

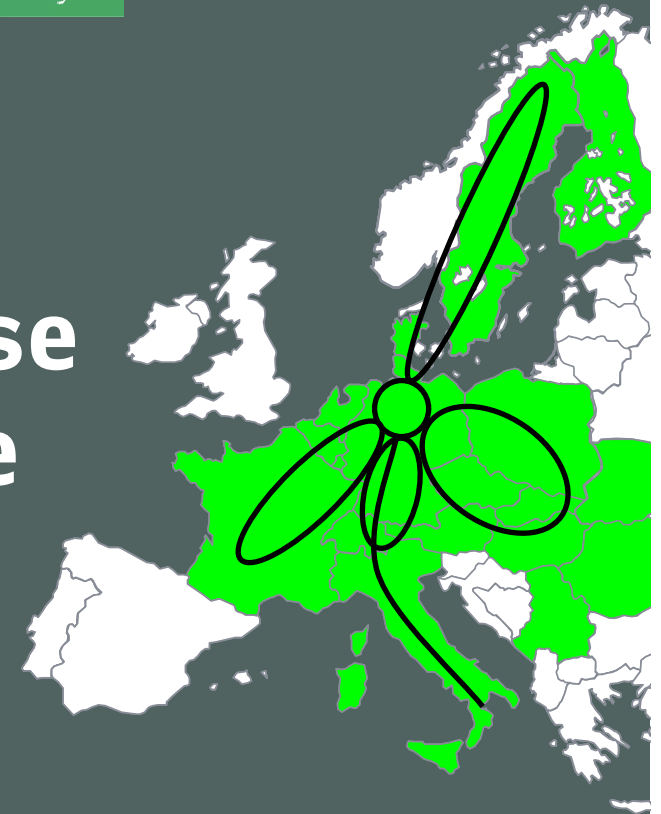


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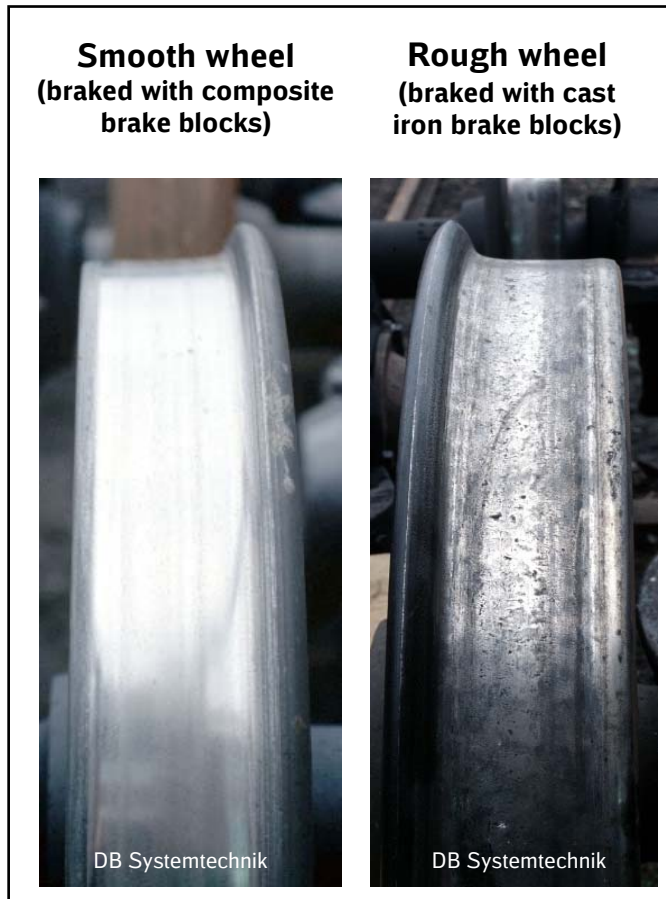
EUROPETRAIN and the Homologation of a Low Noise Brake System with LL Brake Blocks



UIC Presentation, May, 28th 2013

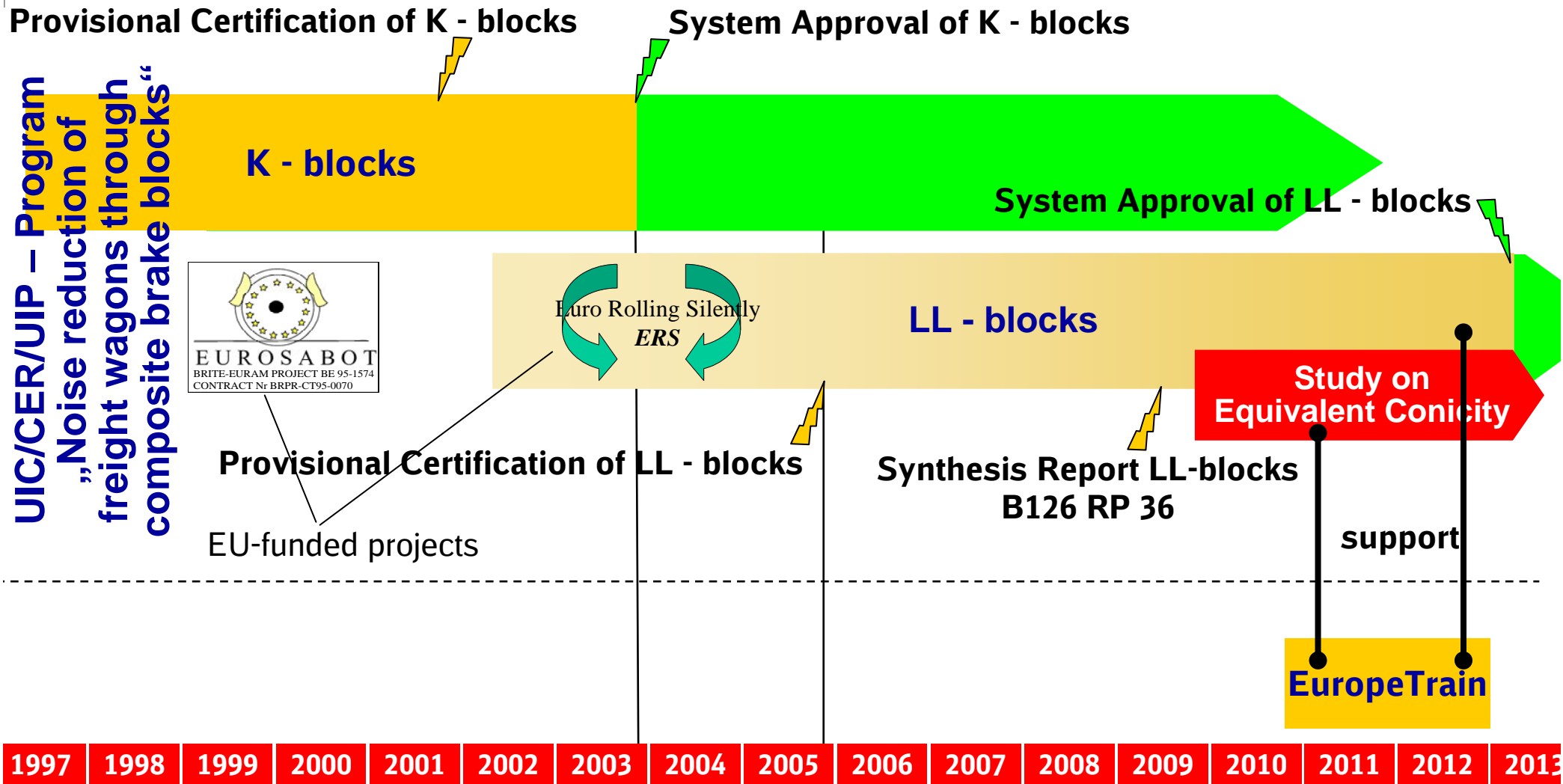
Johannes Gräber, DB Systemtechnik, UIC Project Manager EuropeTrain

The basic principle for a noise reduction at the source (wheel/rail-contact) is very simple: “Smooth wheels on smooth rails”



- **Basic principle: „Smooth wheels on smooth rails “**
- **With the use of composite brake blocks in combination with smooth rails the pass-by (rolling) noise is reduced by approximately 10 dB (A), which means a halving of the felt noise**
- **Two technical solutions are available with type K or LL**
- **With K blocks a proven and fully homologated technology is available for new wagons – but not economically feasible for retrofitting due to high effort and cost**
- **The final homologation of LL brake blocks for a quick and affordable retrofitting of the existing fleet is done**

UIC member's money spent so far on the development of composite brake blocks now led to the final goal – the Homologation of LL blocks

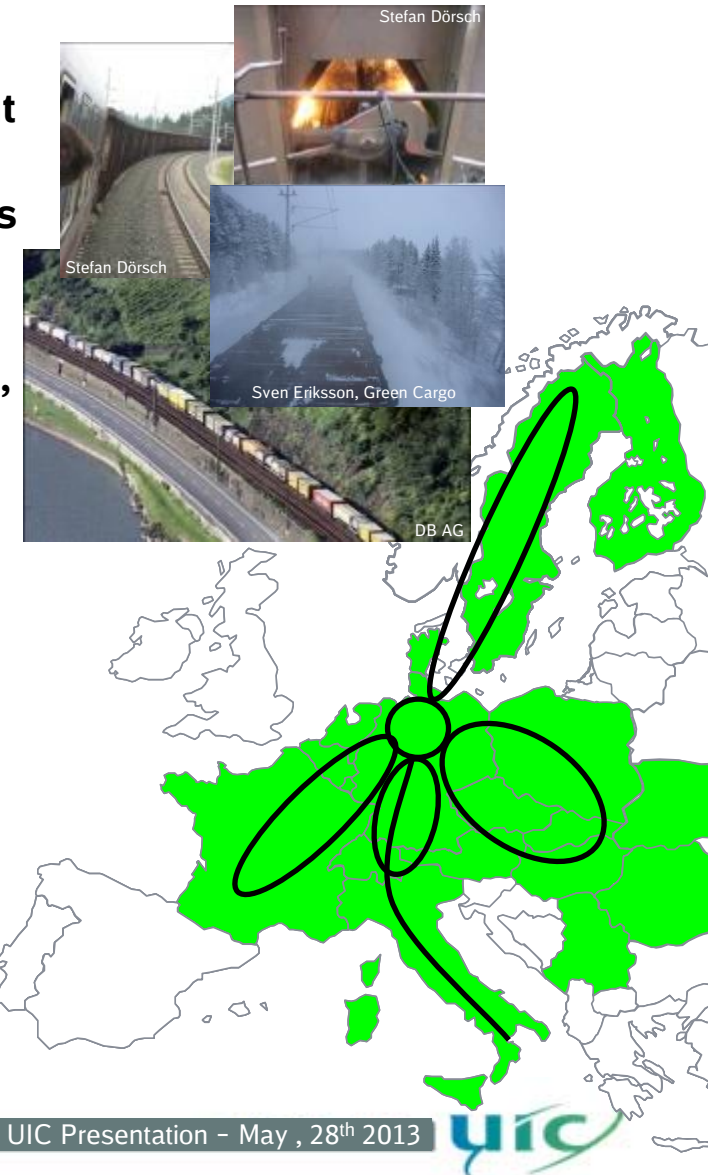


The path of the EuropeTrain was defined in different Loops, each representing certain operational, topographic and/or meteorological conditions



- A Train with about 30 representative wagons which runs throughout Europe only for the in-service testing of LL brake blocks
- Duration of testing at least one year including all climatic conditions
- Mileage to be achieved at least 200.000 km
- All operational conditions relevant for Europe have to be covered, e.g. running on different gradients with different operational modes, arctic winter areas, high temperature zones

Loop 1	Winter flat loop (Scandinavian loop)	2 runs planned
Loop 2a	Summer flat loop (French loop)	4 runs planned
Loop 2b	Summer flat loop (German Rhine valley loop)	2-3 runs planned
Loop 3	Transalpine loop (winter and summer conditions)	3-4 runs planned
Loop 4	Eastern loop	2-3 runs planned
Loop 5	Summer mix loop (Italian loop)	2 runs planned
In total	Approx. 200.000 km	16 runs planned



The operation of EuropeTrain was finished successfully with an overall mileage of more than 200.000 km. The results are very promising.



1	06.12.10 – 06.01.11	Scandinavian loop - Sweden	✓
2	27.01. - 11.02.11	Summer flat loop - Germany	✓
3	26.02. - 17.03.11	Summer flat loop - France	✓
4	07.04. – 29.04.11	Eastern loop – Poland	✓
5	14.05. – 01.06.11	Transalpine loop – Switzerland	✓
6	17.06. – 17.07.11	Summer mix loop – Italy	✓
7	30.07. - 23.08.11	Summer flat loop – France	✓
8	06.09. – 26.09.11	Transalpine loop – Austria	✓
9	15.10. – 06.11.11	Eastern loop – Poland/Slovakia	✓
10	26.11. – 16.12.11	Winter flat loop - France loop	✓
11	20.01.12 - 07.02.12	Winter mix loop – Germany/ Switzerland	✓
12	02.03.12 - 17.03.12	Scandinavian Loop – Sweden	✓
13	14.04.12 - 05.05.12	Summer flat Loop – Germany	✓
14	28.05.12 - 14.06.12	Summer flat Loop – France and Luxembourg	✓
15	06.07.12 - 05.08.12	Summer Loop – Italy	✓
16	01.09.12 - 20.09.12	Summer mix Loop – Austria/Hungary	✓
	In total	Approx. 200.000 km	

Final report – completed by end 2012



27 Railways and 8 Industry Partners supported the Project



Austria



Belgium



Bulgaria



Czech Republic



Denmark



Finland



France



Germany



Hungary



Italy



Luxembourg



The Netherlands



Norway



Poland



Portugal



Romania



Serbia



Slovakia



Slovenia



Sweden



Switzerland



4 Manufacturers of Brake systems and Brake blocks supported the project with considerable financial contributions

Faiveley Transport

Knorr Bremse

ICER Brakes

Wabtec (Becorit / CoFren)



Conclusions and Perspective of EuropeTrain

The conclusions summarized in the Synthesis Report LL – B 126 RB 36, were also confirmed by the results of EuropeTrain:

- The requirements regarding braking are fulfilled.
- The thermal burden on the wheels is uncritical by following the rules defined in the „Usage guidelines for composite (LL) brake blocks”.

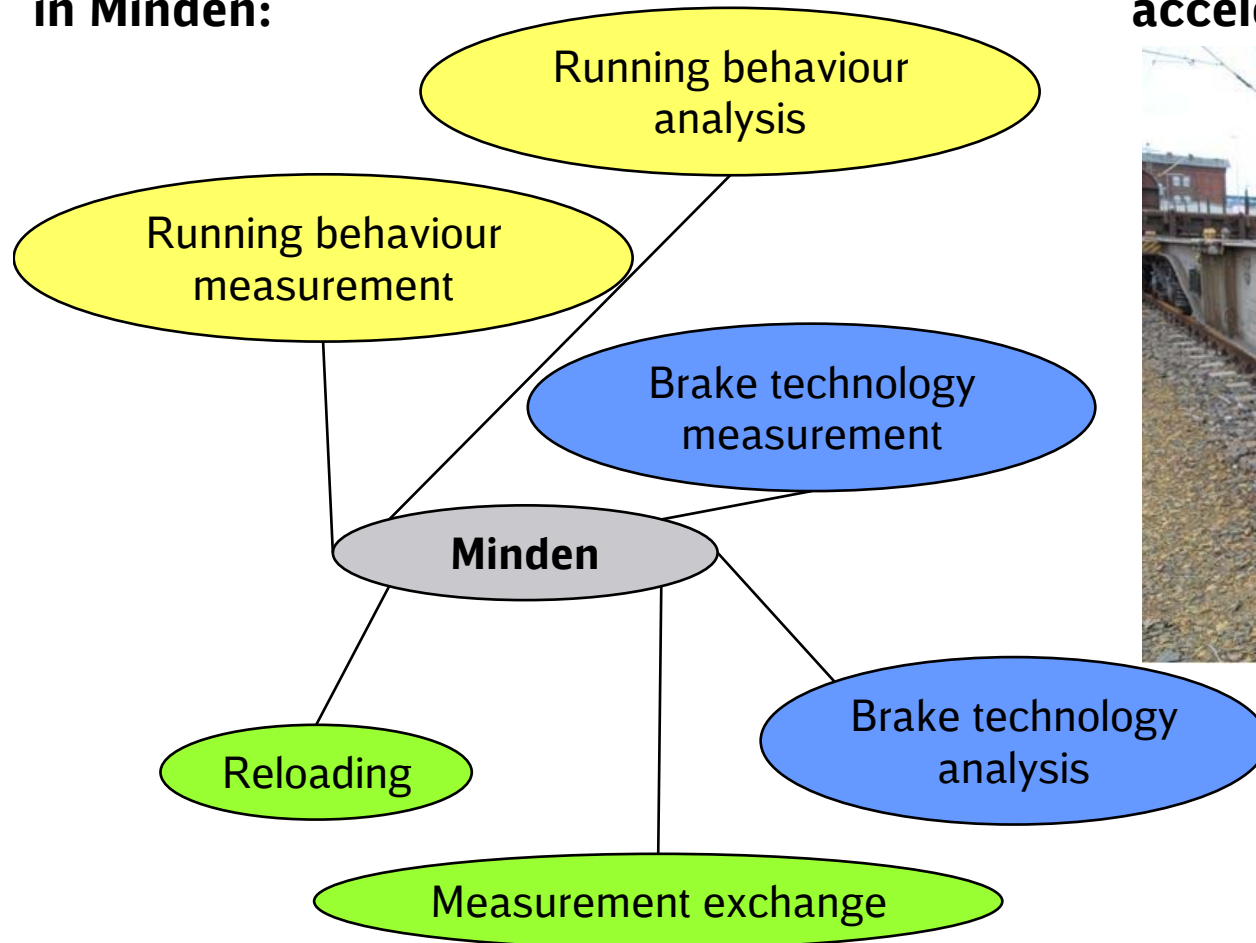
Perspective for the final Homologation based on the results of EuropeTrain:

- **LL-block products are available to be homologated**
- The Homologation can be finalized taking into account operational constraints
- **The operational constraints are related to regularly inspections of the wheel profiles and possibly reprofilations. The new, less extensive intervals and limit values were derived from the very positive results of EuropeTrain.**

And now a quick look into the workshop

Continuous and Stationary measurements in EuropeTrain

Stationary measurements and activities in Minden:



Continuous measurements of accelerations on the train:



The mean values of wheel wear and block durability show the same tendency as in other in-service tests

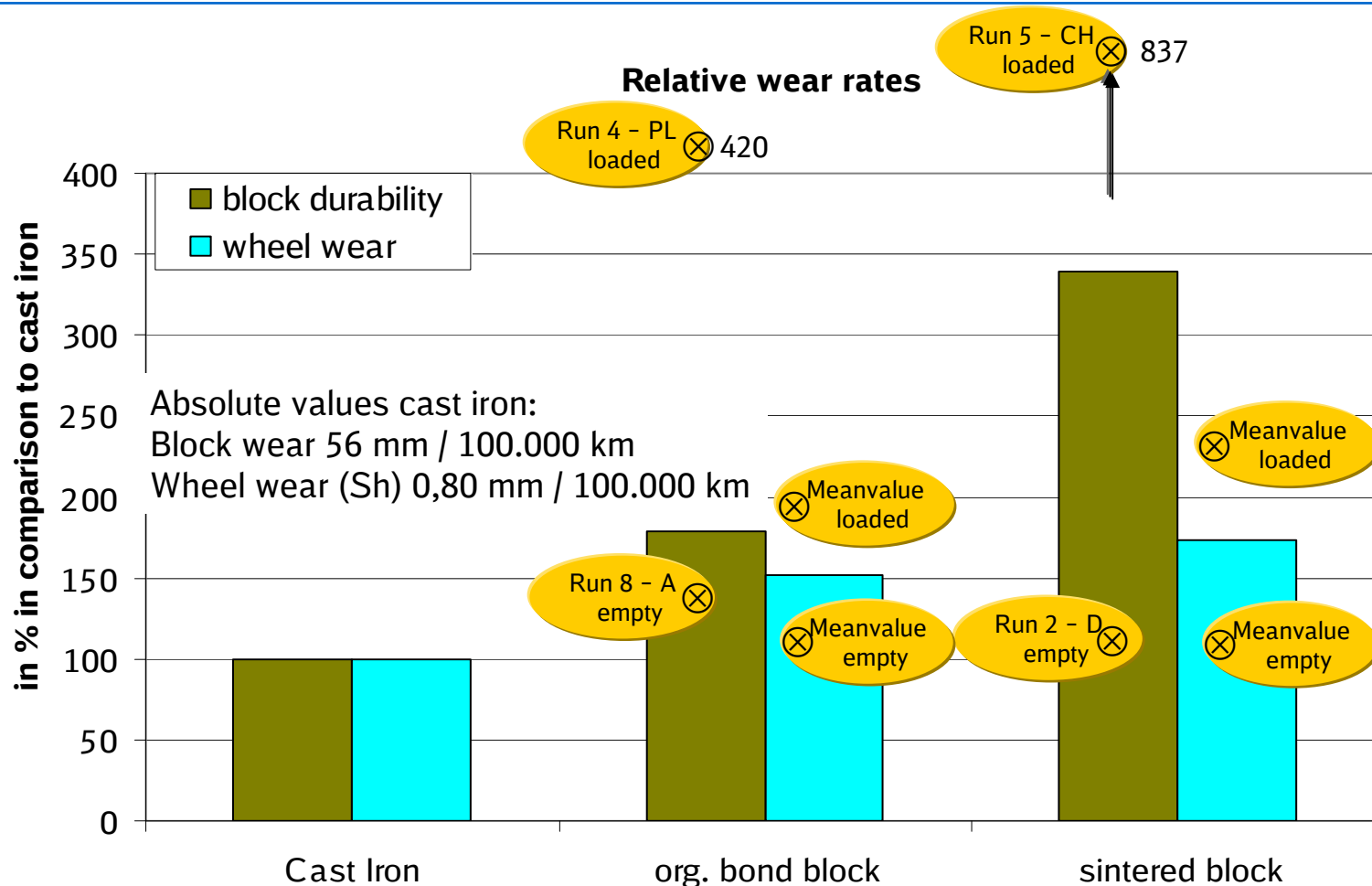
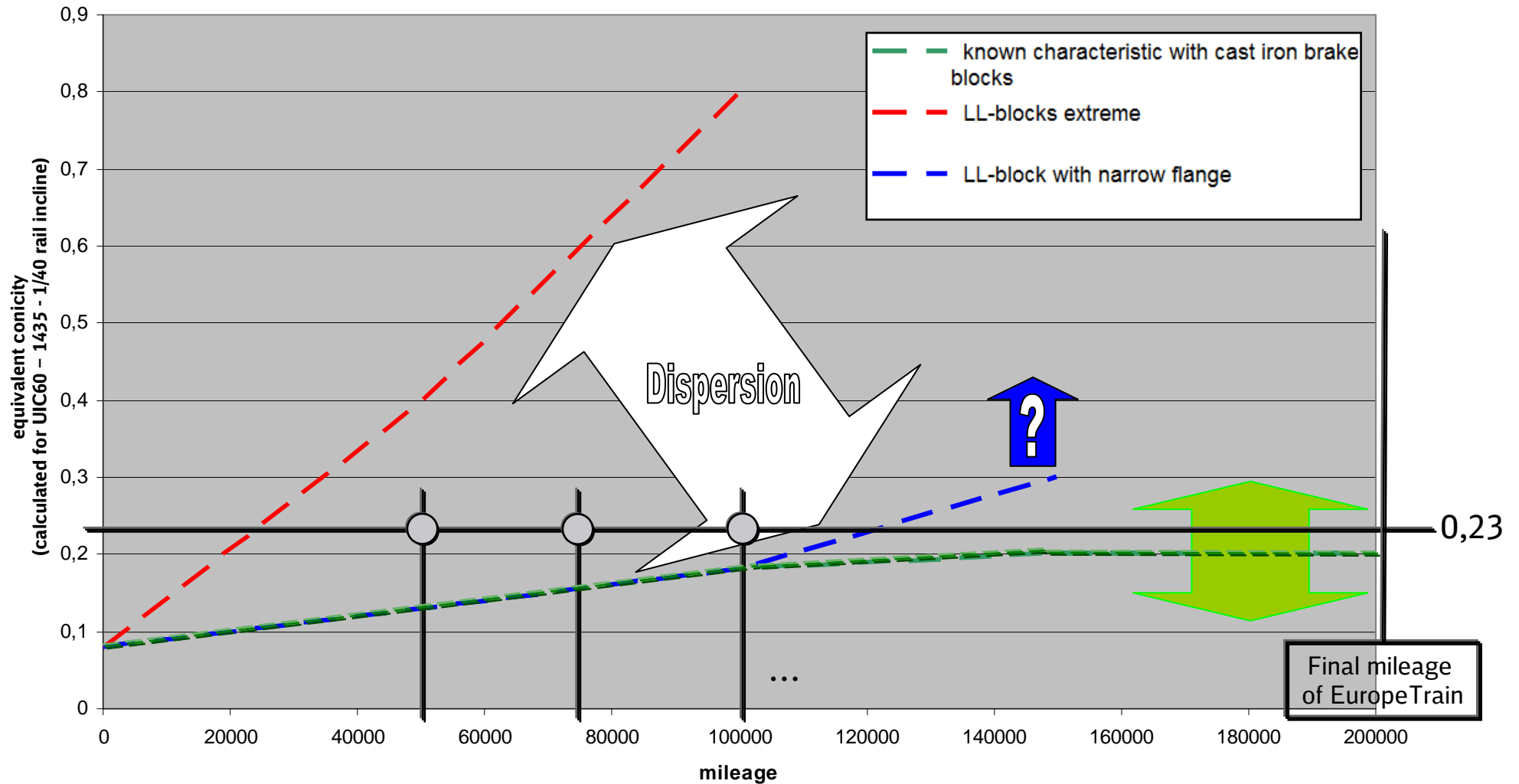


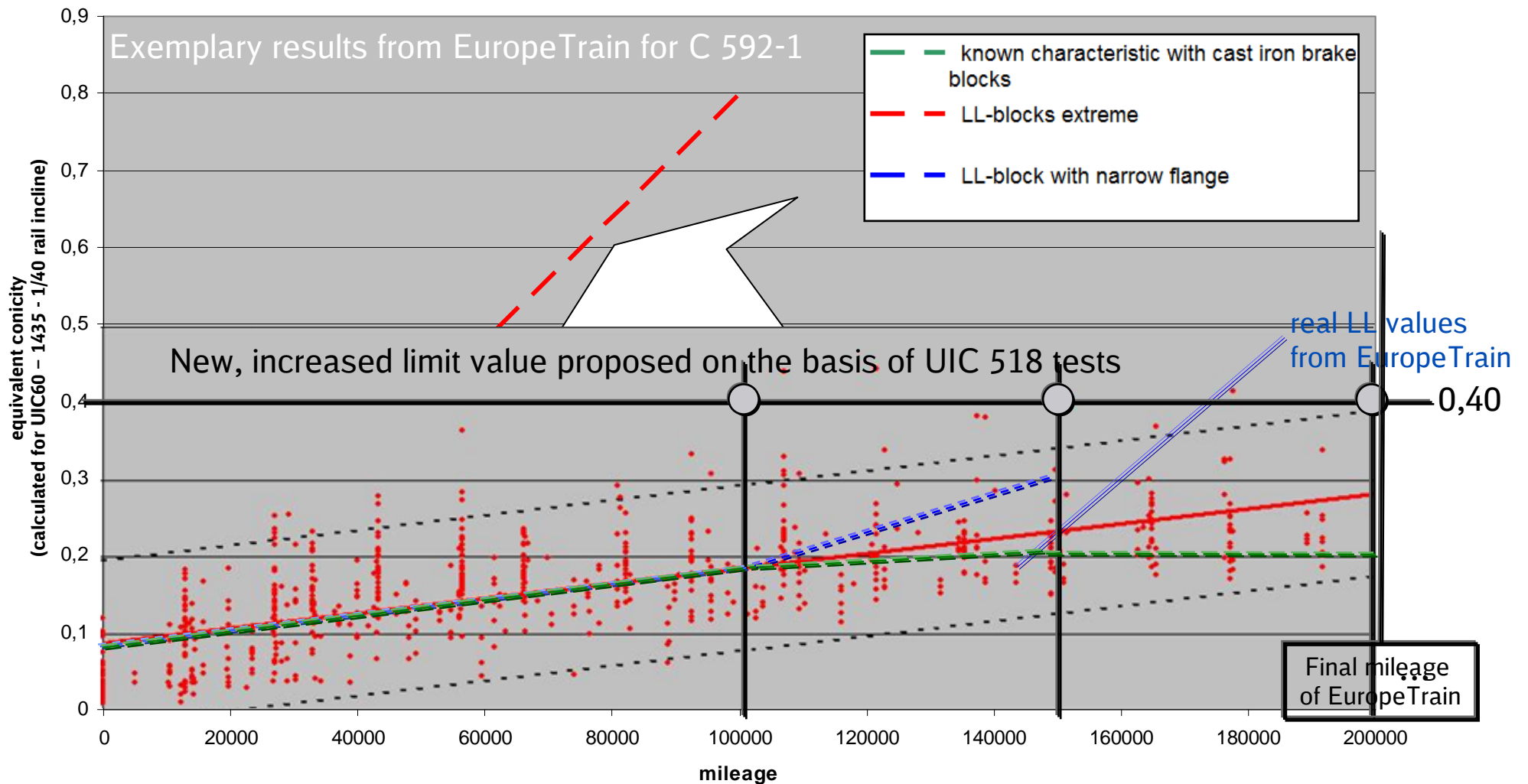
Diagram: all wagons (unloaded and loaded), all runs

Please note: Block and wheel wear is varying much between the different loops and conditions (see examples). Therefore the EuropeTrain project also provides a huge amount of raw data for further LCC analyses.

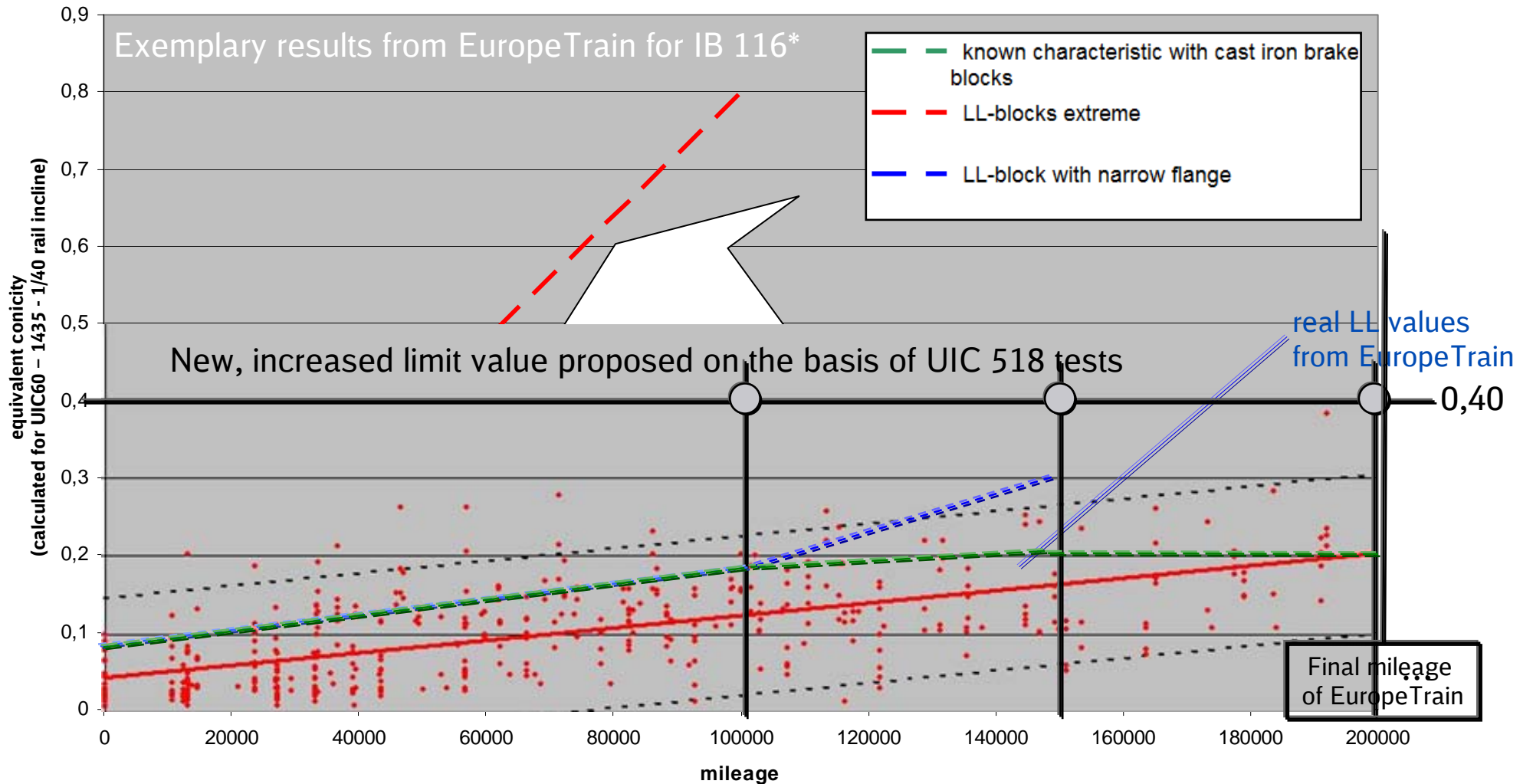
Overall Results regarding the evolution of Equivalent conicity - Situation at the beginning of EuropeTrain - schematic -



LL brake blocks in EuropeTrain show an increase of equivalent conicity near the lower limit of the schematic diagram

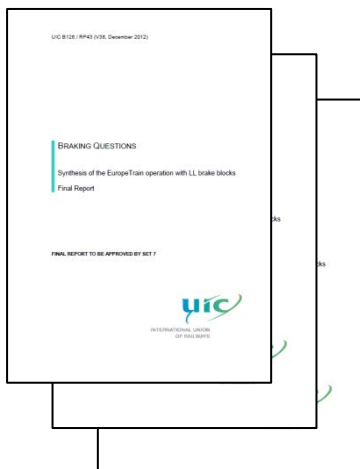


LL brake blocks in EuropeTrain show an increase of equivalent conicity near the lower limit of the schematic diagram

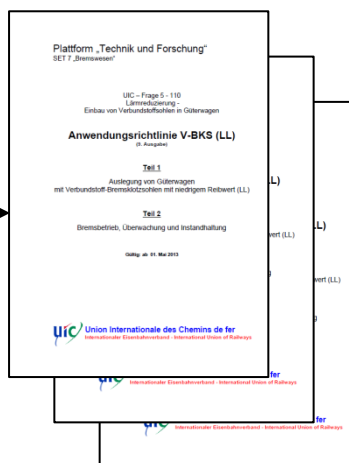


Decisions of UIC regarding the final Homologation of LL brake blocks are published in two documents

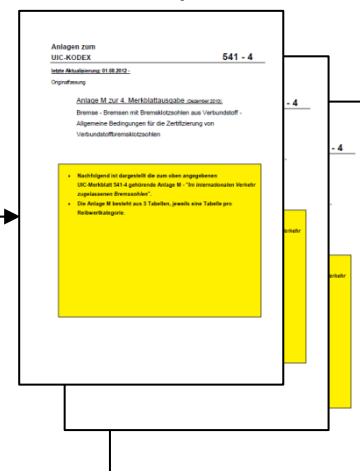
Final Report EuropeTrain
UIC B 126 / RP 43



Usage guideline LL
9th edition



UIC-Leaflet 541-4
Appendix M
(list of products)



Conclusions / Recommendations:

- C 952-1 and IB 116* are available to be homologated
- Regulations regarding the monitoring of the wheel profiles can be adapted
→ see proposal for revision of the usage guideline

1.3 Approved composite (LL) brake blocks - types and use

See Appendix M3 to UIC leaflet 541-4, 4th edition “fully certified products”.

Appendix M3 – LL brake blocks

Fully certified products as per UIC Leaflet 541-4

Manufacturer	Type designation and abbreviated designation (if different)	Nominal wheel diameter [mm]	Min. / max. axle load [t]	Braking regime / speed [km/h]	Min. / max. force per block [kN]	Configuration	Certified as per leaflet addition no.	Remarks	Certification expires
ColPren	C952-1 (splithead)	920	3,6 22,5	s	6 80	2 x Bg	4	#1	01.05.2013 30.04.2023
ColPren	C952-1 (splithead)	920	3,6 22,5	s and sk (up to 20 t)	6 80	2 x Bg	4		01.05.2013 30.04.2023
UIC Rail / Becort	IB 116* (organic)	920	3,6 22,5	s	6 80	2 x Bg	4		01.05.2013 30.04.2023
UIC Rail / Becort	IB 116* (organic)	920	3,6 22,5	s and sk (up to 20 t)	6 80	2 x Bg and 2 x Bgv	4		01.05.2013 30.04.2023

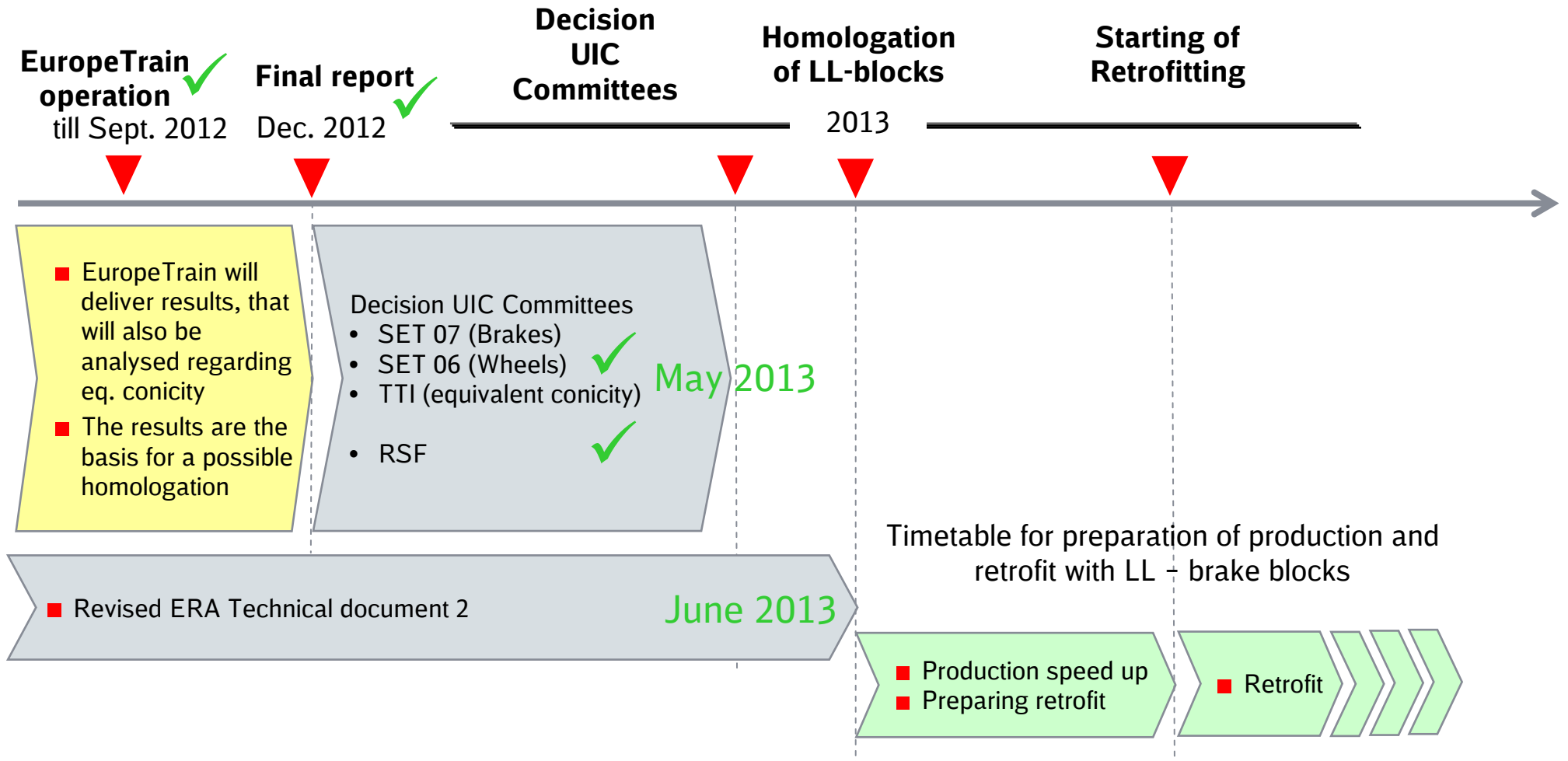
Note #1: UIC116 is demonstrated that this block is interchangeable with cast iron brake assessment runs against UIC Leaflet 541-4 and continue to be performed with this configuration prior to fitting vehicles with this block.

Published for UIC internal use

Published on public UIC website since May, 1st 2013

Published on public UIC website soon

Time table Homologation of LL brake blocks / Retrofitting with LL-blocks



Summarizing with some facts and figures

- The STAIRRS project demonstrated that **reducing noise at the source** by retrofitting freight rolling stock with low noise braking technology to ensure smooth wheel surfaces is the most cost effective option, and that this is far more cost-effective than constructing noise barriers, since it avoids high investments and maintenance cost for infrastructure managers
- With K blocks a proven and fully homologated technology is available for **new wagons** - but not economically feasible for retrofitting due to high effort and cost (approx. 2,000 - 10,000 € per wagon)
- Considering a fleet of 350,000 freight wagons in Europe **retrofitting with LL blocks** will significantly reduce the retrofitting cost from ca. 1,8 Billion € to ca. 450 Million €
- UIC spent so far **about 15 Million €** on the whole development process for K and LL brake blocks

For Questions and Suggestions I'm at your disposal



For further information:

>>> <http://EuropeTrain.uic.org> <<<

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