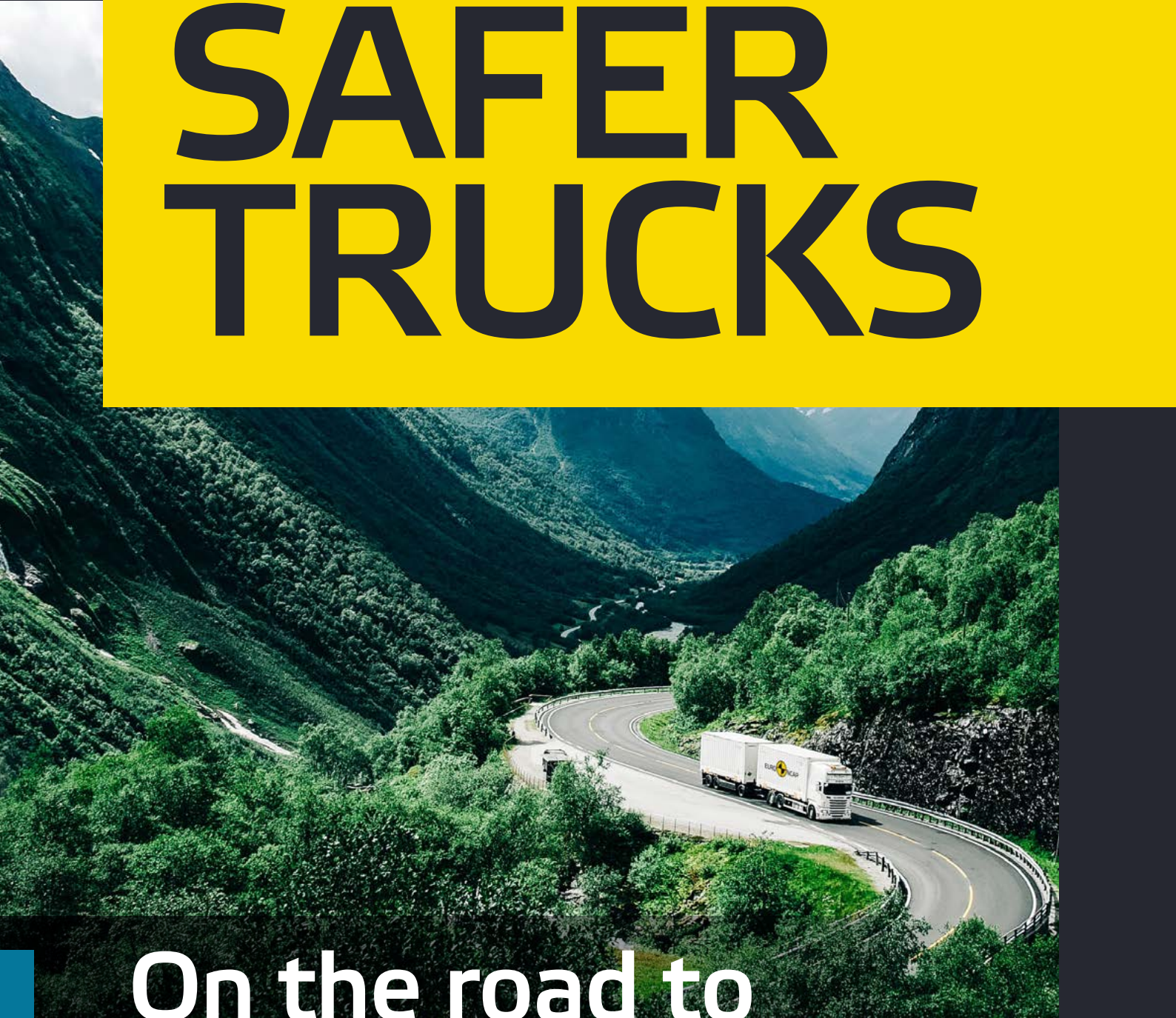




SAFER TRUCKS

A photograph of a white truck with the EURO NCAP logo on its side, driving on a winding asphalt road that curves through a deep, lush green valley. The road is bordered by a metal guardrail. The surrounding landscape is filled with dense green trees and vegetation, with steep hillsides rising on either side. In the distance, a small town or village is visible in the valley floor.

**On the road to
Vision Zero**

2023 and beyond



This report is intended to quantify the rationale for action on heavy trucks, identify characteristics of the market that may require different responses compared with passenger cars, determine what safety technologies industry is introducing, and what else might be feasible or desirable to promote safety.

Foreword

As a provider of consumer information regarding vehicle safety, Euro NCAP has historically focused on safety testing and ratings in the passenger car market. But having introduced a new Commercial Van Safety Rating in 2020, Euro NCAP is expanding its scope even further in 2023, to provide detailed safety information for heavy trucks.

This is another important step towards Euro NCAP ensuring the safety of all road vehicles. By examining safety levels within the heavy truck category, Euro NCAP aims to help many countries across Europe achieve their 'Vision Zero' target and end traffic-related fatalities.

In this report, safety data for heavy trucks is examined, illustrating why ratings are needed for this vehicle category, and a range of current safety features are discussed. Together with consideration of restrictions relating to the introduction of additional safety devices on heavy trucks, recommendations are made about how the safety of these large vehicles could be enhanced further, and how safety testing performance may be translated into



formal ratings.

Euro NCAP has played a leading role in encouraging the widespread use of active safety technology that's delivering real-world benefits and reduced collisions in the passenger car segment. But ADAS (Advanced Driver Assistance Systems) technology on heavy trucks is not as effective and fitment is not as widespread as it could be.

While recognising there are many similarities between the heavy truck and passenger car markets in terms of safety considerations and solutions, Euro NCAP also acknowledges and embraces the specific challenges that will need to be overcome so that robust heavy truck safety ratings can be devised and implemented.

To achieve this, Euro NCAP believes collaboration

is key. It hopes transport authorities and the automotive industry across Europe will adopt and support the development of its city and highway certification model, to ensure heavy trucks on European roads progress towards best practice safety rather than just meeting minimum standards.

We are seeking new members that can invest resources and their knowledge to help us make this scheme the success that society needs it to be. If your organisation has a mission to make freight in your region safe, we want to hear from you. This marks the beginning of a new, challenging, and exciting journey for Euro NCAP and our existing members as well as those who wish to join us in the future.

Michiel van Ratingen

Secretary General, Euro NCAP

01

Why heavy trucks?

Goods transport is an essential fact of all modern societies, providing everything we need to survive (food and medicines, for example) and much of what we want for comfort and enjoyment.

The vast majority of freight within each country is transported by road. Efforts to increase rail freight capacity, promote modal shift, source goods more locally, or organise logistics

chains more efficiently can reduce road freight demand. Population growth and increases in the standard of living tend to increase freight demand. The net effect is a prediction that global freight demand will treble between 2015 and 2050 (ITF, 2019). Heavy trucks are likely to become more, not less, important.

Heavy trucks represent almost 1.5% of vehicles on Europe's roads¹, and are involved in almost 15% of all EU road fatalities². Vision Zero will not be reached without tackling the challenges presented by trucks on our roads.



In the UK, similar statistics show that heavy trucks represent 1.3% of licensed vehicles, 5.8% of all traffic (billion vehicle km) 3.6% of casualties and 14.3% of fatalities. They are not involved in collisions more frequently than other vehicle types but when they are involved, a fatality is more likely. Size and weight is an obvious factor in higher crash severity but different usage may be an important reason why the same size issues do not increase frequency.

Heavy trucks are more likely to be used on safer roads such as highways but they are designed specifically for different uses, with some vehicles tailored specifically for city usage

and others specifically for longer distances on highways. Crash patterns also differ in these environments with vulnerable road users a key priority for cities, car occupants the key priority in highway crashes.

The combination of society's continuing reliance on road freight transport and the over involvement of road freight transport in fatalities means that Vision Zero will not be achievable without substantial action to improve heavy truck safety.

1 Based on data extracted from Eurostat
2 ERSO, 2017



“In all European countries, crashes involving heavy commercial vehicles stand out due to their serious consequences, often to occupants in other smaller vehicles and vulnerable road users.”

Stefanie Ritter, Accident Research, DEKRA Automobil

02

Is a different approach needed?

Extent of market influence

The purely commercial use of heavy trucks is likely to demand a different approach to safety campaigns. Consumers are Euro NCAP's usual audience. The consumers of cars are a mix of individual personal buyers, lease companies and fleets. However, even within the fleet market, the individual end user often has significant influence on the vehicle choice, and safety for themselves and their family will often be an important parameter. Providing the consumer with clear and simple safety measures has proven to be a very effective way of stimulating customer demands for safety, and vehicle manufacturers are very effective at responding to customer demand.

The above situation is not necessarily the case for heavy trucks. Heavy truck drivers typically have almost zero influence over the choice of vehicle. A competitive freight industry with narrow margins will prioritise operational needs. In isolation, a bad safety rating may not be enough to outweigh a best-in-class payload capacity or energy efficiency.

The fact that maintenance costs are similar to vehicle capital costs, fuel costs are four times the vehicle capital costs, and all three are many times greater than insurance costs (a proxy for safety), shows that operational influences such as payload capacity, fuel efficiency and vehicle reliability will be of far more importance to many fleet buyers.

Uncertainty over whether an innovative safety feature will be reliable or easily maintained can cause a conservative approach of sticking with a known quantity. Stimulating customer demand for safer vehicles within the freight industry may therefore require more than just the provision of safety information. But how can this be achieved?

The freight industry itself will be key to answering that question but creating a market where the safest choice of vehicle is also the most profitable choice of vehicle will be important. One way of achieving this may be for Euro NCAP to work with stakeholders already trying to achieve this through national, regional or local initiatives such as safety clauses in public sector contracting, local access restrictions, cash subsidies to encourage fitment of specific safety technologies and freight best practice schemes.

These schemes can strongly influence operator behaviour in their areas but are not harmonised in any way and often rely on expensive retrofit technology with much less evidence of effectiveness. The use of a harmonised technical standard for these schemes would reduce complexity for operators, increase buying power and improve the safety market for OEMs (vehicle manufacturers).

Heavy trucks are considerably more expensive than passenger cars, with an average tractor unit costing in the region of €100k.

Distribution of running costs of a 44-tonne tractor unit

Source: derived from Motor Transport, 2020



- Fuel costs: 32%
- Maintenance: 7%
- Vehicle costs: 8%
- Insurance costs: 3%
- Finance costs: 3%
- Overheads & facilities: 18%
- Driver costs: 29%

Regulation

The lower buyer demand for innovative safety features means that, in practice, the fitting of many safety features on heavy trucks will remain low until mandatory regulation is introduced. Regulation is powerful. It is the only instrument that can guarantee that all new vehicles are equipped with a feature.

However, there are weaknesses too. Mandatory requirements usually apply to all vehicles in a given category. Trucks may be used in a wide variety of applications, and the base chassis are highly customisable to suit a huge range of body types, often added by different suppliers to the chassis cab. Some trucks may be used on dedicated routes, such as overnight freight on major roads between large parcel depots – the same job every night. What is important for safety in one sector may be of little benefit in another or, worse, actively conflict with the operational needs of another sector. This makes developing proportionate regulation more difficult and has tended to keep the minimum standards of regulations at the level of the lowest common denominator achievable by all.

This is, however, changing. Regulators are demanding higher standards. In Europe, the revised GSR (General Safety Regulation) requires mandatory fitment within five years of a range of technologies that most truck manufacturers do not currently even offer as options. R159 (Moving Off Information System (MOIS) for pedestrians and cyclists) requires a technology that no manufacturer offered before the regulation was completed. This approach achieves higher standards, but is not without complications, in terms of ensuring that the burden on diverse industries is proportionate and preventing unintended effects on operational capabilities. The requirements of existing and new type approval regulations for heavy trucks are summarised in the table opposite.

Although the GSR places many new and stringent demands on new vehicles, gaps remain both in terms of both the crash types addressed (strong short term focus on close proximity manoeuvring crashes) and the different categories of protection (no advanced avoidance systems in the longer term and no crash protection or post-crash safety measures at all).




Requirements of existing and new type approval regulations for heavy trucks

Crash stages				
Regulation	Safe driving	Crash avoidance	Crash protection	Post-crash safety
Existing regulation	<ul style="list-style-type: none"> > Seat belt reminders > Spray suppression > Tyres, brakes, etc. 	<ul style="list-style-type: none"> > ABS (Anti-lock Braking Systems) > ESC (Electronic Stability Control) (Roll & Yaw) > AEB (front-to-rear) > LDW 	<ul style="list-style-type: none"> > Front, rear and side underrun protection > Seat belts > Cab strength 	
GSR 2022/24	<ul style="list-style-type: none"> > ISA > TPMS (Tyre Pressure Monitoring System) > Driver monitoring system (indirect) > Alcolock interface 	<ul style="list-style-type: none"> > Moving off information system (MOIS) > Blind spot information system (BSIS) > Reversing detection > Emergency stop signal 		
GSR 2024 / 2026	<ul style="list-style-type: none"> > Driver monitoring system (direct) 			
GSR 2026 / 2029	<ul style="list-style-type: none"> > Direct vision 			

“We see head-on crashes, and especially with heavy trucks, as one of our biggest challenges to develop a safe road transport system. We believe that additional front-end compatibility improvements will be necessary to supplement the benefits of collision avoidance technologies.”

Rikard Fredriksson, Vehicle Safety Advisor,
Swedish Transport Administration (Trafikverket)


Euro NCAP believes
creating a market where
the safest choice of
vehicle is the most
profitable choice of
vehicle will be critical
to success.



03

A new business model for safer trucks

Euro NCAP believes creating a market where the safest choice of vehicle is the most profitable choice of vehicle will be critical to success.

One way of achieving this is for Euro NCAP to link with national, regional and local initiatives such as local access restrictions, freight best practice schemes, public procurement contracting and insurers to create incentives.

If combined with a more robust and harmonised framework of technical standards, this will create the buying power necessary to generate the demand for safe vehicles that manufacturers need if they are to combine innovation and commercial success.

Euro NCAP is introducing an innovative Truck Safe: City and Highway rating scheme that promotes safer trucks. City and highway authorities will be able to identify the best vehicles for their roads and incentivise adoption, while companies and fleet managers will be able to easily identify the vehicle specifications they need to buy to comply with road authority schemes. Shippers and hauliers can be assured that their vehicles meet safety standards as well as minimising adverse brand impact and vehicle/driver downtime. This will keep their drivers safe, minimise environmental footprint and, most importantly, create a market for safe technology developed within a clear framework for safety grounded in Euro NCAP principles.



04

The Truck Safe rating

Euro NCAP aims to:

- > Create clear and simple ratings applicable to the operating area of each vehicle
- > Offer clear indication to fleet managers about the safest vehicles
- > Be relevant to the collision types commonly occurring in each different usage area
- > Appeal directly to the organisations that can promote vehicle safety using the Euro NCAP rating
- > Create a pan-European market for safe freight vehicles through an international technical standard and a cooperative model of local and national actions that can help deliver Vision Zero

Whereas Euro NCAP's Commercial Van rating considers the urban and non-urban areas in which vans operate, the operation of heavy trucks is more nuanced.

One size certainly does not fit all. For example, many trucks will be used depot-to-depot and never go near a built-up area. Others will spend their time distributing goods in cities, and construction industry trucks might need to access off-road sites, rural lanes, motorways, and city centres.

There is no point encouraging an urban-specific safety solution on a truck that never enters an urban area – that would create a cost without a benefit. But if vehicles without urban safety systems are permitted, it is only right to allow cities to try and keep them out of areas where those urban risks are high.

This has led to Euro NCAP's innovative concept of a dual rating for city and highway environments. All vehicles will be rated against both sets of criteria. City authorities will link their access restrictions or incentive schemes only to the City rating, motorway authorities to the Highway rating. If vehicle operators buy a vehicle for a specific use, they also only need to consider the appropriate rating. Only general-purpose vehicles may require good performance in both ratings.

Euro NCAP's membership is currently national governments, consumer, and motoring organisations. But this new model changes the direction of our membership towards city authorities, highway authorities, fleet insurers, and freight shippers and operators.


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05

Application of the rating

With this new rating, Euro NCAP sees 'win-win' partnerships as the ideal approach, so it is intended to keep first implementation simple by rating only the chassis cab as it leaves the first stage manufacturer. Euro NCAP will assess rigids and tractor units, but these will be tested complete with their trailers. Certain safety performance aspects will be excluded from scope initially, for example, side and rear underrun protection, trailer stability systems and dynamic stability or manoeuvrability across a tractor trailer combination.

In contrast, Euro NCAP will tackle the challenges of the high numbers of variants and component modularity. Euro NCAP considers the ability to extend the rating to an individual vehicle level is essential, as key customers may wish to offer discounts or cash incentives, or to impose charges or access limitations based on a Euro NCAP rating. It will be of no value to them if the rating is based on a particular model specification, and the reality is the vehicle they are rewarding has a significantly different performance.

Initially, Euro NCAP aims to test each primary or secondary safety feature identified in the roadmap for at least one high sales volume variant from each manufacturer, in each of the four freight applications:

- > Long haul
- > Distribution
- > Construction/waste
- > Utility

This will provide the opportunity for a high-level brand and sector comparison of safety and ZEV (Zero-Emission Vehicle) availability. Although major cab or architecture redesigns are rare, perhaps once every 20 years or so for each company, specific component or system changes can be more frequent than in the passenger car market.

For each aspect of the roadmap, rules will be developed to identify what changes in design would invalidate the rating and require additional testing. Euro NCAP will work with industry to develop a method of identifying sufficient characteristics of individual vehicles to allow appropriate ratings to be assigned at individual vehicle level.

06

Casualty priorities

This report outlines the number and classes of road users killed in collisions between 2017 and 2019. Crashes involving two vehicles or fewer and involving a range of different types of vehicles, occurring in five countries with Euro NCAP membership (DE, FR, GB, IT and SE) are included. In total, this data provided information on 28,452 fatalities from all types of collisions and 3,340 fatalities from collisions involving heavy trucks over the combined three-year period.

The fatality data suggests that a HighwaySafe rating is higher priority than a CitySafe rating, if the number, feasibility and effectiveness of technical solutions in each domain were equal. This split is more even (57% highway) if casualties of all severities are considered (Schindler et al., 2020).

Heavy trucks suffer significantly different collision patterns from passenger cars. More than 60% of those killed in collisions involving cars are the car occupants themselves. For heavy trucks, only 11% are those of the occupants – most of the fatalities are parties outside the vehicle.

Across all areas and casualty types, around 56% of fatalities involve rigid trucks and 44% tractor semi-trailer articulated combinations. This becomes 70% rigid and 30% articulated in urban areas, and 50% rigid to 50% articulated outside urban areas (35% rigid, 65% articulated on motorways).

When truck occupants are killed, 52% are involved in a single-vehicle collision, 38% collide with another heavy truck, and 7% collide with a car. Fewer than 10% of truck occupants are killed in urban areas, and almost two-thirds of those in single-vehicle collisions.

Note that there is significant variation in data between countries. For example, in Great Britain, pedestrians represent a bigger proportion of the total, whereas in Germany cyclists represent a bigger proportion.

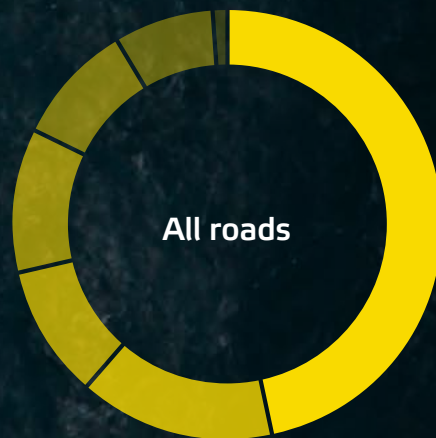
These figures may not yet reflect the full benefit of past regulatory interventions such as the introduction of AEB (Autonomous Emergency Braking) or LDW (Lane Departure Warning), and priorities may change slightly due to the forthcoming GSR measures. There are however clear gaps in those new measures, such as a lack of any new features specifically targeting car occupant protection or VRU (Vulnerable Road User) protection outside a low-speed manoeuvring context.

Heavy trucks suffer significantly different collision patterns from passenger cars. More than 60% of those killed in collisions involving cars are the car occupants themselves.





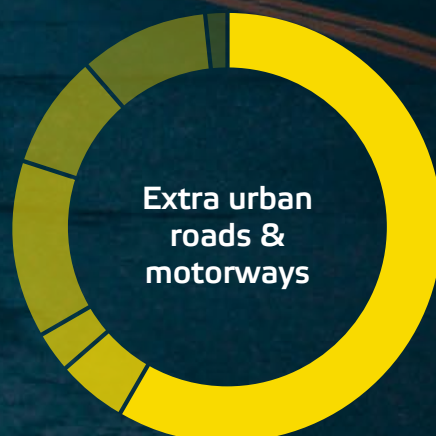
- City: 928 (28%)
- Highway: 2,417 (72%)



- Car occupants: 1,560 (47%)
- Pedestrians: 491 (15%)
- Pedal cyclists: 334 (10%)
- Heavy truck occupants: 370 (11%)
- PTW riders: 304 (9%)
- Van occupants: 245 (7%)
- Others: 36 (1%)



- Car occupants: 147 (16%)
- Pedestrians: 364 (39%)
- Pedal cyclists: 262 (28%)
- Heavy truck occupants: 45 (5%)
- PTW riders: 97 (11%)
- Van occupants: 7 (1%)
- Others: 1 (0%)




- Car occupants: 1,413 (59%)
- Pedestrians: 127 (5%)
- Pedal cyclists: 72 (3%)
- Heavy truck occupants: 325 (13%)
- PTW riders: 207 (9%)
- Van occupants: 238 (10%)
- Others: 35 (1%)

07

Safety technologies

Despite the limitations, a range of safety features are available on the market for heavy trucks, but are not yet uniform, or standard fitment. However, they do have significant potential for fatality reduction and for implementation in 2024. Euro NCAP has studied the available evidence about safety features for heavy trucks and assessed their potential based on:

- > The type of casualties they are intended to prevent (target population)
- > System effectiveness (where evidence is available)
- > Current and future availability in the commercial vehicle market
- > Opportunity to accelerate or exceed existing and forthcoming regulatory standards



Blind spot information systems for detecting vulnerable road users will be mandatory in 2024.

Highlights are:

01

AEB for vulnerable road users

A large subset of pedestrian fatalities plus a significant number of cyclists are addressed, with the crossing collisions mainly occurring in urban areas, the longitudinal ones more often outside of towns. The effectiveness is proven in cars, but currently only one heavy truck manufacturer offers the system. A forthcoming regulation will set minimum standards but will not make fitment mandatory, we consider we can encourage more fitment and higher performance standards.

02

Lane support systems

These address a range of fatalities from different road user groups that occur when a heavy truck unintentionally leaves its lane. The technology can help protect the occupants themselves particularly when they run off road, pedestrians, and other vehicle occupants when the heavy truck drifts onto a hard shoulder on motorways and collides with broken down vehicles, or other vehicle occupants when they collide with overtaking or oncoming vehicles when drifting out of lane. Effectiveness is proven in passenger cars. There is only a regulatory requirement for simple warning systems in heavy trucks, and several manufacturers offer more advanced systems as options.

03

Vision

This targets a sub-set of pedestrian and cyclist fatalities that occur during low-speed manoeuvres such as nearside turns (right in EU, left in UK) and moving off from rest, where blind spots are a contributory factor. These collisions occur almost exclusively in urban areas with the majority in major cities. A regulation will enforce minimum standards of Direct Vision through the windows from 2029, but has been controversial because operational requirements are a very significant factor in vision performance. All levels of Direct Vision from bad to excellent already exist in the market, so Euro NCAP will encourage operators to buy the best variant available for the job their vehicle needs to do. Where direct vision cannot help (e.g. to the rear of the cab, where operational needs mean tall cabs) camera monitor systems designed to replace mirrors in accordance with Regulation 46 can offer significant advantages over traditional mirrors, including larger field of view, reduced distortion, more intuitive orientation of images and monitor locations as well as dynamic views that adapt according to the manoeuvre the vehicle is undertaking (e.g. allowing sight of the rear of a trailer during a tight turn).

04

AEB nearside turn across cyclist path

This addresses the part of those low-speed manoeuvring crashes considered by direct vision that involve a heavy truck turning to the nearside across the path of a cyclist. However, it will address a greater proportion of those crashes than direct vision because in many cases, the cyclist approaches from behind the heavy truck and, at the critical moment, is positioned behind the cab where direct vision can't help. It also can be more effective than human intervention because of a potentially reduced reaction time. This is a brand new system unique to the heavy truck market and currently only offered by one manufacturer. It has strong potential to solve a high-profile collision problem, and there is clear scope for Euro NCAP to demand it performs well and increase its fitment.

05 **Motion inhibit**

This addresses the part of those low-speed manoeuvring crashes considered by direct vision that involve a heavy truck moving off from rest. It works the same way in collisions but, if a vulnerable road user is detected in the area in front of the vehicle, the driver is prevented from accelerating away. Such a system does not yet exist in the market, but a blind spot information system for this situation will be mandatory from 2024, and it is thought this will be a relatively straightforward extension to that system that will greatly improve effectiveness.

06 **AEB for vehicle front-to-rear**

AEB is a key and well proven Euro NCAP technology for cars. It has been mandatory on new heavy trucks since 2015, and the regulation governing this has recently been subject to a major upgrade that will come into force next year. Euro NCAP believes this leaves room for the best systems to exceed even this new regulation in terms of their robustness.

07 **Occupant status monitoring**

Inattentive driving is a major contributory factor to serious collisions of all types and heavy trucks are no exception. Truck drivers can be distracted and are more frequently impaired by fatigue. Systems that use cameras to monitor the driver, identify inattention and take action to reduce the risk, are being brought into Euro NCAP's passenger car rating and will be mandatory from 2026. There may be scope to encourage earlier fitment and exceed the regulatory standard, particularly in a professional driving context. There appear to be strong benefits from linking to fleet management systems that allow drivers struggling with fatigue to be identified and helped with softer interventions rather than just in-cab warning.

08 **Crash compatibility**

The single biggest group of fatalities from collisions involving heavy trucks is car occupants. There are differences between countries, but in many the largest group are killed in head-on collisions. Not only is there a large mass ratio to be contended with but the structures of heavy trucks are not very compatible with cars in terms of both geometry and stiffness. Front underrun protection regulations have been in place since 2003 to mitigate this, but the structural interaction remains far from perfect in several respects. There is still more that could be done, particularly where

manufacturers offer 'elongated' cabins under the new weights and dimensions regulations for improving safety and environmental performance.

Similar issues occur at the rear of vehicles and less frequently the side, where protection is only designed to be effective for vulnerable road users and not car occupants. Devices intended to mitigate severity in these collisions will tend to be fitted by the body builders more commonly than the OEM.

09 **Passive pedestrian protection**

This will address the same group of crashes as AEB VRU, but in a different way. As good as it is, AEB will not avoid all frontal collisions with VRUs, and heavy trucks are not subject to regulation on their passive pedestrian protection in the ways cars are. Applying the principles from cars is certainly possible but not straightforward.

The near vertical front of many heavy trucks significantly changes the distribution of injuries, the probability of damaging secondary impacts with the ground and being runover by the wheels, and the same test procedures may no longer be appropriate. However, there is scope for encouraging improved shapes and kinematics, as well as energy absorption, particularly near the edges of the vehicle where AEB is less likely to be effective.

10 **Heavy truck occupant protection**

It is often the case that those outside the heavy truck suffer in collisions, but drivers still represent a substantial minority of fatalities. When it happens, it is usually a frontal collision with another heavy vehicle, or a single vehicle collision often involving rollover. Regulation demands a minimum standard of cab strength to ensure a basic survival space in simple pendulum tests and seat belts are mandatory – but nothing else. Manufacturers are thought to go far beyond this and undertake internal programmes of full-scale crash tests and to some degree, the kind of measures seen in cars, like a frontal airbag, are seen in heavy trucks. But, overall, they appear to remain well behind the best passenger vehicle occupant protection technologies.

In addition to these, several Euro NCAP staples are also relevant, such as **ISA (Intelligent Speed Adaptation)**, **Seat Belt Reminders** and **ISO 17840-compliant Rescue Sheets** for post-crash safety.

Some of these technologies are ready to go, with test procedures easily transferred from our passenger car scheme. Others will take time either for the technologies to develop among the industry and/or for Euro NCAP to develop the assessments.



08

The Truck Safe road map

Euro NCAP plans the same versatile and successful partnership approach to enhance the safety of heavy trucks, as it does already for the passenger car market.

Euro NCAP incentivises consumers to choose safer cars by integrating the performance of complex technologies into the 5-star rating and on a periodic basis increasing the performance requirements to encourage still better performance. These increased requirements are agreed with the vehicle manufacturers beforehand and are communicated to the industry by way of a 5-year roadmap, giving manufacturers lead time to integrate this in their development plans.

The roadmap produced here for heavy trucks endeavours to highlight technologies that are both cost-effective but also realistic in their implementation over the coming years. The current proposal for certified safe trucks is presented for Cities (top) and Highways (bottom) below. This remains open for discussion with interested partners.

“Advanced Driver Assistance technologies are now standard on most European cars and they are contributing to more than a 40% reduction in some crashes. Heavy trucks have the very same crashes but don’t have this technology fitted, leading to a disproportionate amount of casualties in crashes involving heavy vehicles.”

Matthew Avery, Chief Research Strategy Officer, Thatcham Research

	Provisional weighting	2024						2027			2030			
		Safe Driving	Crash Avoidance				Post Crash	Safe Driving	Crash Avoidance	Crash Avoidance	Crash Protection			
			Technologies											
		ISA (Intelligent Speed Adaptation)	AEB Vehicle front-to-rear	LSS (Lane Support Systems)	AEB VRU (Vulnerable Road User)	Direct Vision	AEB Nearside turn	Rescue Sheets	OSM (Occupant Status Monitoring)	Motion Inhibit	AEB Reverse	AEB turn across vehicle path	Passive Pedestrian Protection	Crash Compatibility
City Safe	VRU crossing	40%	+		+			+					+	
	Stationary or walking VRU	5%	+		+	+		+					+	
	VRU in collision with low speed manoeuvring heavy truck	20%			+	+	+	+	+					
	VRU in collision with a reversing heavy truck	5%						+		+				
	Car occupant in collision with a heavy truck	15%	+	+	+			+			+		+	
	Heavy truck occupant in collision	5%	+	+	+		+	+			+			+
	PTW (Powered Two Wheeler) in collision with a heavy truck	10%	+		+			+			+			

	Provisional weighting	2024						2027			2030			
		Safe Driving	Crash Avoidance				Post Crash	Safe Driving	Crash Avoidance	Crash Protection				
			Technologies											
		ISA (Intelligent Speed Adaptation)	AEB Vehicle front-to-rear	LSS (Lane Support Systems)	AEB VRU (Vulnerable Road User)	Rescue Sheets	OSM (Occupant Status Monitoring)	AEB turn across vehicle path	Passive Pedestrian Protection	Crash Compatibility	Occupant Protection			
Highway Safe	VRU crossing	5%	+			+		+				+		
	Stationary or walking VRU	5%	+		+	+		+				+		
	Car occupant in collision with a heavy truck	65%	+	+	+			+		+		+		
	Heavy truck occupant in collision	15%	+	+	+		+	+		+			+	
	PTW (Powered Two Wheeler) in collision with a heavy truck	10%	+		+			+		+				

09

Who benefits from the rating?

Euro NCAP sees this as a partnership approach with all stakeholders interested in achieving Vision Zero. The approach needs to be 'win-win'. We believe the following stakeholders can gain from Euro NCAP's new Truck Safe rating.

Cities and road authorities

- › Lowering the barriers to develop schemes that drive the 'safer vehicles' pillar of safety strategies forward in a way that suits the road environment, by sharing the costs of developing tests and criteria across a membership organisation
- › Substantially increasing the influence of local schemes can have on global vehicle design through the development of a harmonised standard, while retaining the flexibility to set restrictions and/or incentives through mechanisms that work in local jurisdictions (e.g. access restrictions, financial incentives, contracting, road user charging etc.)

Freight shippers

- › An easy, internationally-recognised way of embedding requirements for safer vehicles in transport contracts
- › Clearly demonstrable progress towards CSR (Corporate Social Responsibility) targets
- › A way to identify carriers that care about their environmental impact

Freight carriers

- › Clear, simple information on vehicle safety
- › Transition, from the disruptive and expensive aftermarket requirements of several local schemes to an OEM-integrated safety solution
- › International Harmonisation – 'City A' might require a silver standard to gain access, while 'City B' might charge less to enter for gold standard, but the technical standard and identifying the qualifying vehicles will be easy. Platinum may have no restrictions

Vehicle manufacturers

- › Create a market for safety – an environment where innovation and new and improved safety features are encouraged, which will ensure there is a mechanism for a steady stream of customers
- › Harmonisation and standardisation – a reduction in the demand for bespoke configurations or post-registration dealer fit systems that vary

Wider society

- › A safer freight industry that can sustain our society and prosperity with a much lower price in terms of casualties. A safer future for Europe

A safer freight industry that can sustain our society and prosperity with a much lower price in terms of casualties. A safer future for Europe.



10

Integration of Green NCAP for commercial vehicles

The decarbonisation agenda is one of the biggest topics and challenges in freight transport currently. Lorries, buses and coaches in combination are responsible for about a quarter of all CO₂ emissions from road transport and about 6% of total EU Greenhouse Gas (GHG) emissions. During discussions with stakeholders, it has become apparent that many would greatly appreciate independent advice or ratings that allow them to choose vehicles that are safe, energy efficient and have a low carbon footprint.

There are significant challenges to providing robust and meaningful data about the environmental performance of heavy trucks. Some of those challenges are common with comparable aspects for passenger cars, but others are unique to the sector. How this can be integrated with safety in a way that doesn't dilute a core message on safety is also very important. Overall, the issue with commercial vehicles is more complex than with passenger cars and requires careful consideration.


Regulations require the publishing of emissions information in relation to individual vehicles, which makes it easy to identify CO₂ emissions or zero tailpipe emissions (e.g. battery electric) for a specific vehicle. However, manufacturers ranges, variants and options are complex, particularly for commercial vehicles. Stakeholders with involvement in purchasing fleets or for setting standards in relation to the use of fleets have reported that they need to set the standards for a purchasing initiative well ahead of the identification of individual vehicles.

To make strategic decisions and plan for the future and write tender specifications, they need to have information about the availability of vehicles that are safe, clean and capable of doing the job that they need them to do. They may need to be able to show that they are available from multiple suppliers to ensure competition. So, to begin with, Euro NCAP will aim to provide simple information about the availability of vehicles that are Zero Emission at the tailpipe in different specifications suitable for different end uses and different stakeholders involved in different parts of the chain of purchasing policies.

The aim is that by making it easier for purchasing or policy departments to justify strategies prioritising vehicles that are both safe and clean this will contribute to their rapid uptake. Over time, we will examine whether we can further build on this development, considering the:

- Energy efficiency of vehicles per unit of freight moved, which is affected not only by powertrain technology but also by tyre, aerodynamic and payload efficiency
- Lifecycle emissions considering the embedded energy and emissions in vehicle construction and disposal as well as those associated with its use.

The integration of 'green' issues with safety for commercial vehicles is a very attractive proposition, with potentially very substantial benefits in an area where clear and independent information for the freight industry is often missing. However, this integration is also complex and challenging technically and it may be necessary to take a stepwise approach.



Heavy trucks, buses and coaches in combination are responsible for about a quarter of all CO₂ emissions from road transport.

11

Conclusions

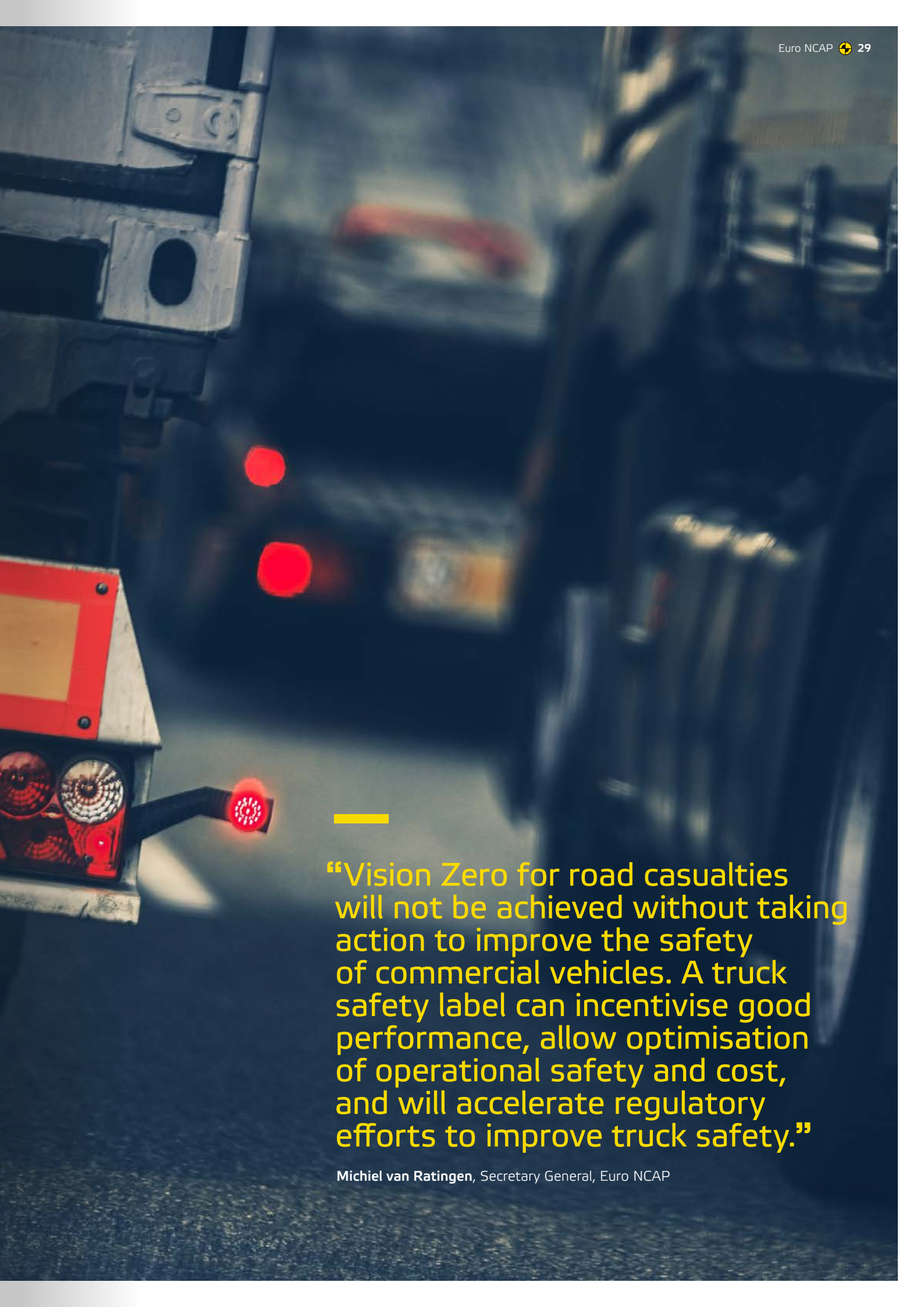
Vision Zero for road casualties will not be achieved without taking action to improve the safety of commercial vehicles, which are strongly overrepresented in fatal collisions. However, their essential role in modern economies can make it harder to both develop safety solutions that work without hampering operational productivity and to influence vehicle purchasers where maintenance costs and vehicle downtime can be major concerns and greatly outweigh safety costs. Applying a dual rating for city and highway operations will help to engage parties that can incentivise good performance, and allow optimisation of safety and cost for some operations, hence overcoming commercial barriers.

A range of safety features are available on the market but not yet uniform, or standard fitment, and do have significant potential for fatality reduction for implementation in 2024. These include AEB for pedestrian, low speed manoeuvring, and front-to-rear collisions as well as lane support systems, and rescue and extrication data. Additional measures including occupant status monitoring, AEB for reversing motion and passive safety measures such as crash compatibility at the front and side with both cars and vulnerable road users, and truck occupant protection all have strong potential. These will be investigated with a view to implementation in 2027 and 2030.

Euro NCAP is proud to propose this innovative City and Highway rating scheme to promote safer trucks. It offers clear advantages for all stakeholders. This will keep drivers safe, and will create a market for safe technology that will allow manufacturers to innovate and advance their offering within a clear framework for safety grounded in the Euro NCAP principles of an independent and respected approach. European roads will become safer, and we can all move towards Vision Zero.

We are actively seeking new members that can invest resources and knowledge to help us make this scheme the success that society as a whole needs it to be. If your organisation has a mission to make freight safe, then we want to hear from you.





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“Vision Zero for road casualties will not be achieved without taking action to improve the safety of commercial vehicles. A truck safety label can incentivise good performance, allow optimisation of operational safety and cost, and will accelerate regulatory efforts to improve truck safety.”

Michiel van Ratingen, Secretary General, Euro NCAP

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