

# MAGAZINE

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**Haldex**



**Timber transport in Sweden**  
60 tonnes through the forest



**TrCM+**  
Fleets jump at the chance



**Trailers and Hydraulics**  
A single source



**Fleet+ 3**  
A thorough upgrade



**Diciotto Project**  
Overlength trailers in Italy

**WORLD PREMIERE FOR ROLLOVER SIMULATOR**

**TRAILER TEST IN  
CYBERSPACE**



# CYBER-COURSE

The new rollover simulator for trailers, recently launched by Haldex, leads the way far into the future. It eliminates expensive road tests and greatly accelerates development and homologation.

**T**HERE IS MUSIC IN IT: one hears fizzing, stamping and whistling when the rollover stability function goes into action. Yet these sounds are secondary to the highly modern electronics. This is because the trailer exists only virtually in this scene.

However, the hardware – from brake chambers to valves and pneumatic lines – is real, as prescribed by the UN-ECE (United Nations Economic Commission for Europe) for hardware-in-the-loop simulation testing.

Nonetheless, quite a few eyes look on, spell-bound, as this virtual trailer goes into a curve at 65 km/h and completes the manoeuvre, just barely: a beamer projects the exercise onto the wall.

The spectators in the Haldex facility in Redditch (UK) are, at this moment, experiencing nothing less than the world premiere of the first type-approved rollover simulator for trailers. Guests include testing and approval experts from across Europe.

'And now the whole thing at 66 km/h', chief engineer (trailer) Dudley Harrison announces: the vehicle moves leisurely. On the tachometer and rotational speed counter display it is possible to follow how the road-train approaches the maximum desired speed gear by gear.

At the same time, several red bars show the current laden weight of each wheel at the height of the trailer wheels. As the vehicle again curves right, this time at 66 km/h,

the bars on the left race upwards while those on the right just melt away: 4.4 meters per second squared is shown on another display as the lateral acceleration, which is ultimately too much – the wheels on the right lose contact with the ground and lift off. When an imaginary support wheel to the left makes a so-called touch-down (ground contact), the programme aborts.



CHIEF ENGINEER DUDLEY HARRISON: 'ACCELERATED PROCESSES'.

of November 2011, national homologation will no longer be permitted.

Trailer manufacturers will, therefore, soon have to document the functional capability of rollover control for new trailers pursuant to directive UN/ECE 13. More than 30 different trailer configurations are affected. They must be subjected to tests such as

single and double lane changes, constant circular driving and driving through a tightening curve.

Virtual testing, for secure homologation pursuant to EU directives as recently allowed by the EU, and the rollover simulator from Haldex now make it possible to save time and money. To benefit, however, trailers must be equipped with EB+ from Haldex.

This is because, precisely at this moment, the simulator showed what regulations require of such tests – that they be conducted to physical limits. Legal requirements are not particularly stringent: 'The minimum standard is at least as good as without rollover control or slightly better', brake expert Winfried Gaupp from the German TÜV Nord paraphrases the specifications according to the law.

Harrison further explains just how effectively Haldex EB+ stability control actually works: 'Without rollover control, the trailer would already have tipped at 57 km/h and not just at 66 km/h'.

Rollover stability has been integrated into EB+ from Haldex since 2003. However, only in 2010 will this safety system be required by the EU throughout Europe. As of July 2010, it will no longer be possible to homologate a trailer without rollover control in Europe. As



BRAKE EXPERT WINFRIED GAUPP GAVE THE SIMULATOR HIS SEAL OF APPROVAL.



TAKE IT TO THE LIMIT: EVERYTHING SEEMS FINE UNTIL THE VIRTUAL TRAILER TIPS.

### CLEVER FELLOW

The EB+ braking system and the rollover simulator from Haldex can accommodate a number of configurations. It is also possible to specify additional parameters such as vehicle dynamics, tyres and road surface to carry out the defined test manoeuvre virtually using such variables and complex software.

The simulator was developed in cooperation with the IPG automotive company Karlsruhe, which specialises in simulated driving dynamics. IPG calls the simulation solution 'TruckMaker'. It is based on existing modules of 'CarMaker', which is used, for example, by Porsche, and is supplemented by several trailer-specific elements.



NEARLY ANY DRIVING SITUATION AND VEHICLE COMBINATION CAN BE SIMULATED.

Haldex thoroughly tested the prescribed test programme in 2009 with 33 different trailer configurations through road tests at the IDIADA test grounds (near Barcelona) in Spain. Haldex then developed the type-approved rollover simulator on the basis of that data.

In a comprehensive expert opinion, German TÜV North confirmed that the simulator satisfies the requirements of the UN/ECE regulation for simulation testing and can serve as a full-fledged virtual replacement for expensive road tests.

The new simulator is a blessing not only for trailer manufacturers who can accelerate homologation but also for Haldex, which profits from the new technology: 'What previously took three to four months to test', says chief engineer Dudley Harrison, can be carried out by the simulator in one or two days.