

# UN Regulation development on Heavy-Vehicles Direct Vision

OICA position

*VRU-PROXI 11*



## OICA Position on Direct Vision (DV) for N3

### OICA supports:

- An objective methodology to evaluate close proximity DV with a sound definition of a baseline level
- A common DV requirement for all vehicles within a vehicle category (as agreed in EU GSR phase 2)
- Type approval of systems based on the worst case vehicle of the family with verification by simulation to cover a whole vehicle range

## OICA recommends:

- DV requirements shall not be connected to cab elongation enabled by new EU W&D:
  - *Cab elongation is not mandatory, only applicable for EU and not beneficial for all truck applications.*
- DV requirements shall be feasible with economically reasonable re-designs of conventional cabs:
  - *Taking into account long cab life cycles and very high investments for re-designs;*
  - *Rely mainly on potential of measures not impacting cab structure (e.g. CMS replacing mirrors, additional door windows...).*
- As a 1 star rating is very challenging for long haul vehicles with high seating positions (see later slide), it shall be possible to meet DV regulation by applying assistant systems instead (like VRU-detection incl. intervention):
  - *Assistant systems reduce driver load and are effective if the driver failed to look properly (effectiveness of assistant systems expected to be higher than changes in cab design, see results of accident analysis on next slide and link to [ACEA communication](#));*
  - *Long haulage has priority to see far in front of vehicle, assistant systems can be used for close proximity VRU-safety.*

## Results of accident analysis on effectiveness of direct vision and detection/AEB measures



**Trucks and vision-related accidents:  
active safety 50% more effective  
than 'direct vision' cabs**

Since 2005, the number of traffic fatalities involving heavy trucks in the EU has declined by nearly 50%

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## VIS- FRONT END DESIGN (TRUCKS)

M1

M2

M3

N1

N2

N3

### • Summary and comments

- Target populations
  - ≈ 3-4 % of all road user fatalities
  - ≈ 0.75-1% of all seriously injured road users
  - ≈ 0.25% of all slightly injured road users
- Results shows Detection and AEB measures are more effective than changes in CAB design (direct vision)
- Potential benefits expected
  - Less than target populations which is already low

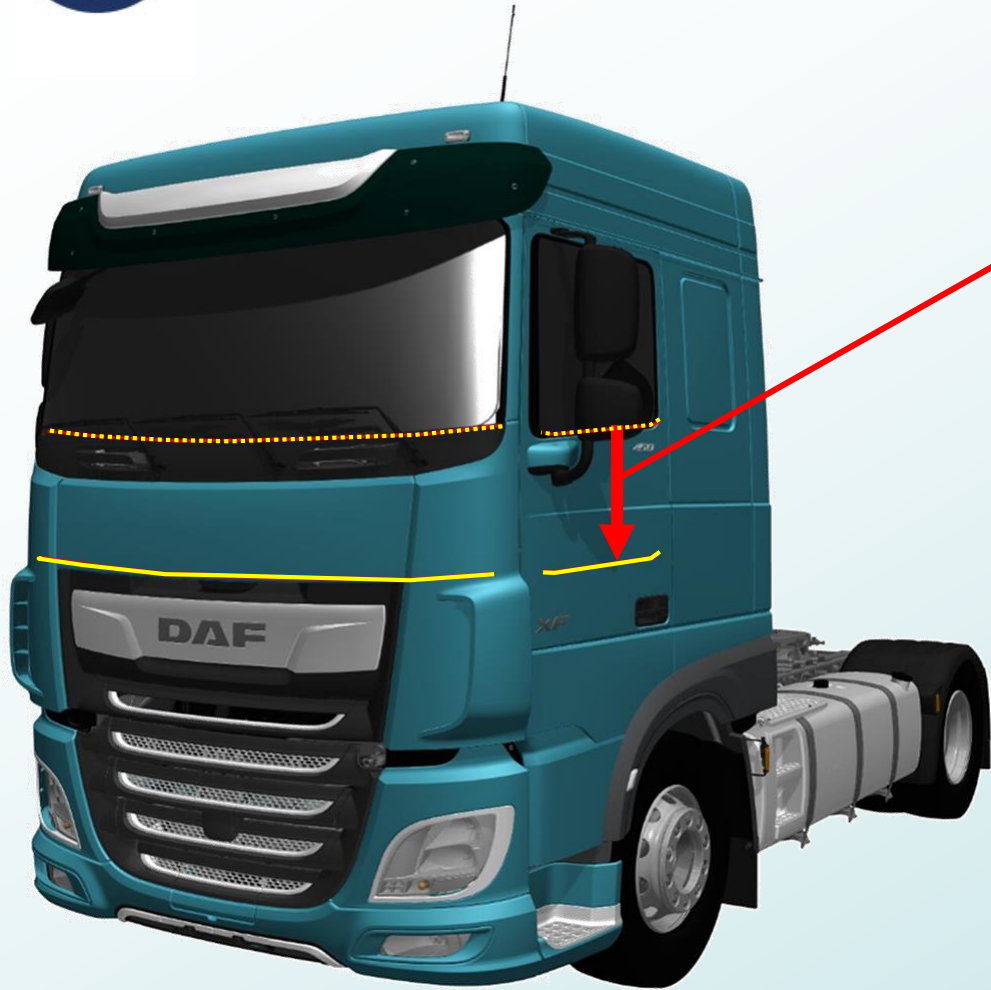
Results from STATS19 (UK) as reduction of total number of fatalities, seriously and slightly injured, all road users

		Severity	Fatal	Serious	Slight
VIS Approach	Direct Visibility	Best-in-class cab savings	-0,10%	-0,02%	-0,01%
	CAB design	High-visibility cab savings	-0,95%	-0,20%	-0,06%
	Driver Support /	VRU detection savings	-1,40%	-0,29%	-0,09%
	Active Safety	AEB-VRU savings	-1,53%	-0,32%	-0,10%





# Required cab re-design (example)



Required drop of the vision lines (lower window lines) to achieve 1 star on a typical highway truck



Significant lower vision lines conflict with installation of required components (e.g. cooling system) ①, engine space ②, etc.



# Explanation of height diversity on trucks

- What parameters have influence on driver height in a truck:
  - Load capacity of the vehicle, resulting in:
    - Tyre/wheel size
    - Type of suspension (pneumatic or mechanical), and variation of height between empty and laden state
    - Size of chassis elements
  - Off-road capacity, resulting in:
    - Minimum geometric requirements to ensure off-road driveability (ramp angle, approach angle, ground clearance)
  - Engine power, adapted to load, type of mission, driveability, resulting in:
    - Minimum frontal area required for engine cooling => higher engine power will tend to move cab floor higher to increase cooling capacity
    - Space needed for noise encapsulation (UN R51-03 Phases 2 and 3 will increase need for encapsulation)
  - Driver healthiness
    - Long-Haulage mission requires further reduction of noise and vibration level to which driver is exposed during its working hours, as well as improved comfort while resting in the cab (flat floor)
  - Cab design constraints
    - Limitations to lower windscreen: HMI displays and controls, packaging of ECU, climate control systems...
    - Increase of glazed areas decreases cab strength, while UN R29-03 requires higher energy
    - Position of driver seat: ergonomics, post-crash survival space, comfort...



Show the volumetric and star rating scores for each cab design at its highest and lowest possible mounting heights  
The coloured bars show the potential improvement of zero star vehicles by adding an Aerodynamic front

Typical Long-haulage and heavy construction configurations

