An aerial photograph of a road scene. A white car is driving on the asphalt road. To the right of the road is a green-paved area, possibly a bicycle lane. The background shows a concrete structure, possibly a bridge or overpass.

ACCIDENT INVOLVEMENT OF TRUCK COMBINATIONS UP TO 25.25 M AND STUDIES OF LONGER HCT AND CYCLIST SAFETY

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TRUCK COMBINATIONS

- Articulated truck combinations used for volume goods transport

Truck combination	GVW	Number of axles		Length
		Tractor/ truck	Trailer	
Tractor and semitrailer	>16 tonnes	2 or 3	3	appr. 16.5m
Foreign truck*	>16 tonnes	2 or 3	3	appr. 16.5m
Rigid truck and trailer	>16 tonnes	3	4 or 5	24.0-25.25m

* 90% of foreign trucks driving on Swedish roads are 2- or 3-axle tractors and semitrailer, with length around 16.5 meters and total GVW > 16 tonnes. Thus, the assumption is that the majority of accident-involved foreign trucks also were tractors and semitrailers.

ACCIDENTS BETWEEN 2009 AND 2018

Truck combination	Total accidents
Tractor and semitrailer (16.5m)	1 108
Foreign truck (16.5m)	897*
Truck and trailer (24.0-25.25m)	931
<i>Total</i>	2 936

*Accidents with foreign trucks were greatly underreported 2016

- In Sweden **involving** any of the truck combinations
- 2 936 accidents were identified involving at least one truck from the three categories
- Corresponds to 35% of all 8 500 accidents involving heavy trucks (GVW > 3.5 tonne)

MILEAGE ESTIMATION

Truck combination	Annual average mileage (km)
Tractor and semitrailer (16.5m)	689 000 000
Foreign truck (16.5m)	705 000 000
Truck and trailer (24.0-25.25m)	739 000 000

- Actual kilometres driven extracted from vehicle-inspection data, and
- Data from an EU-regulated questionnaire

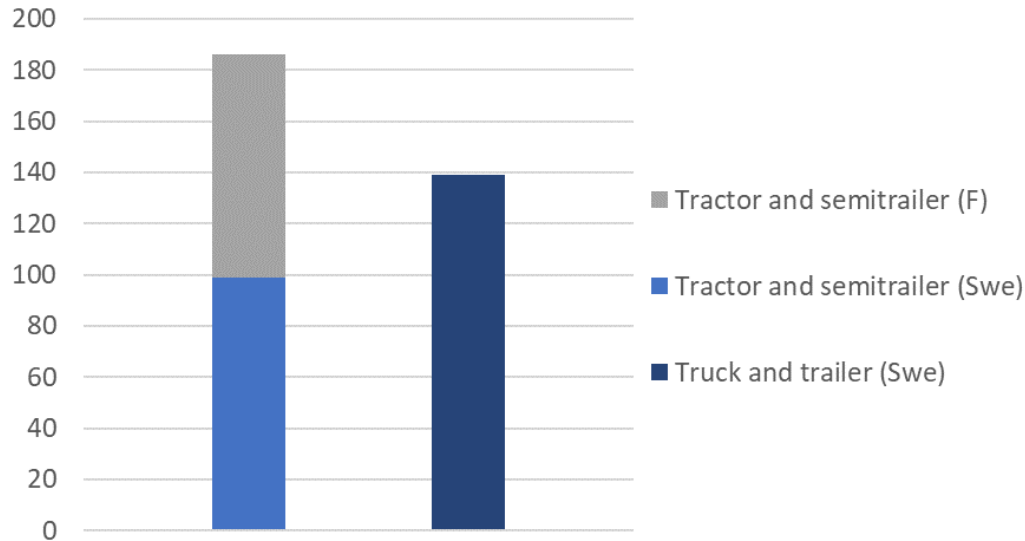
ACCIDENT RISK – AVERAGE 2009 – 2018

Truck combination	Accidents per million vehicle kilometers	
	All accidents	Fatal or serious injury outcome
Tractor and semitrailer (16.5m)	0.161	0.015
Foreign truck (16.5m)	0.145*	0.017*
Truck and trailer (24.0-25.25m)	0.126**	0.017**

*The underreporting of accidents with foreign trucks 2016 is compensated for by averaging values from adjacent years

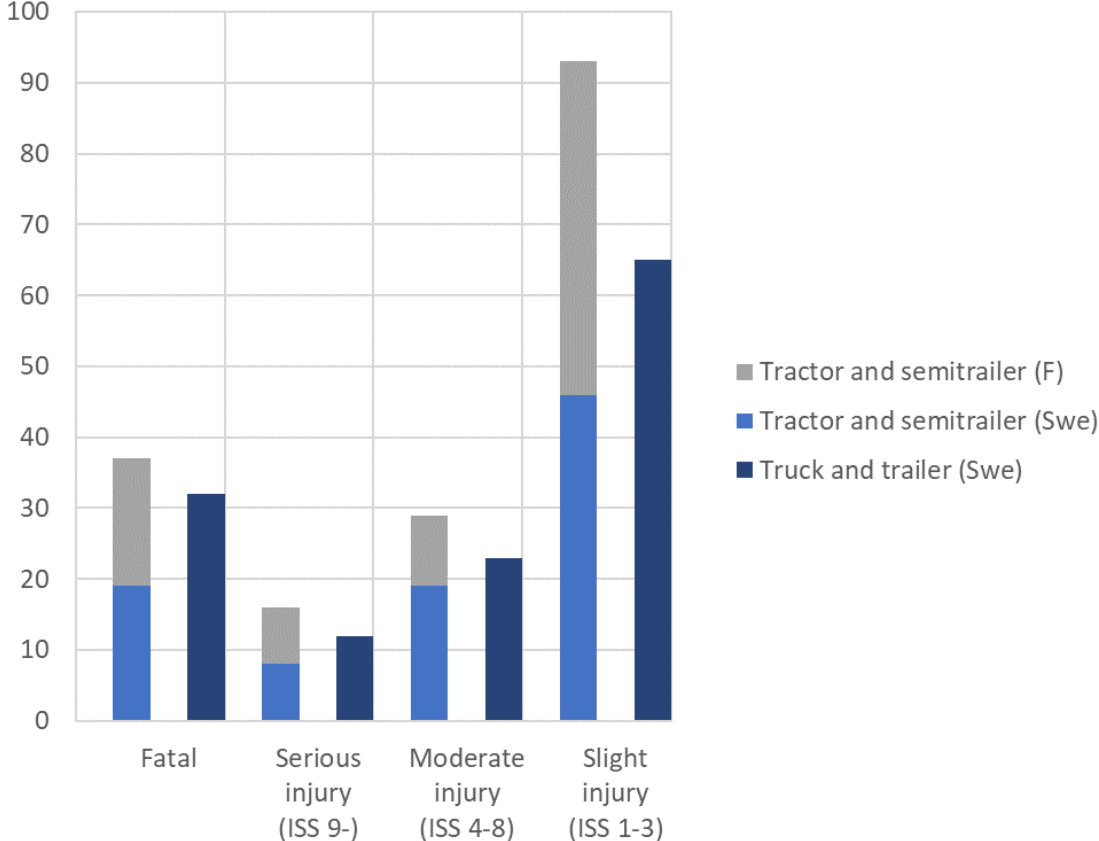
**Possible overestimation of accidents

ONCOMING: 325 ACCIDENTS

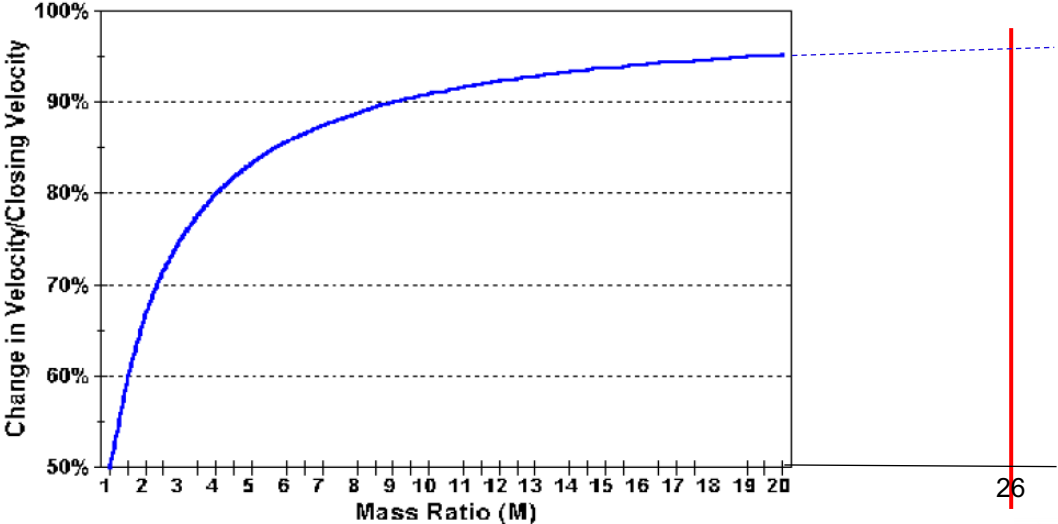


- Collision opponent:
 - A passenger car or light truck in 241 (74%) accidents
 - Another heavy truck in 68 (21%) accidents
- Which vehicle entered the opposite lane:
 - A passenger car or light truck in 174 (54%) accidents
 - A truck from the three categories entered the opposite lane in 86 (26%) accidents
 - In which the trailer entered the opposite lane in 40 accidents

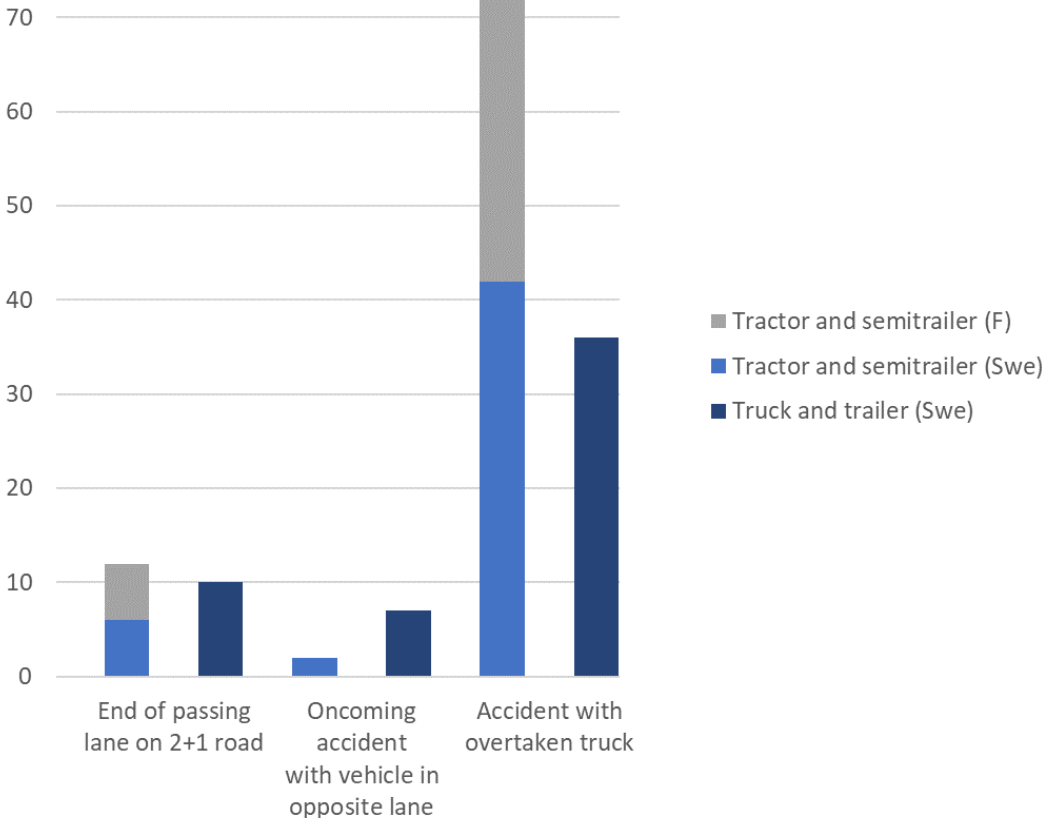
ONCOMING – MAX INJURY LEVEL IN ACCIDENT



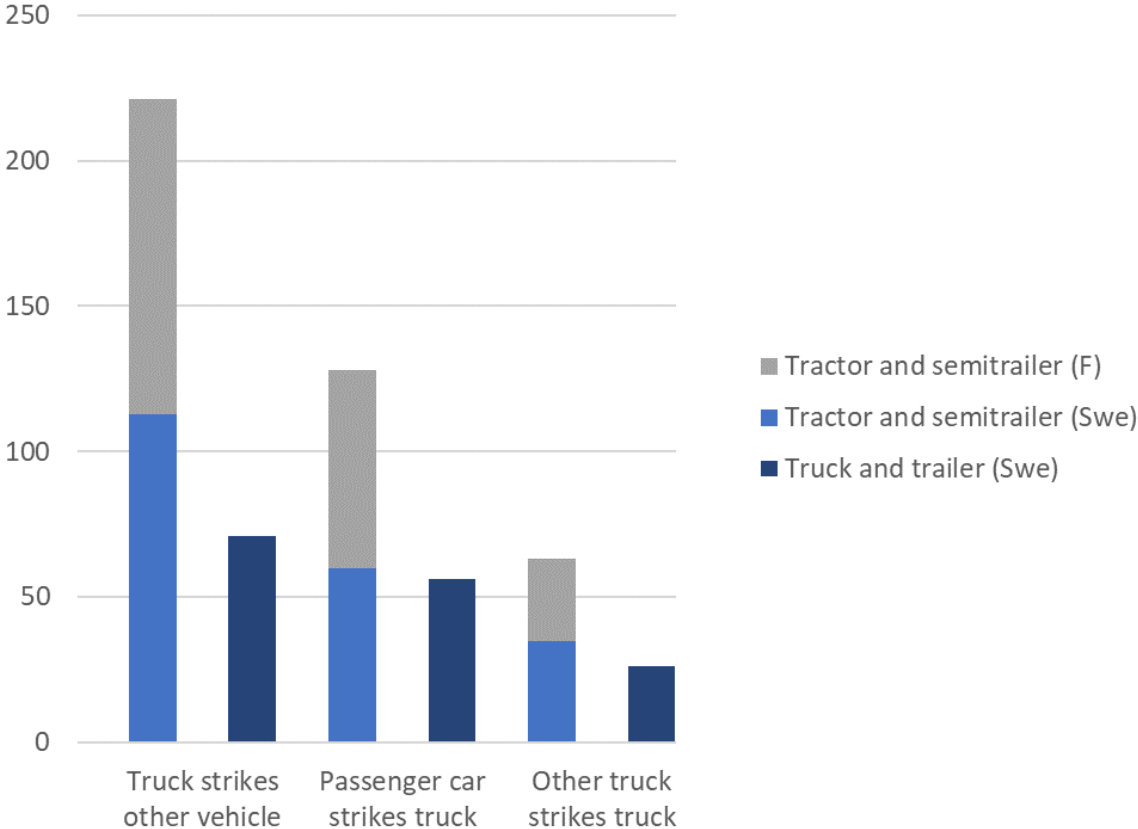
CRASH VIOLANCE IN FRONTAL COLLISIONS



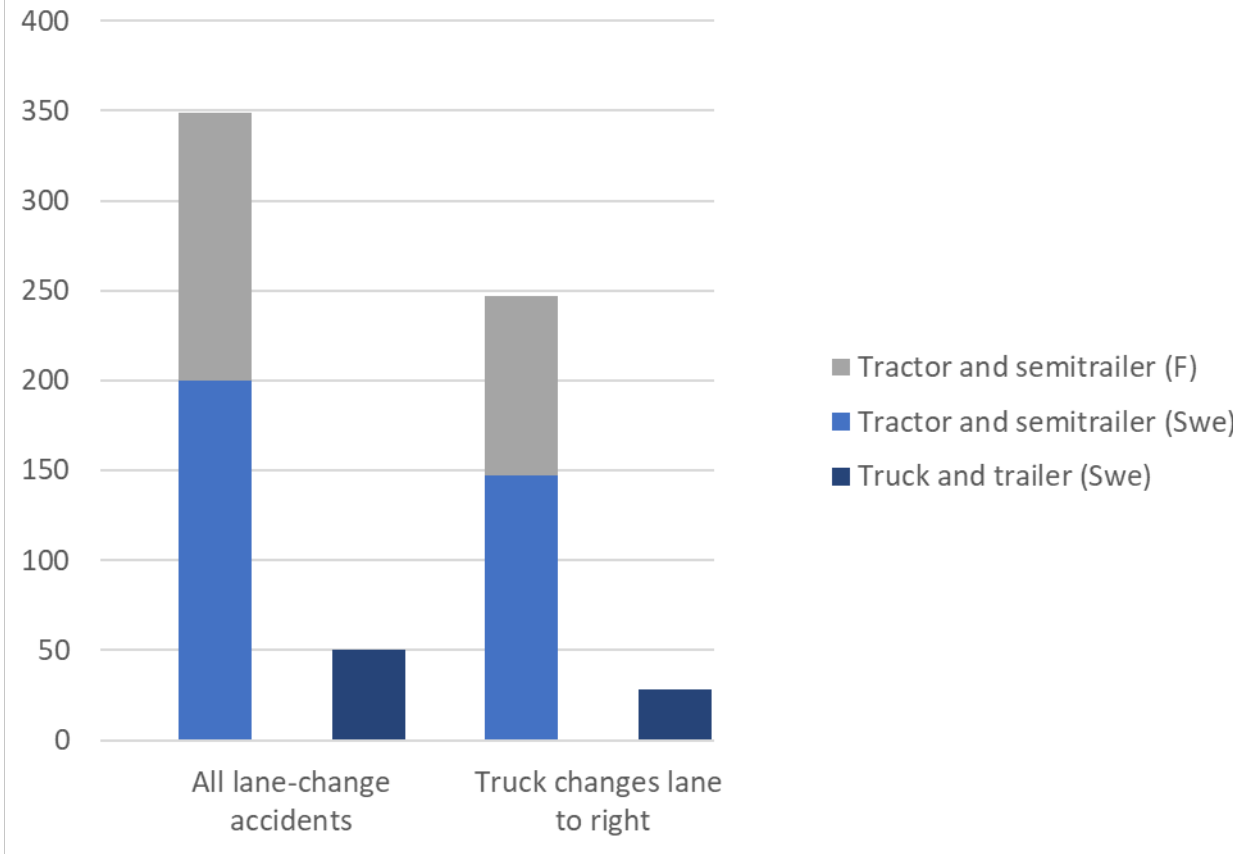
CAR OVERTAKES TRUCK: 139 ACCIDENTS



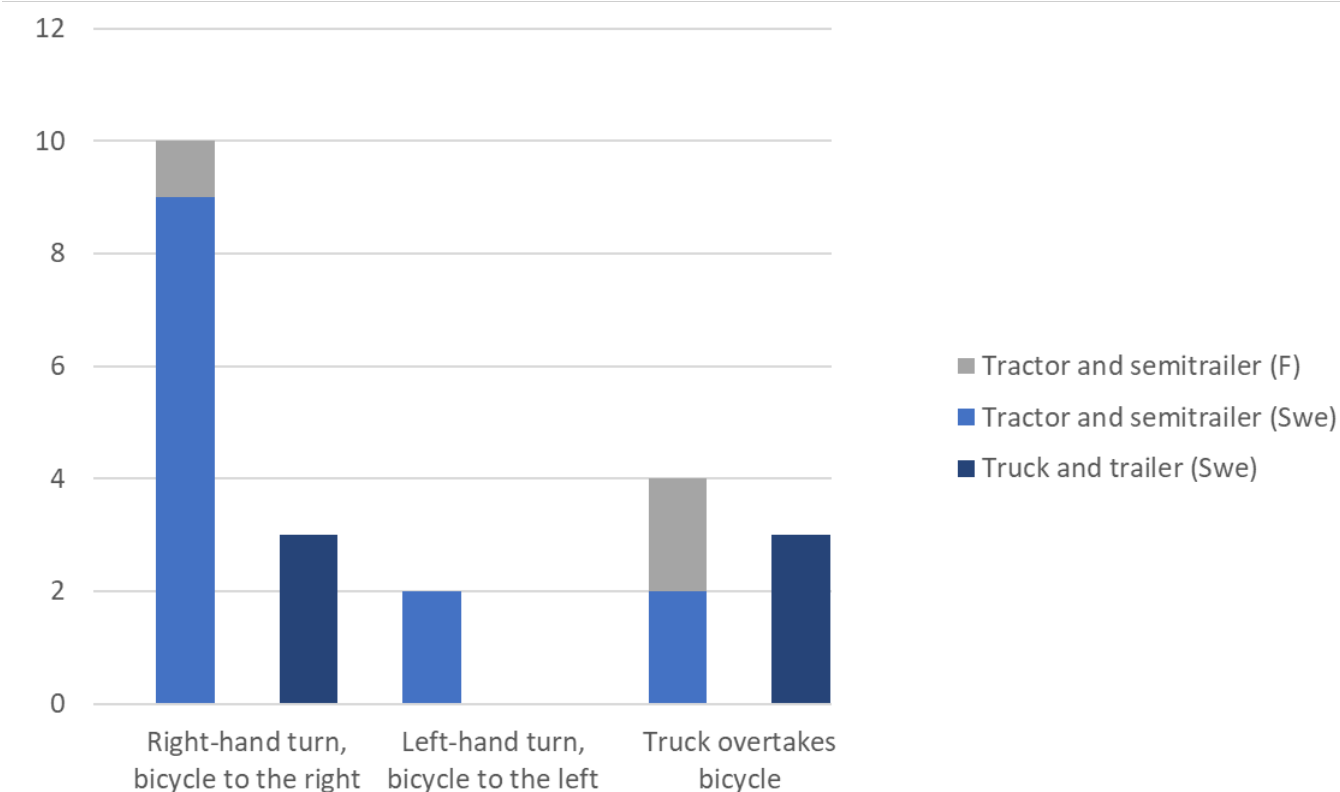
REAR END: 565 ACCIDENTS



LANE CHANGE: 399 ACCIDENTS



TRUCK AND BICYCLE: 22 ACCIDENTS



CYCLIST RISK ASSESSMENT - TEST TRACK STUDY

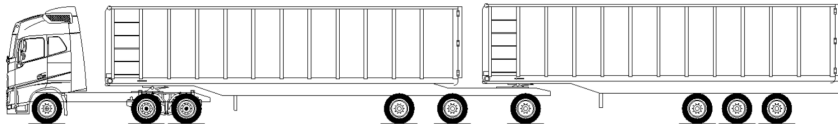


- Conducted in a 700m long “tent” at AstaZero
- Controlled study with:
 - Two truck combinations: 32m double-trailer or 16,5m tractor and trailer
 - Lateral distance: 1m, 1.5m or 2m
 - Truck speed: 50 km/h or 80 km/h
- 22 cyclists during three days
- Analysis is ongoing, but preliminary:
 - Lateral distance and speed affected cyclist discomfort more than truck length
 - Comparison with objective data, for example turbulence, cycle dynamics

SIMILAR CYCLIST STUDY ON REAL ROAD



- Planned in May 2024
- Conducted on a 5 km long road section
- Two truck combinations:
 - 30m tractor, link and trailer, or
 - 16,5m tractor and trailer
- 40-45 cyclists during three days
- The same measurements as on the test track
- Cameras on cycle and truck



THANK YOU!

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