

SLR-39-24



NIKLAS BLOMQVIST - EPCV

TRUCKS AND HEADLAMP LEVELLING

SCANIA



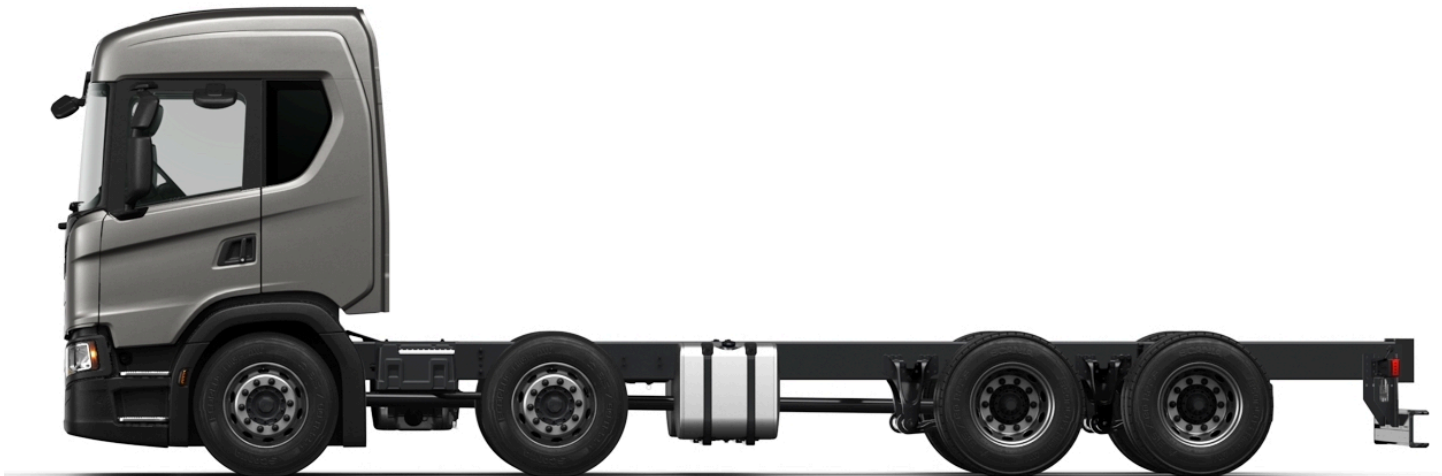
Construction and off-road vehicles - harsh environment



- Some vehicles are operating in a very harsh environment
- Adding sensors for an automatic levelling systems is a reliability risk
- Finding usable positions for the sensors with the different vehicle configurations is not always possible



Changes during life of vehicle



- Trucks are delivered as empty chassis and then rebuilt by body builders.
- To have an accurate automatic levelling system several properties must be modelled:
 - Frame bending
 - Tire compression
 - Bogie behavior
- All of the topics above can be changed during the finalization of the vehicle and during the life of the vehicle.



High system tolerances

- Based on measurements on vehicles we had the following contributions to the tolerances:
- Frame bending:
+0.3% on the headlamp inclination
- Tire compression:
+0.3% on the headlamp inclination
- Sensor error depending on bogie:
+0.06% on the headlamp inclination
- Hysteresis in the lamp:
+0.17% on the headlamp inclination





Conclusions

- The large tolerances can be reduced by re-designs and modelling of the vehicle behavior
- The models will **not** be accurate after a potential rebuild of the vehicle
- There is a potential of using non-axle based sensors, but we are not aware of any development for trucks and it is today not possible to state when, or if, it will be available and what the performance will be
- **Depending on truck type and configuration – automatic levelling can cause a worse aiming and more glare than a manual system!**
- **In order to have the best possible and reliable light performance it is our recommendation to keep manual levelling for at least class N₃ and off-road vehicles.**