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

Final report on EVIC sampling programme

ERA, Lille
13th December 2011

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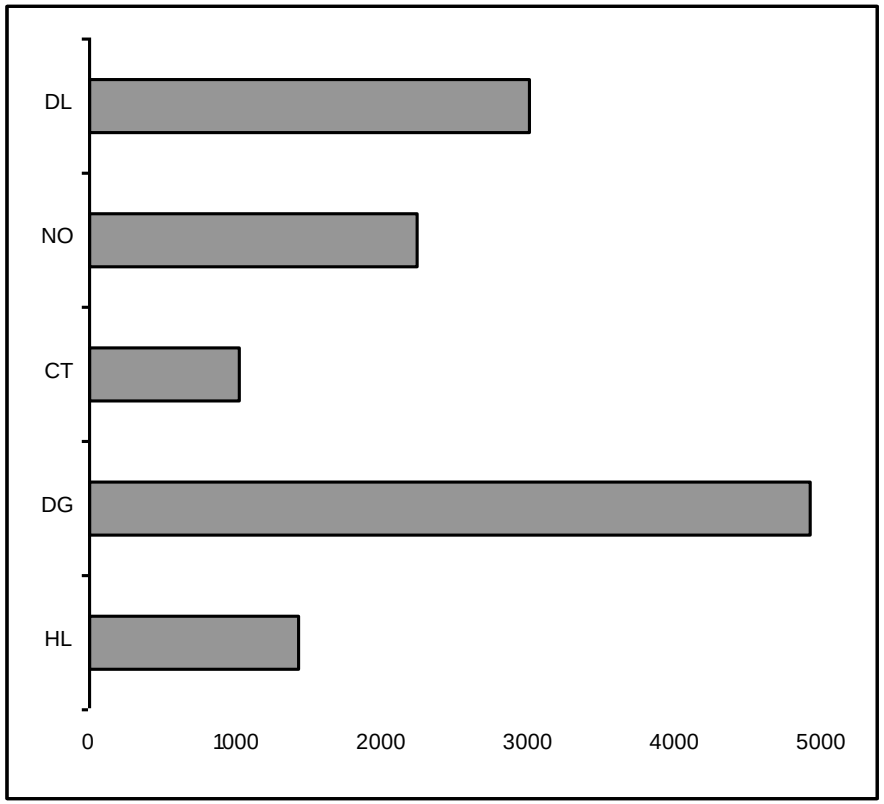
1. Programme and current situation

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*	*195*	*UT man*	2000		1000	1000
SBB	*30 000*	*2%*	*436*	*600*	*6*				350	250
AAE	*40 000*	*2%*	*581*	*750*	*707*				50	700
SNCB	*60 000*	*4%*	*871*	*800*	*853*				400	400
HUPAC	*16 000*	*1%*	*232*	*300*	*-*				150	150
Total	**426 000**	**0**	**6 185**	**6 450**	**1 761**		**2 000**	**-**	**1 950**	**2 500**
DB SR D	*370 000*	*22%*	*5 372*	*5 000*	*3 728*	*UT auto*	3300		500	1200
TI	*115 000*	*7%*	*1 670*	*1 300*	*-*		200		1100	
ÖBB	*60 000*	*4%*	*871*	*700*	*707*				400	300
AAE	80 000	*5%*	*1 162*	*1 000*	*826*				200	800
Total	**625 000**		**9 074**	**8 000**	**5 261**		**3 500**	**-**	**2 200**	**2 300**
UIP	*300 000*	*18%*	*4 356*	*6 000*	*4 906*	*MT*		6000		
SNCF	*291 000*	*18%*	*4 225*	*3 550*	*669*		500		1850	1200
SLO	*11 000*	*1%*	*160*	*-*						
Total	**602 000**		**8 740**	**9 550**	**5 575**		**500**	**6 000**	**1 850**	**1 200**
Total	**1 653 000**		**24 000**	**24 000**	**12 597**		**6 000**	**6 000**	**6 000**	**6 000**

1. Programme and current situation

Wheelsets sampled per Risk Category, state per end of November 2011



30.11.2010:	**2.930 in total**
01.03.2011:	**5.739 in total**
30.08.2011:	**10.623 in total**
30.11.2011:	**12.597 in total**

- ≈ 52% of the sampling volume has been checked up to now

(11/2010: 10%, 03/2011: 24%, 09/2011: 44%)

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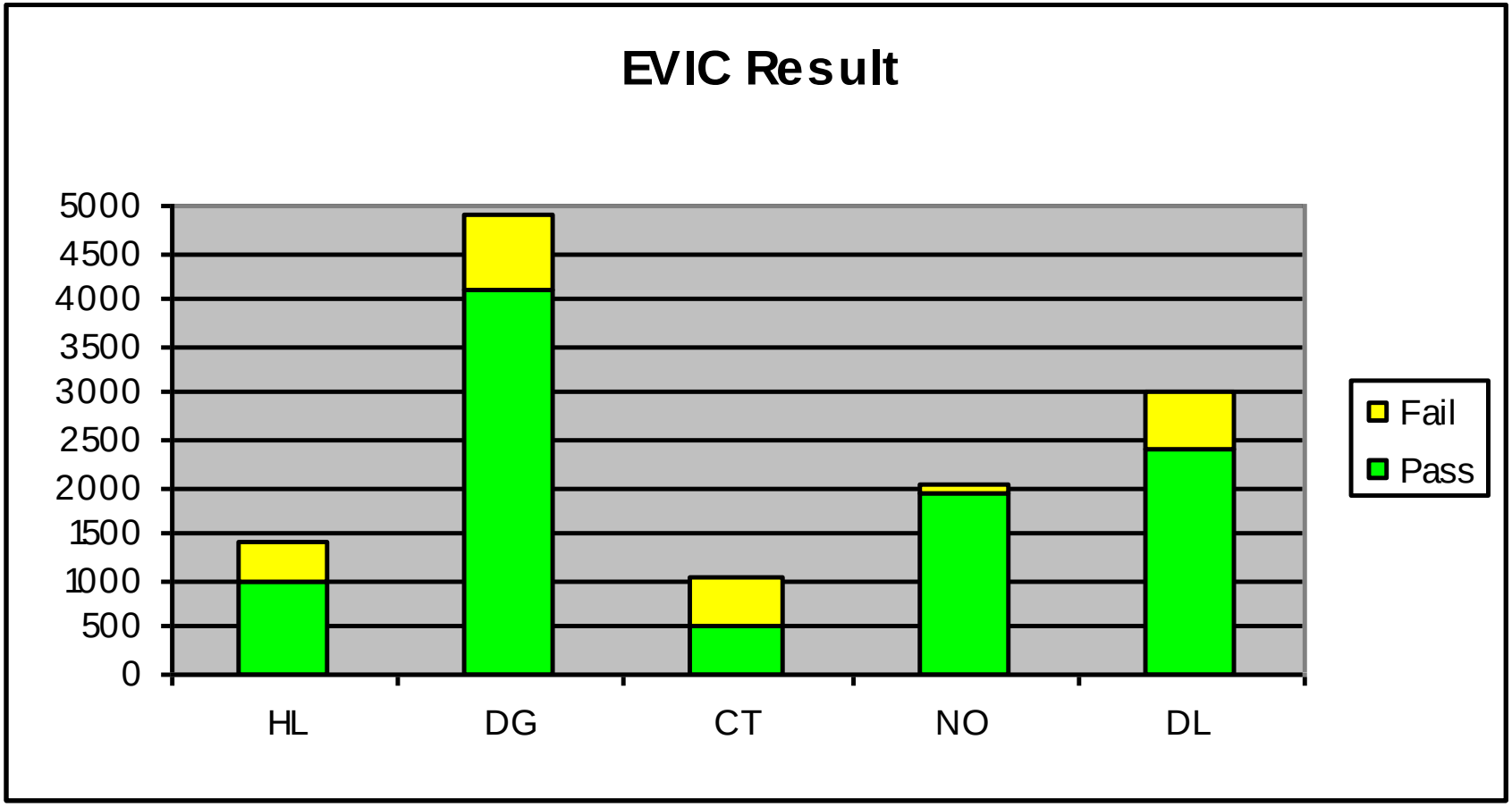
2. Results per end of November



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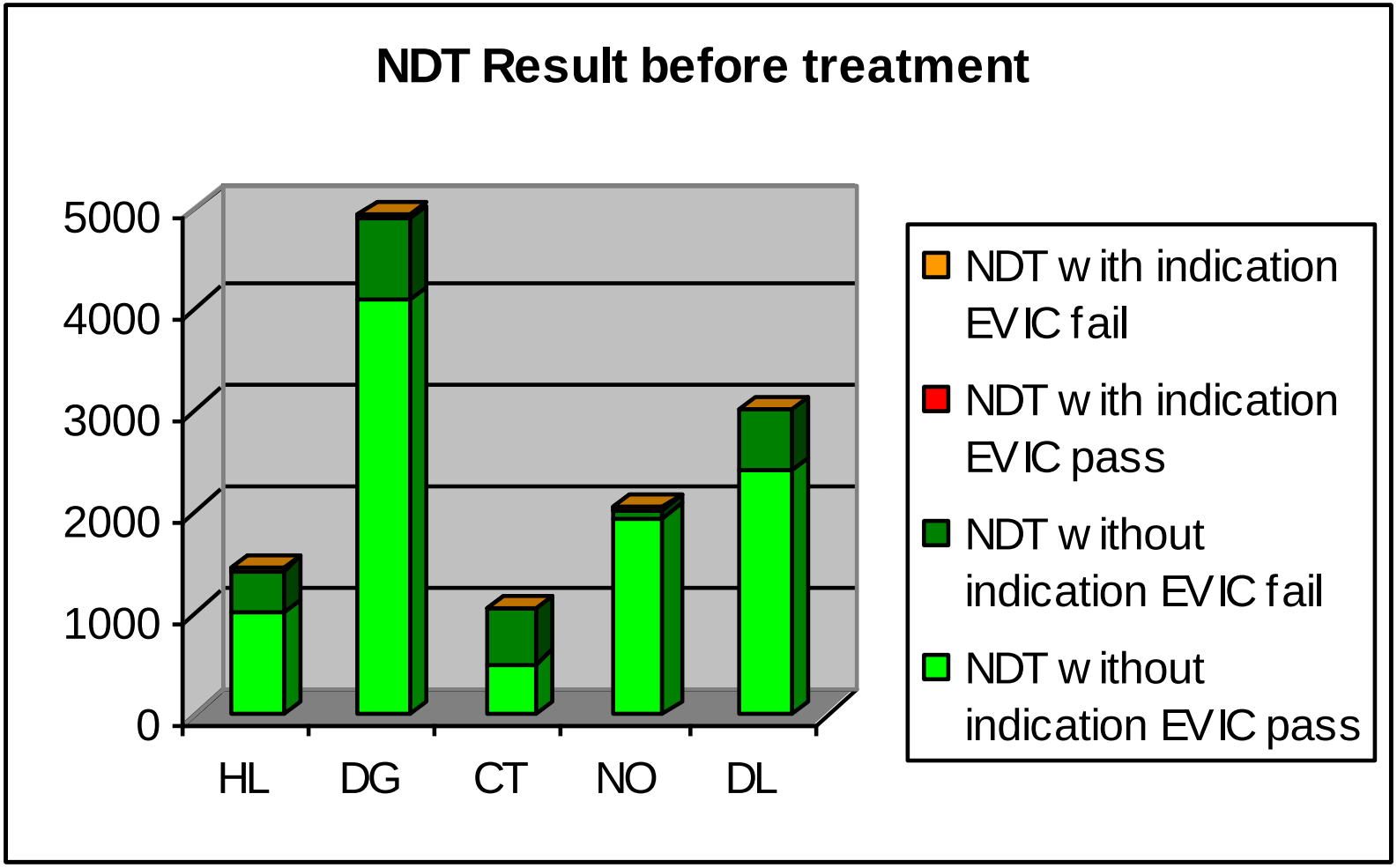

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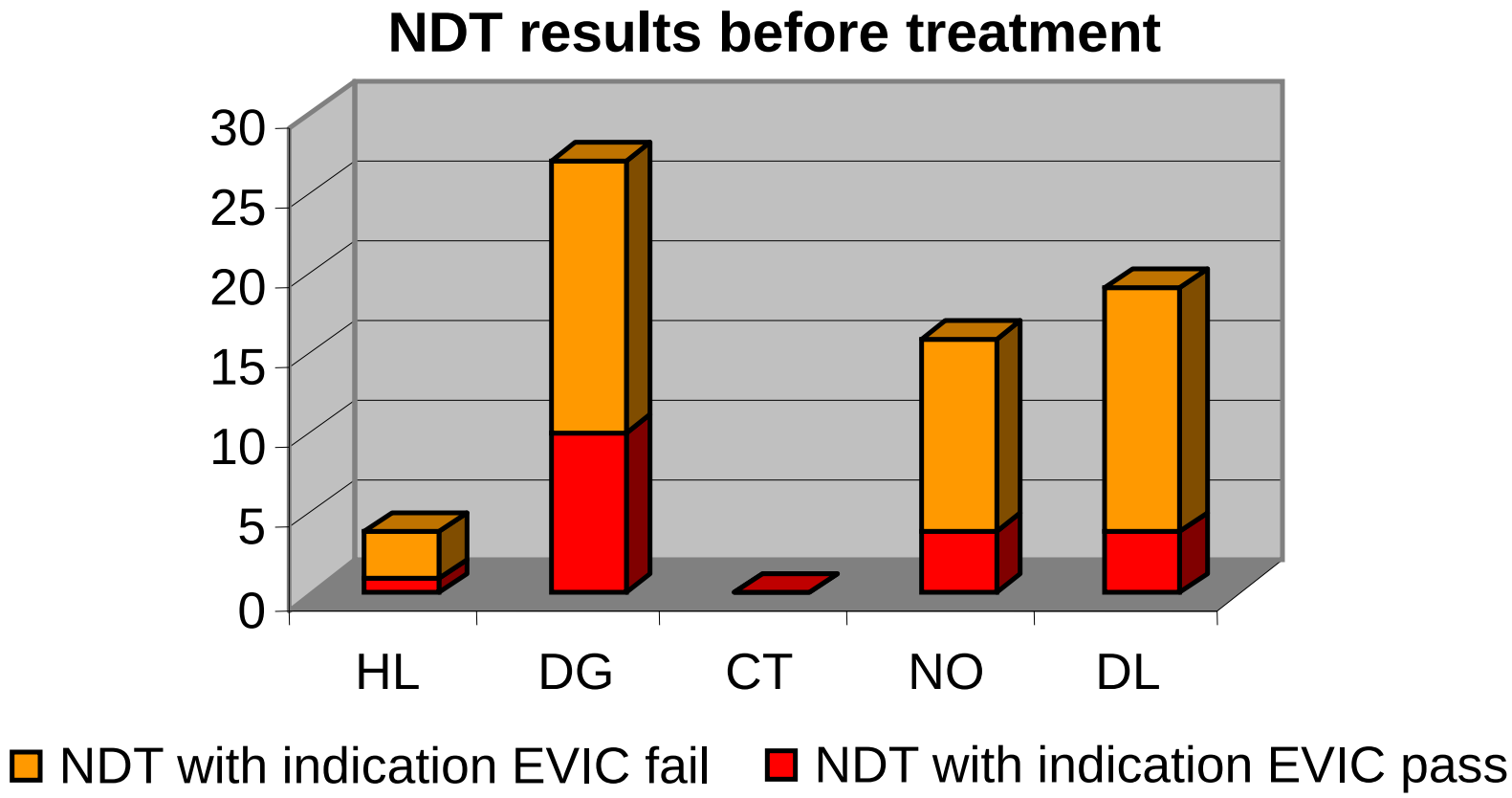

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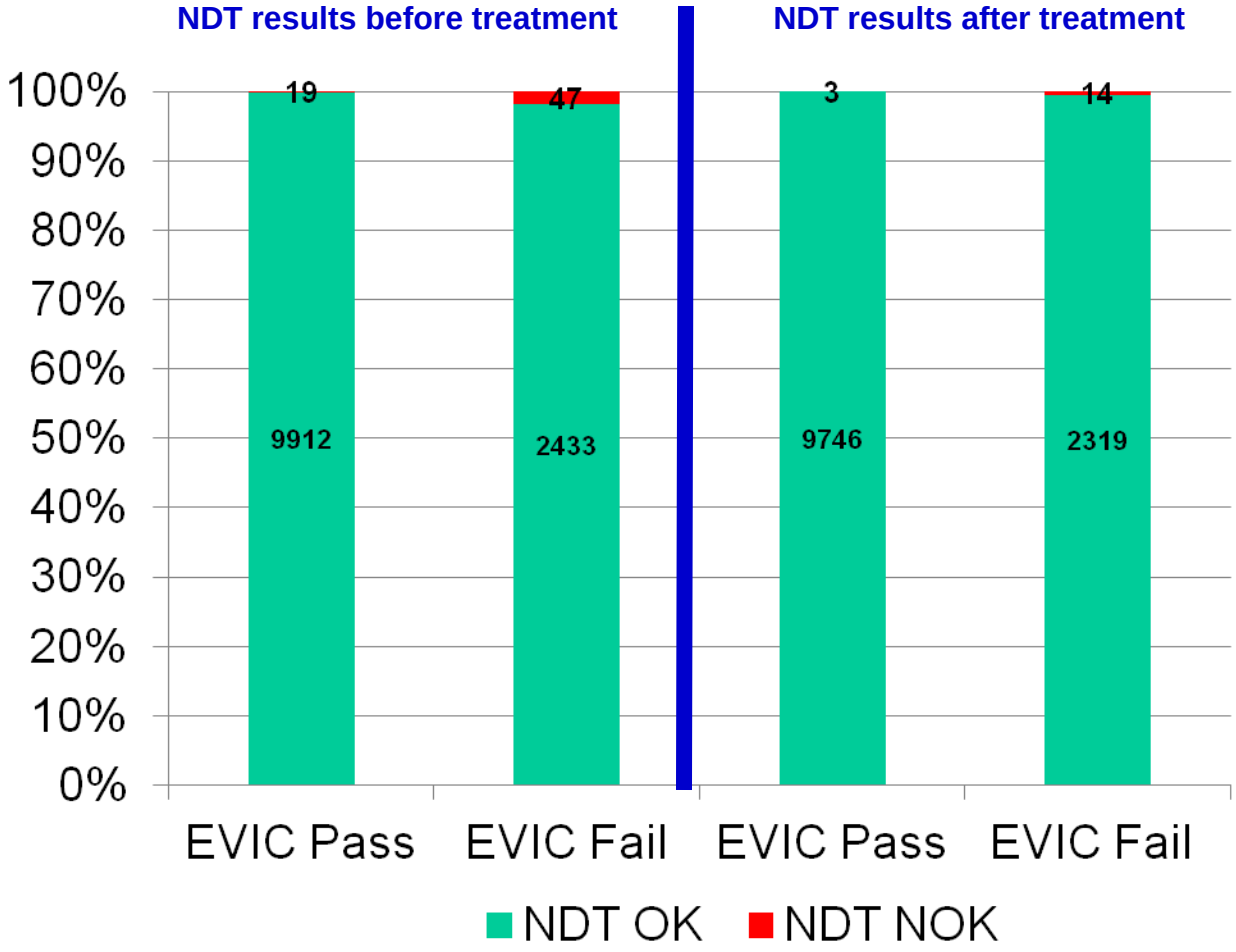

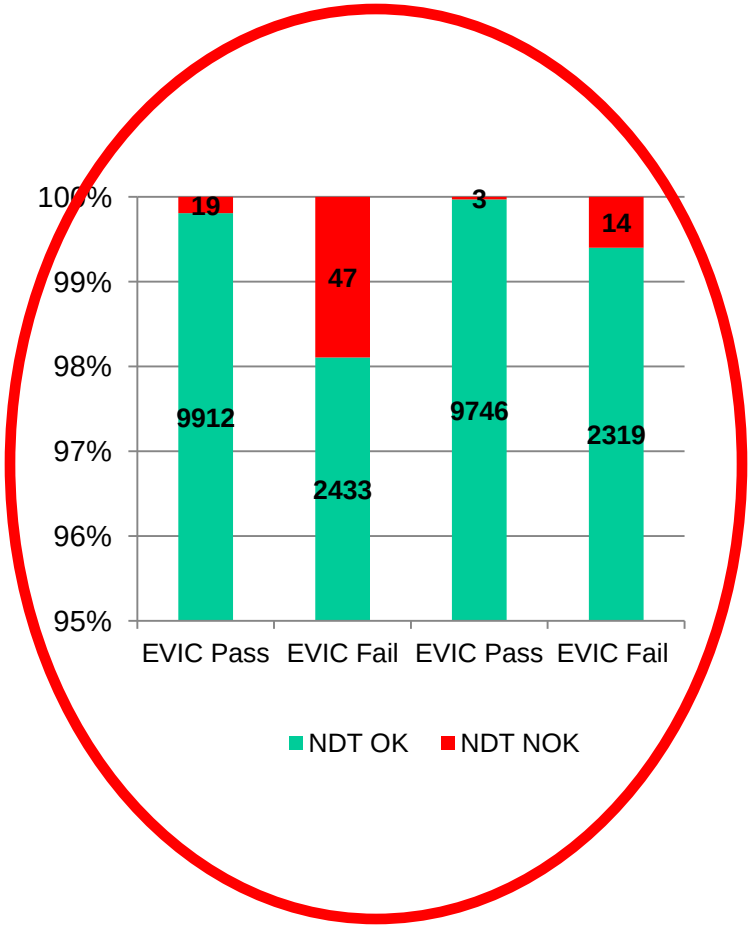

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3. Analysis NDT indication after treatment

EVIC categories	Defect in visual EVIC Zone	
	Yes	**No**
NOK	**432422** defect 36 (deeply pitted corrosion scars on shaft) depth 1,4 mm **8827** ? **650053** length 5 mm axial on shaft **656405** length 20 mm axial on shaft **920279** length 13 mm axial on shaft **921446** length 5 mm axial on shaft **910522** length 20 mm axial on shaft **106058** surface category 4 + transverse indication depth 2mm. **0013** length 55 mm longitudinal on shaft. **148504** lenght 100 mm longitudinal on shaft	**86676** defect 31 (sharp edged circumferential fluting) on abutment both side **82000021005** ? **525592** lenght 4mm quer
C	**543364** surface category 3 on shaft **784888** lenght 20 mm transverse on shaft **168478** ?	**035004** lenght 65 mm longitudinal on shaft
OK		

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4. Conclusions

Statistical treatment of axles sampled

	NDT Not Ok After treatment	NDT Ok After treatment	Ratio	95% Confidence range	99% Confidence range
EVIC Ok	0	5664	0 ‰	0 – 0.68 ‰	0 – 1.17 ‰
EVIC C	3	4258	0.7 ‰	0.24 – 2.07 ‰	0.18 – 2.78 ‰
EVIC Ok **or** C	3	9922	0.3 ‰	0.1 – 0.89 ‰	0.08 – 1.2 ‰
EVIC Not Ok	14	2480	5.6 ‰	3.36 – 9.45 ‰	2.87 – 11.05‰
Total	17	12402	1.37 ‰	0.86 – 2.19 ‰	0.74 - 2.53 ‰

Estimators:

- Relative number of *NDT not ok* – axles in *EVIC not ok* – sample higher than in *EVIC ok* sample by a factor of 19

Confidence-intervals:

- 99 % – Confidence-intervals for ratios of *NDT not ok* to *EVIC ok/EVIC C* and *EVIC not ok* **do not overlap**

➔ Positive effect of EVIC is *significant to a level of 99 %*

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4. Conclusions

NDT results vs. risk categories – November 2011

	Corrosive traffic	Dangerous goods	Drop loading	High loading	Normal operation	
NDT not Ok	0	27	19	4	16	Before treatment
NDT Ok	1026	4892	2987	1421	2022	
NDT not Ok	0	8	2	2	5	After treatment (axle scrapped)
NDT Ok	1026	4656	2981	1373	2029	

Conclusions:

- NDT not Ok lower than 1%, no significant differences between risk domains
- No need for special attention to a particular risk domain

4. Conclusions

- All the C and OK EVIC axle comes from normal maintenance flow.
- All the EVIC OK axle NDT before treatment NOK are NDT OK after treatment.
- For C EVIC axle only (4/11) 36 % of NDT NOK are in the EVIC zone and 75% (3/4) are NDT OK after treatment. One cannot be repaired due to too small diameter (surface cat 4).
- For NOK EVIC axle 90% (27/30) of NDT NOK are in the EVIC zone and
  - ✓ **59% (16/27) of them are NDT OK after treatment;**
  - ✓ **41% (11/27) are NDT NOK after treatment ;**
- The normal maintenance rules allow to scrap 550 wheelset.

Sampling can be stopped!