

**=> but it is still too early to draw conclusions**

## 5. EVIC further application strategy (proposal)

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### Situation:

- The main purpose of the EVIC programme is
  - to check the whole axle population once per keeper (corresponding to a 100% wagon fleet checked) within 4 (6) years and
  - to record a set of data for the European monitoring and
  - to enable the keepers and workshops to “take better care of and look better at axle surfaces”,  
also in reinforcement of already existing technical rules
- The “check of the whole axle population” must be completed once per keeper in order to leave only axles in service complying with a European-wide accepted surface status.
- Some wheelsets of a keeper may be checked more times before reaching the full (100%) check per population. This is unavoidable for practical reasons and due to the mandatory application of EVIC under GCU.

## 5. EVIC further application strategy (proposal)

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### JSG proposal for balancing EVIC costs whilst maintaining safety requirements:

- **Before the complete evaluation of the sampling programme**, the EVIC checks have to be continued even if the check of all axles (= wagons) of one keeper has been completed before the 4 (6) years period
- For elimination of cost drivers, keepers can stop the EVIC tracing reporting
  - **either** if a “**full wagon fleet check completed**”-notice has been given by those keepers to “their” national Joint EVIC body (axles in wagons are checked; changed axles are only EVIC OK)
  - **or** for an individual wagon if the keeper can assure that this wagon is already EVIC checked
  - EVIC will be applied further on (for all keepers) under GCU regime (until GCU amendment)
- **After respective evidence of the sampling programme**, a decision will be taken whether EVIC will be / will not be a permanent measure and/or amended accordingly. **Then**,
  - the GCU needs also to be amended accordingly and within short time
  - the existing regular GCU criteria (apart from EVIC) will be applied further on anyway (especially: for mechanical damages)
  - keepers having not reached a full check of their axles still must complete until full check in order to comply with the above said reasons

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**Thank you for your attention!**



# EVIC-Sampling

## Confidence intervals by example

- **Sample** gives an estimate for the ratio/probability of a certain feature in a set
  - Here: 5/904 or 5.53 ‰ axles EVIC NOK & NDT NOK after treatment
- **Confidence intervals** define a range of ratios/probabilities for which the real outcome of the sample (here: 5/904) is **plausible**
  - Lower limit of confidence interval is the ratio/probability for which the **real outcome** of the sample is unplausible because it is **improbably high**
  - Upper limit of confidence interval is the ratio/probability for which the **real outcome** of the sample is unplausible because it is **improbably low**

