



# Heavy truck fatal crashes Sweden

*US meeting April 17 2024*

***Rikard Fredriksson***

*Senior Advisor, Road Safety Unit, Swedish Transport Administration*

*Board member Euro NCAP*

*Adjunct Professor, Chalmers University of Technology*



# Heavy trucks in fatal crashes - Sweden

- 20% of all killed on roads
- 6% of road mileage

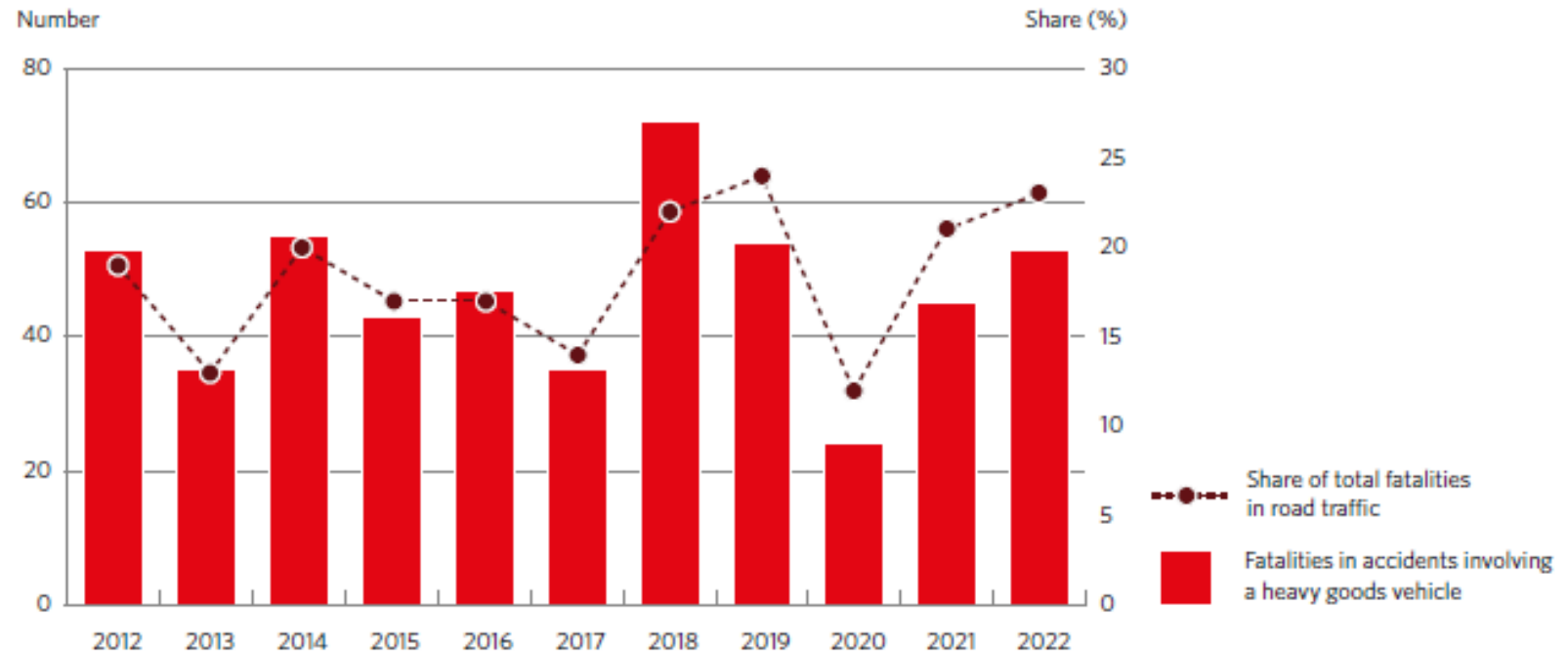
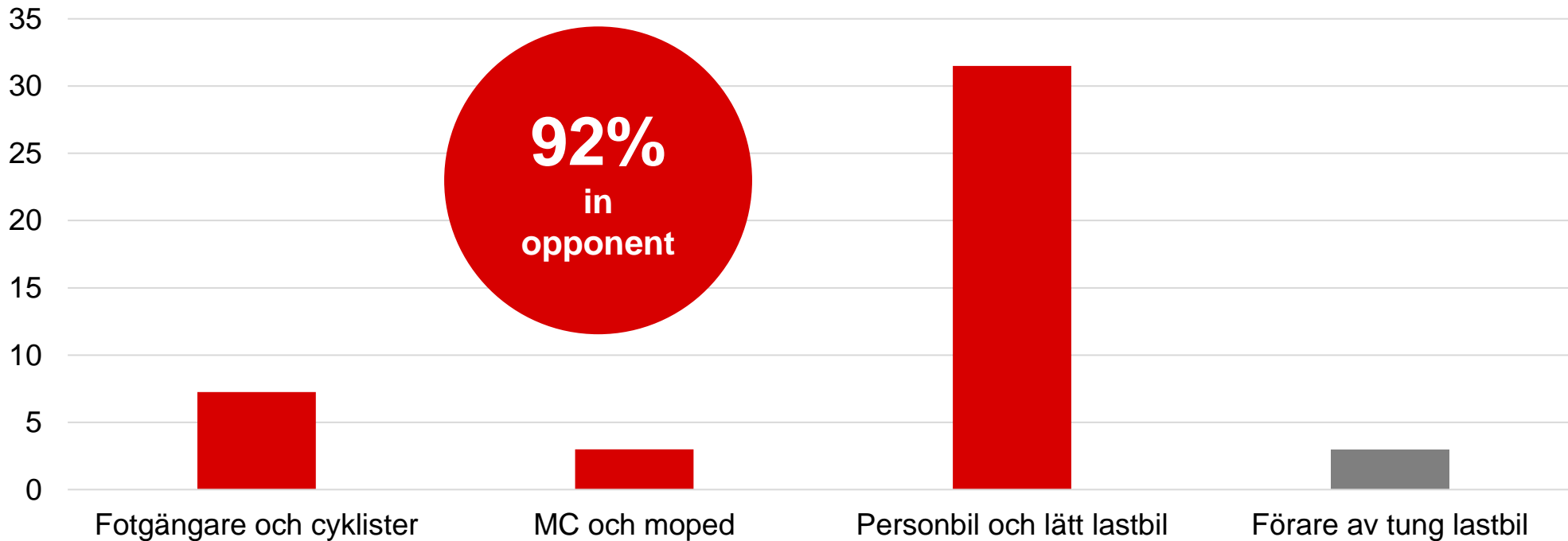


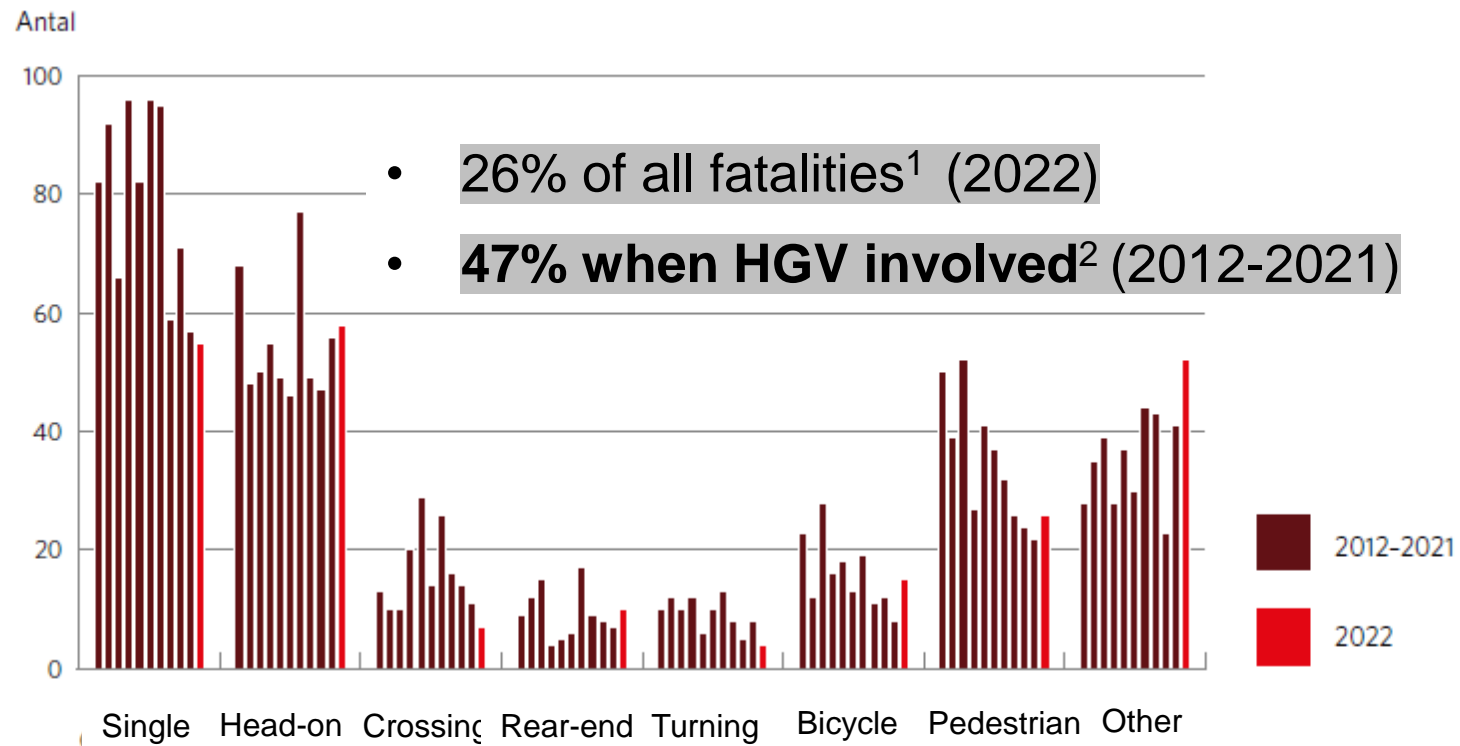
Figure 3. Number and share of road users killed in accidents involving a heavy goods vehicle, 2012-2022. Source: Swedish Transport Agency.

# Road fatalities in Sweden – HGV involved

Ca **45 fatalities** per year



# Head-on most common collision type

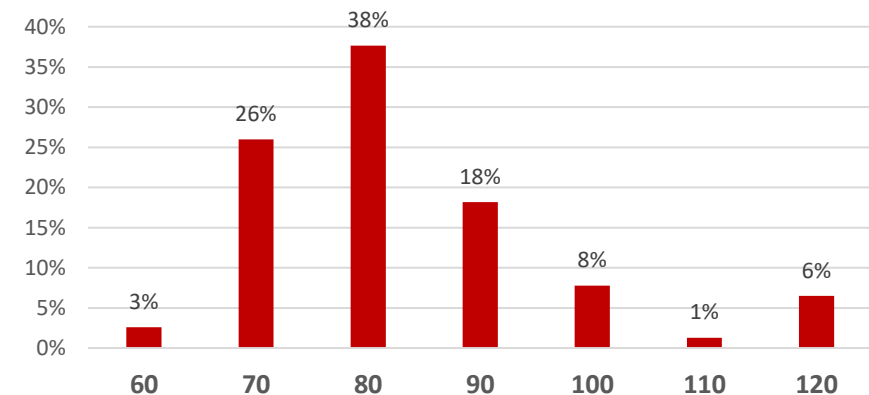
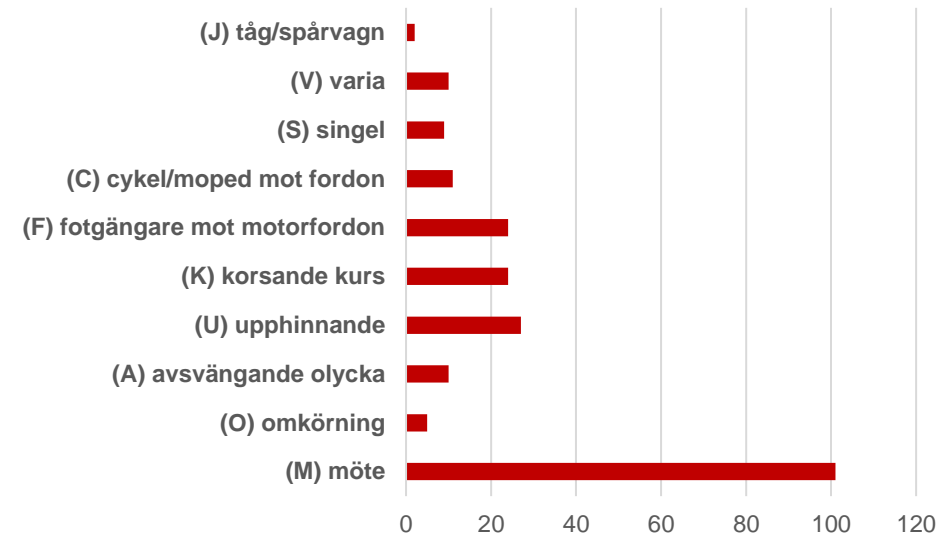


1. Hurtig et al., *Analys av trafiksäkerhetsutvecklingen 2022*, Trafikverket 2023

2. Thomson et al., *Frontal crash incompatibility of heavy goods vehicle in crash test with passenger car*, ESV Conference, Tokyo, 2023

# Head-on crashes HGV involved

- Detailed study 2017-2021\*
- 223 fatalities with HGV involved (suicide excluded)
- 101 head-on
- 77 of these HGV – Car
- 64% of these 70 / 80 km/h speed limit
- 78% of deceased car occupants belted (14% unknown)



\*Thomson et al., Frontal crash incompatibility of heavy goods vehicle in crash test with passenger car, ESV Conference, Tokyo, 2023

# Car-to-HGV head-on crashes (n=77)

- 36 killed in modern car (model year 2010+)
- 89% belted (8% unknown)
- 86% functional frontal airbag
- 86% driver, 11% front right passenger
- 69% daylight
- 91% good weather (no rain or fog)

# Head-on crashes - cause

- 2/3 car wrong lane
  - Drifting most common
  - LOC more common older cars
- 1/3 HGV wrong lane
  - LOC (trailer) most common
  - Followed by tire explosion
  - Drifting uncommon

Lane Support System passenger car

Stability control truck?

# Lane support systems - challenges

- Hard to detect lane markings



- Most often passenger car in wrong lane
- 20 years to replace the car fleet







# Typical fatal crash - unseparated road (no median barrier)



50 mph



Auto-brake head-on



- 30 km/h

31 mph



- 30 km/h

# Research project

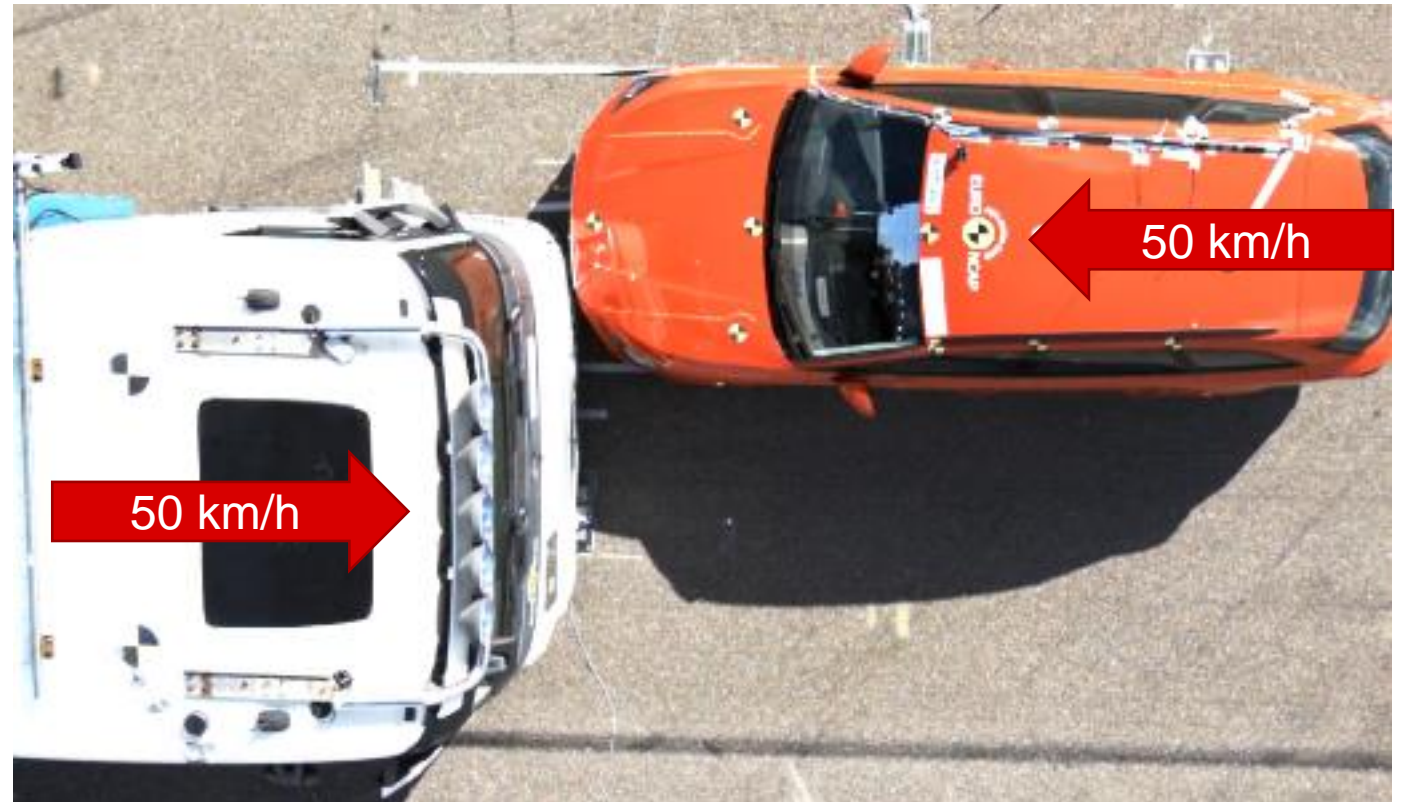
- Research funding from Trafikverket Skyltfonden ("Personal registration plate fund")
  - 4 million SEK
- Full-scale crash tests
- Prototype front-end



# Crash test

- HGV:
  - Test Mass 28 tonnes
  - Energy Absorbing FUPD
- Car:
  - Test Mass 1.57 tonnes
  - 5 Star Euro NCAP rating
  - HIII 50th Male Driver

31 mph







**50 km/h**

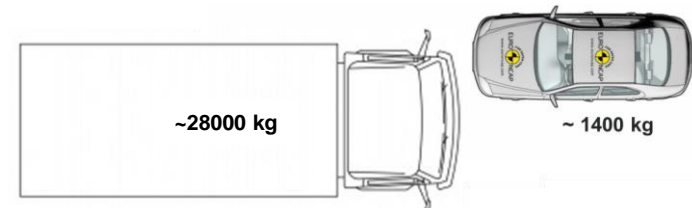




# Crash test



**TEST SETUP: 50 / 50km/h, 50%overlap**



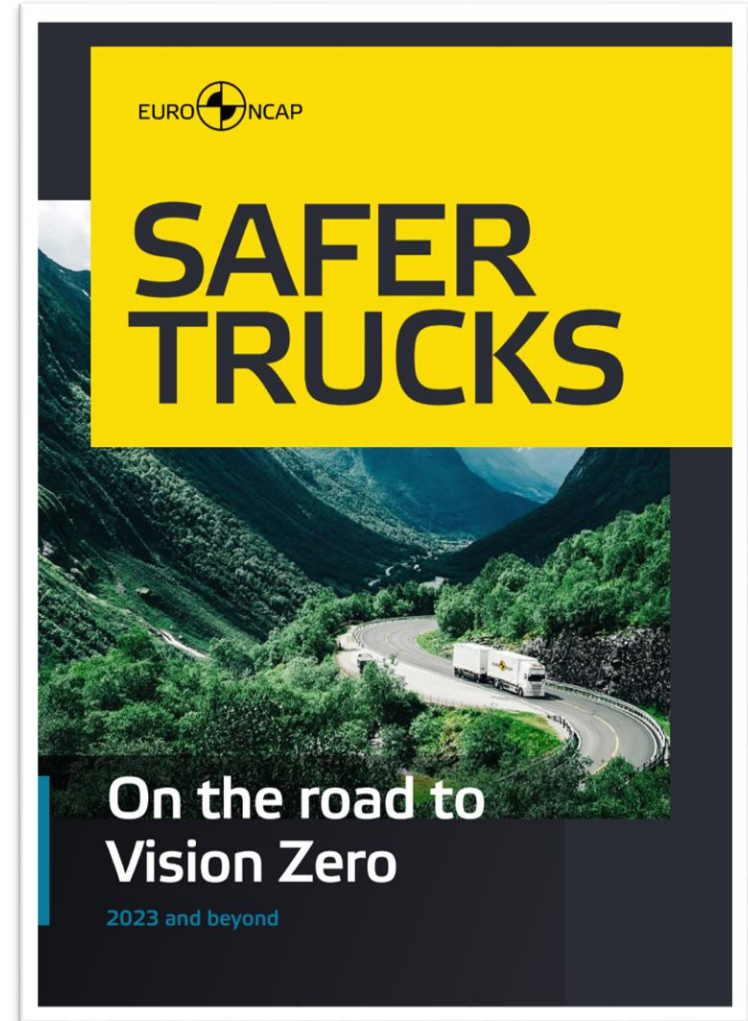






# Euro NCAP announces plans for a new Truck Safety rating scheme

🕒 12<sup>th</sup> April 2023

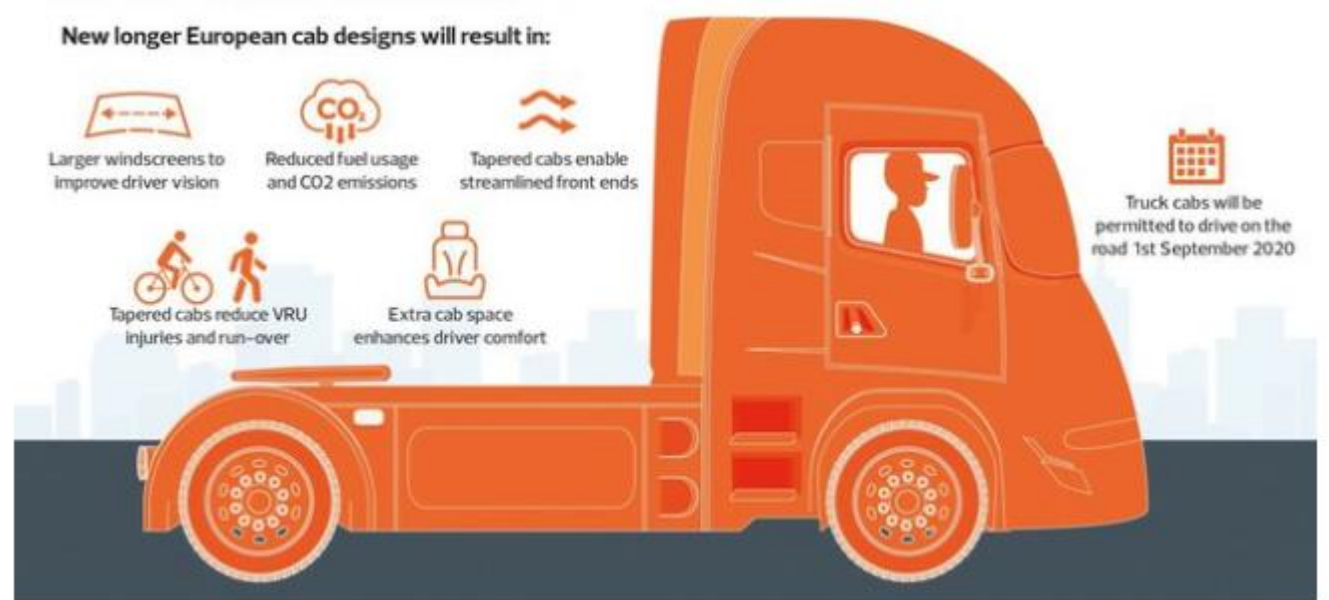


# Proposed introduction

## Which countermeasures should be promoted and when?

Common crash types involving HGVs and other road users	Available (2024)							Emerging (2027)				Long-term (2030+)					
	Speed Assistance	Indirect OSM	AEB vehicle front to rear	Lane Support	AEB VRU	Vision	AEB Nearside turn	Rescue info, ...	Direct OSM	Motion inhibit	AEB PTW front to rear	AEB Reverse	AEB TAP	AEB Head On	Passive Ped Protection	Crash compatibility front/side	Occupant protection
VRU Crossing																	
Stationary or walking VRU																	
VRU in collision with low-speed manoeuvring truck																	
VRU in collision with reversing HGV																	
PTW rider in collision with HGV																	
Car occupant in collision with HGV																	
HGV occupant in collision																	

# Ok with longer if safer!



# New front concept

- Research funding from Trafikverket Skyltfonden ("Personal registration plate fund")
  - 1 million SEK
- Chalmers University of Technology was assigned





Thanks!

[rikard.fredriksson@trafikverket.se](mailto:rikard.fredriksson@trafikverket.se)















