



CR1344

Simulations, brake curve improvement June 9th 2023

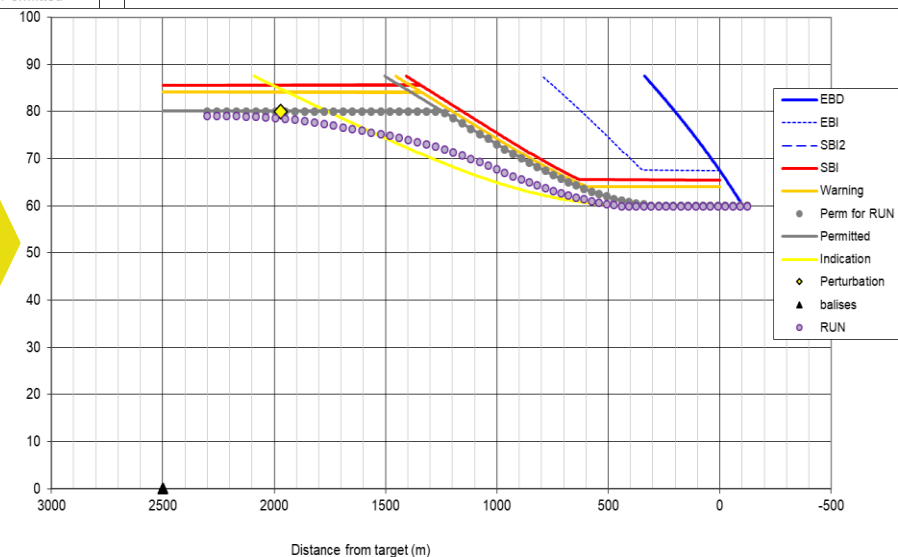
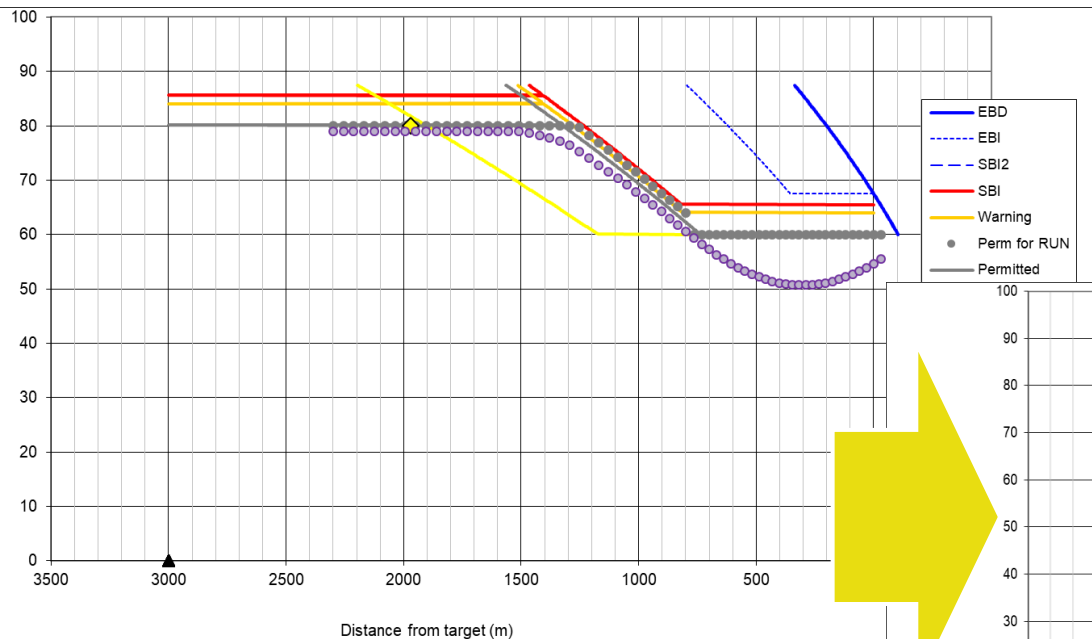
Maarten Bartholomeus / Jakub Marek

ProRail

Agenda

- CR1344 improvement?
- Impact on permitted
- Scenario's to be tested
- Video's on simulation
- Conclusion/ Debriefing

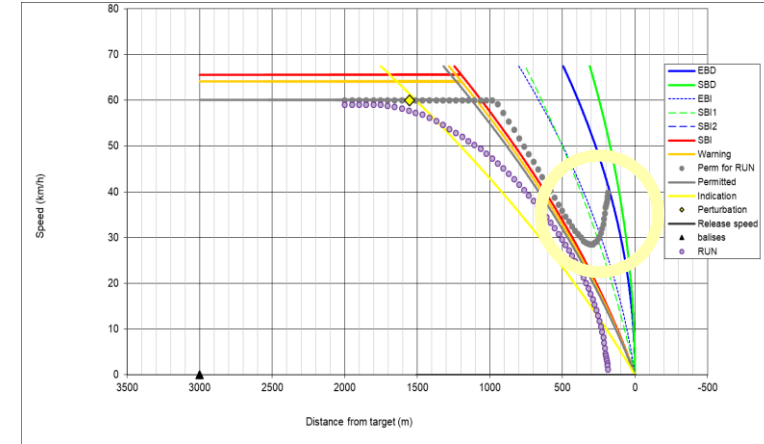
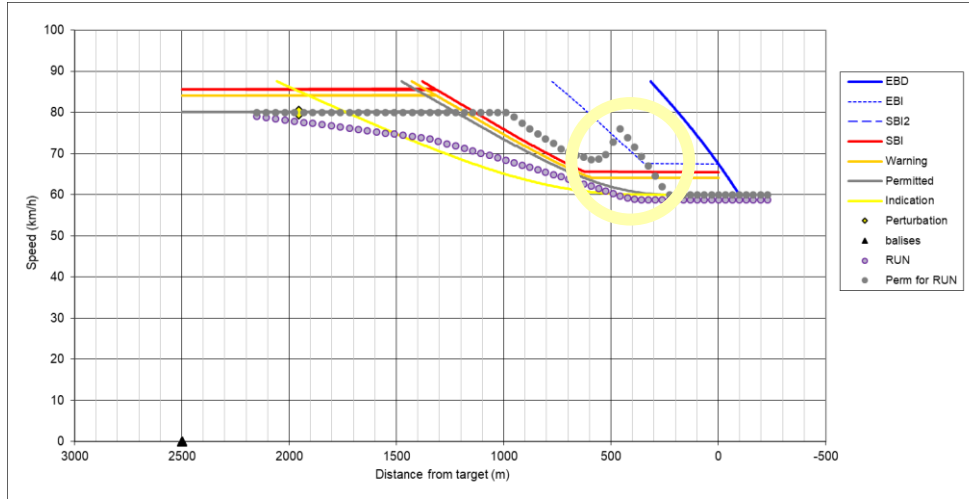
Question ergonomical braking improved?



ProRail

CR1344 issue found on preparation tests

- CR1344 & Displayed permitted speed
 - current solution proposal – detected „issue“ (?): - **already present in B3**



Propose solution: clip permitted
i.e don't increase permitted when approach to target

FunctionAlready exists for SB feedback

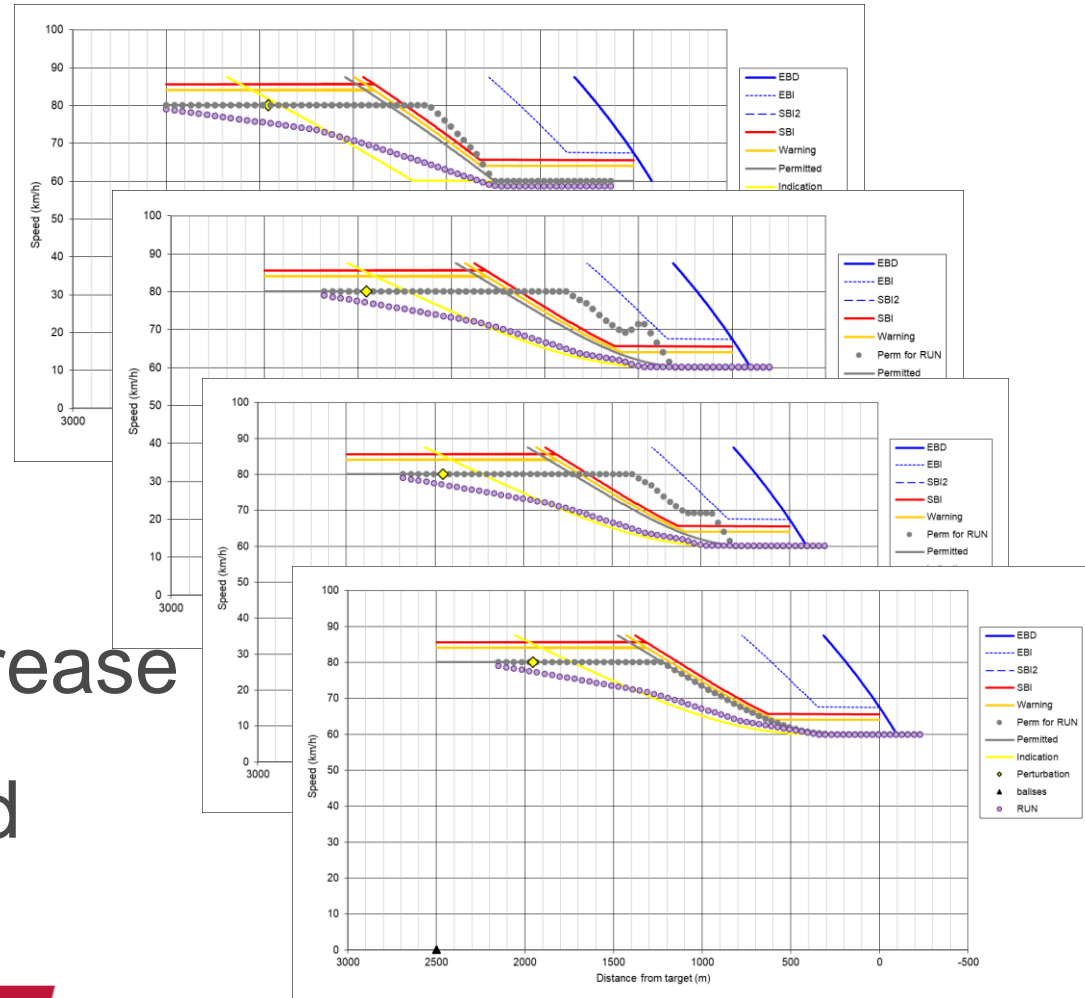
Alternatives to test

A. B3R2 brake curve

B. CR1344

C. CR1344 No P increase

D. CR1344 Permitted



Test trains, Targets, NV's

A. Trains:

1. Cargo, P braked, 87%, 600m
2. Cargo, G braked, 65%, 750m
3. Passenger, P braked, 160%, 400m

B. V_MRSP, V_TARGET

1. P87, 100 -> 80 kmh
2. G65, 80 -> 60 kmh
3. P160, 140 -> 100 kmh

C. Default National values



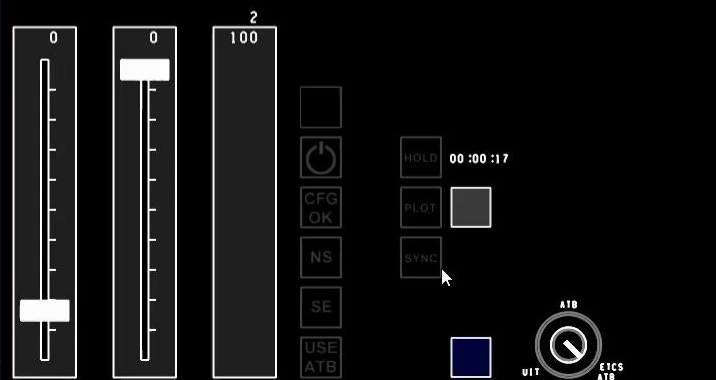
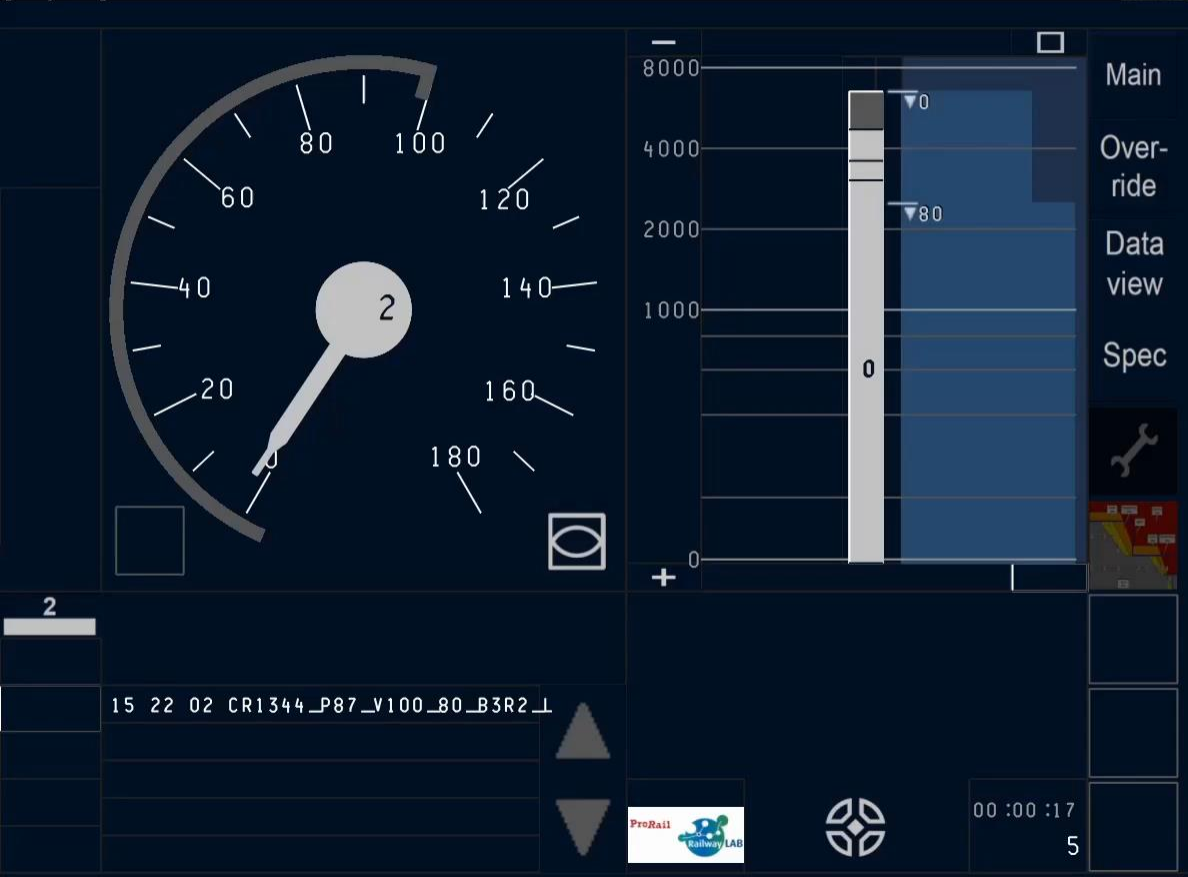
Test setup

- A. Drivers run on one train (P87 or G65 or P160)
- B. After with getting familiar with the train
 - Four scenarios (B3R2, CR1344, P limit, P location)
- A. Instruction follow brake curve, gain time
- B. After each runs driver inquiry, e.g.
 - i. Did you notice anything?
 - ii. What was your brake strategy?
 - iii. Which scenario did you prefer?
- C. Analyse log files
- D. Goal:
 - i. no adverse effects
 - ii. capacity increase



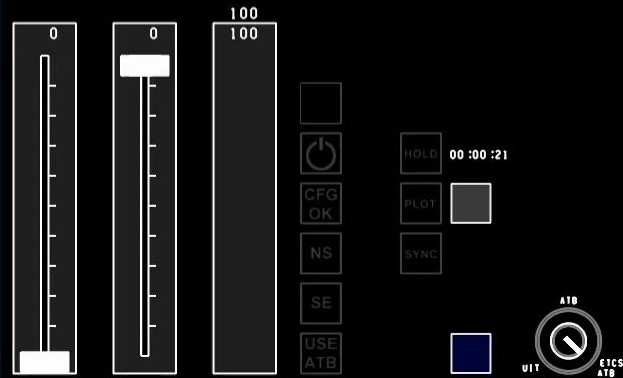
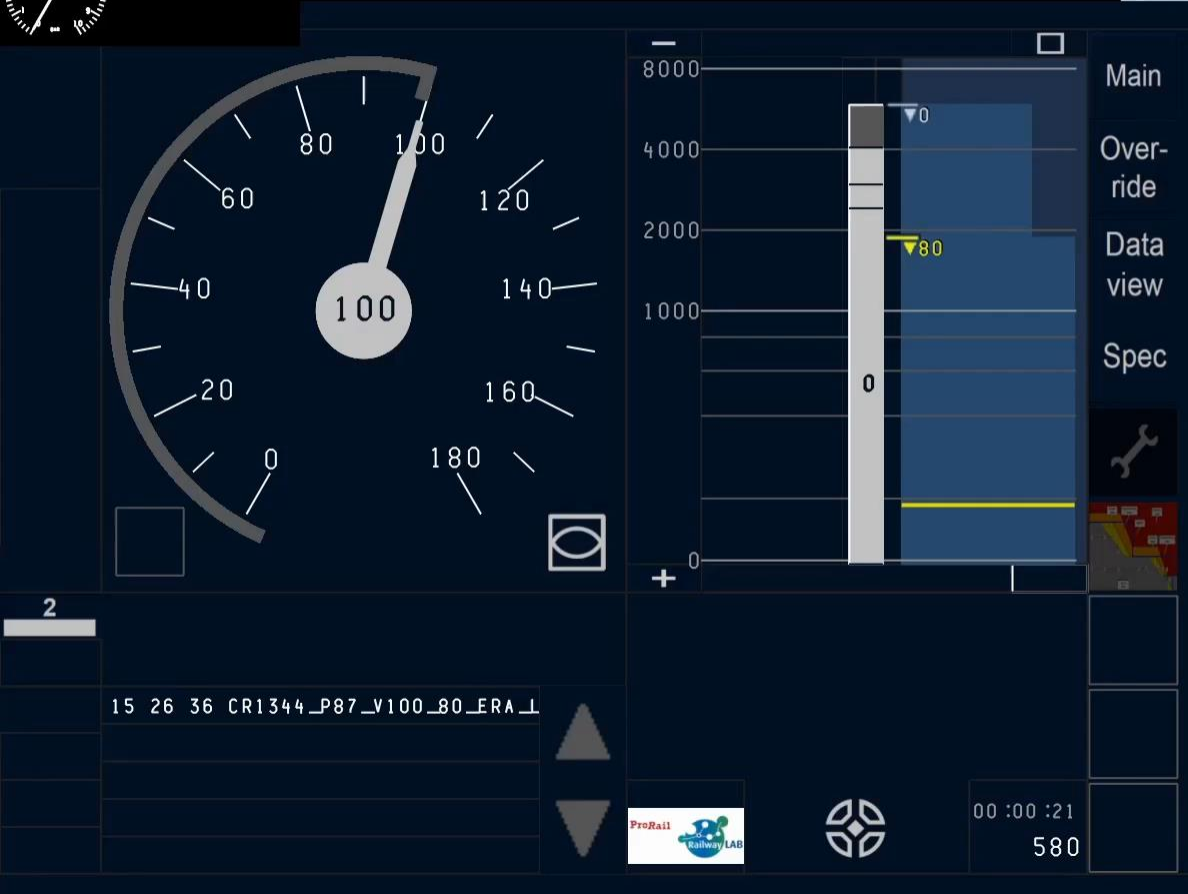


1) B3R2 (current spec.)

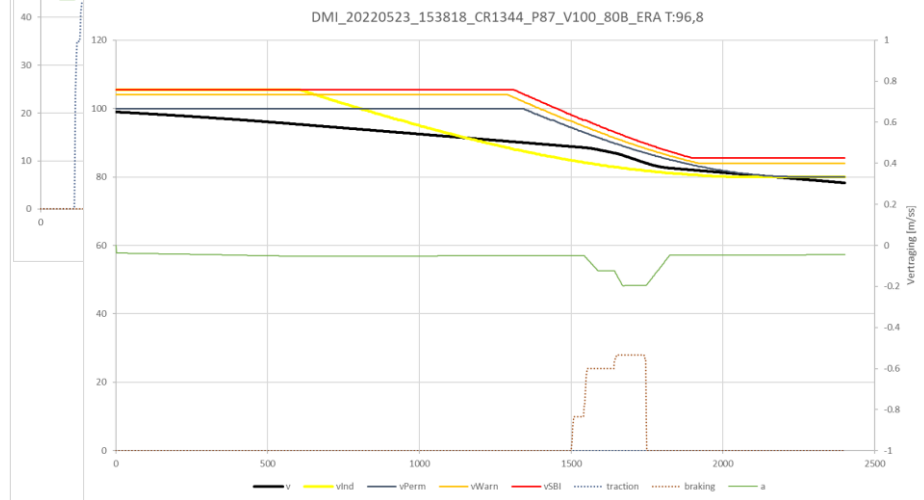
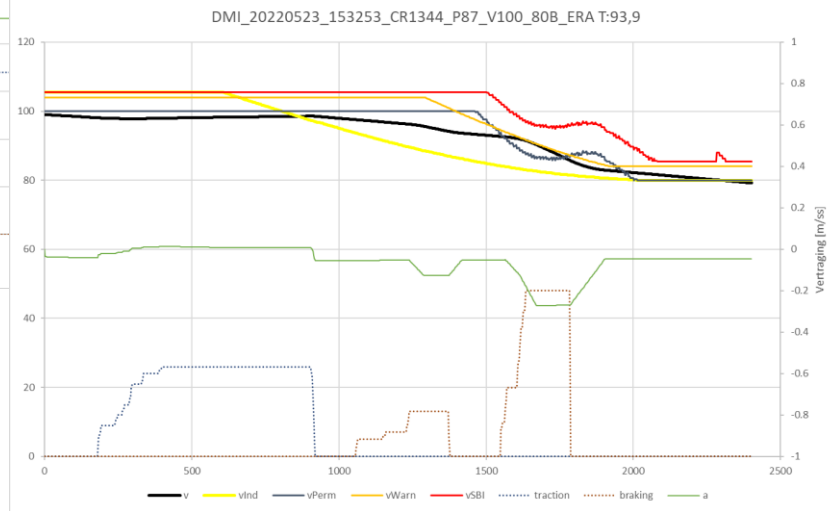
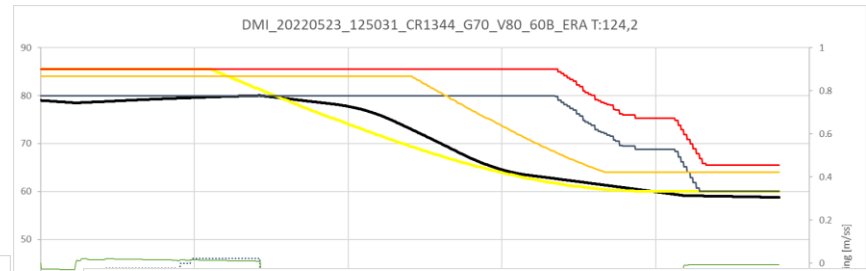
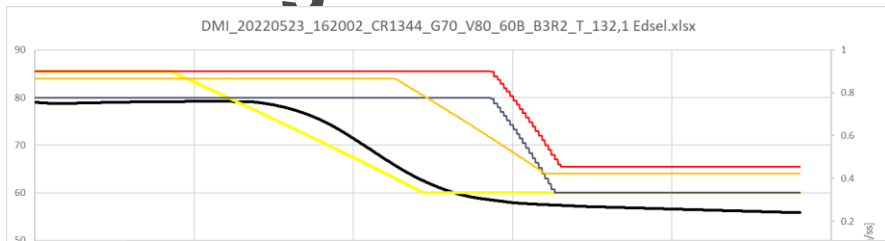




4) CR1344 permitted imp.



Log of scenario's



Debriefing

Question : Is CR1344 an improvement and are there adverse effects?

Drivers response on the CR1344 change:

The changed brake 'curve' improves ERTMS :

- The shown distance bar and location to brake to is closer to the actual target. This is more consistent.
- The last part of the braking is more 'natural' and inline with the train brake behavior.

However:

- Unexpected fluctuation of permitted is very disturbing. I.e. alternative B is not an improvement.
- The alternative C and D were valued as an improvement for the drivers.

Measured brake time reduction:

- Cargo trains 2 to 5 seconds
- Passengers 1 second



Quote:

Why does the hook go up? Should I accelerate? No, that would not work, so very strange.

Quote:

Please install this in my train.

Thanks



UNISIG specialist:

- **Jakub Marak** (AZD)

NS rem specialist:

- **Johan vd Velden** (Ricardo, NS)

Machinisten:

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- **Mark van Dooren** (NS),
- **Sjoerd van Dijk** (NS),
- **IJsbrant Smitt** (NS)

Article: ProRail and drivers are testing improved brakecurves