

# ENFORCED

## Lane discipline

Lane departure warning systems (LDWS) have been mandatory in trucks of 7.5t gvw and over since 2015. But in April this year automated lane keeping systems were legalised for UK passenger cars. And they are coming to heavier vehicles too, as Lucy Radley experienced first-hand

The aim of the new passenger car systems is said to be to reduce the number of accidents caused by human error – the Department of Transport claims it plays a role in over 85% currently. According to DfT, they will enable drivers to “...hand control over to the vehicle, which will constantly monitor speed and keep a safe distance from other cars.” The driver must, however, be ready and able to resume driving control when prompted by the vehicle. The way that this technology has been classified is not without its critics: see sidebar, p11.

Within the truck world, there are currently four manufacturers offering some form of active lane departure warning systems (LDWS): Volvo, Scania, MAN and Mercedes. All of these require drivers to keep their hands on the wheel at all times, but deliver differing levels of haptic (vibration) warning or physical assistance when the system ‘sees’ it as necessary.

Volvo Dynamic Steering first came on to the UK market in 2015. It was originally introduced to soften and reduce feedback up through the steering column, as well as changing the perceived gearing so it feels lighter at low speeds. With high axle loads up to 10 tonnes, and steered eight-wheelers, it eases the effort required by the driver, increasing comfort and reducing stress. It achieves this using an electric motor on

top of the usual hydraulic steering gear.

Since 2018, Dynamic Steering has been available coupled to Volvo’s lane keeping system. This allows it to make a small steering correction, should the front wheel closest to the lane marking cross a point 0.3mm beyond the outside edge of the painted line. Obviously it can only do this where there are road markings for it to see, although it will pick up lines of all colours, broken as well as solid.

### FIRST HAND

The author was given the opportunity to try the system when Volvo released the I-Save in 2019. It was appreciated, but was something of an acquired taste.



While the movement the driver feels the wheel make is only a small kick – it doesn’t grab the steering – it seemed very easy to inadvertently steer with it. This resulted in an oversteer, which reactivated the system when it found the line on the opposite side of the lane, whereupon the same thing happened again (see also graphic, p12). Only once the driver relaxed and allowed it to do its job did the set-up’s full potential become clear (admittedly that didn’t take long).

When asked about the system, Volvo’s head of product, John Comer, replies: “We already have a level of automation today, and one of the key things is the driver understanding what these systems can do and what they



## A DISSENTING VIEW

Both the functionality of automated lane keeping technology and the regulations under which it will operate will mean that it cannot replicate what a competent and engaged human driver can do. In the opinion of Thatcham Research and the Association of British Insurers, they are not safe enough to be classified as 'automated driving', and describing them as such could lead to misconceptions among drivers.

Matthew Avery, Thatcham Research director of research, says: "The limitations of the technology mean it should be classified as 'assisted driving' because the driver must be engaged, ready to take over."

Thatcham Research has identified some scenarios where ALKS may not operate safely without the driver intervening:

- **Debris in the carriageway.** Debris caused 11 serious accidents on UK motorways in 2019. ALKS technology may not see this type of hazard and will continue in lane at its set speed, risking a collision.
- **Pedestrian carriageway encroachment.** Pedestrian casualties accounted for 23% of killed and seriously injured (KSI) on motorways in 2019. If a pedestrian encroaches on the carriageway while emerging from a broken-down vehicle, a human driver would either slow to a safe speed or move out of lane to avoid conflict. An automated lane keeping system won't be allowed to do this.
- **Motorway lane closure.** There were 70 accidents caused by cars driving along a closed lane - marked with a red 'X' - on smart motorways in 2019. Automated Lane Keeping Systems may not recognise a closed lane and break the law.

Avery said: "Automated lane keeping system technology would need a quantum leap in development to be able to cope with these very real scenarios safely."

The sensors contained within today's assisted driving technology can only interpret up to around 120m. At motorway speeds, that distance allows only four seconds to take back control and avoid an incident. But current studies suggest a driver needs more than 15 seconds to properly engage and react appropriately to a hazard. That's 500m more required distance than today's technology provides, they say.



can't. It's there to support them and make life easier, but they are still in control. It is important to highlight the difference between 'automated' and 'autonomous'."

Scania entered this arena late last year, with the launch of its Electric Active Steering (EAS) system (pictured, above inset, showing front near side axle assembly with cab raised). As well as making adjustments to the feel of the steering depending on the speed of the vehicle, it can also be coupled to the camera for the LDWS and the blind spot warning (BSW) sensor. The result is the option to have the vehicle prevent the driver from steering into a potential collision, or back into its lane, rather than just issuing acoustic or optical warnings.

This is the only one of the four available systems not tried by the author. It comes in several versions. Lane Keep Assist, LDW with Active Steering and Lane Change Collision Prevention all work regardless of whether cruise is engaged. They do, however, need to have the LDWS and/or BSW activated.

"EAS works via an electric motor in the steering box, which supports the power steering and can also bring in an interface," explains Phil Rootham, head of pre-sales technical at Scania (GB). "This is part of the step towards

e-mobility, where you don't have an engine to provide power steering, so you need to provide that in a different way."

### STEPPING STONE

He calls it a stepping stone to automation. "But while autonomy is always a conversation piece, actually these safety features - as a result of having that goal in the future - are more relevant in the short term.

Turning to MAN, its Lane Return Assist is available on its most recent generation TGX and TGS vehicles, as well as TGM with 22.5-inch wheels upwards. But it was also an option on later examples of the previous generation of TGX as well. Like all these systems, it relies on being able to pick up the lines on either side of the vehicle using the LDWS camera (pictured, middle, p12). In the author's opinion, it provides the most subtle steering correction of those driven. Once again, LRA works by using an electronic actuator on top of the usual mechanical/hydraulic steering box, which generates additional torque to steer the truck when needed. This set-up also means that as of next year, TG3 vehicles will be available with lane change collision protection as well, in conjunction with the existing Lane Change Assist sensor.

***“Very often, as manufacturers, we’re offering things as options for early adopters which will become mandatory in the fullness of time”***

Nick Hendy



Finally, these features will be bundled together with the MAN adaptive cruise control Stop & Go function, allowing the vehicle to slowly crawl forward in traffic automatically. “As with all these things, it is an assistance system, not autopilot,” stresses Nick Handy, head of product management. “It also monitors minute steering torque from the operator all the time, so it detects whether the driver still has control. We’re a long way from full autonomy yet.”

For MAN, the main driver behind these systems is market readiness. “We had LDWS as an option for many years, in preparation for 2015, and Lane Change Assist is likely to creep into EU legislation as well,” Handy states. The next big date on the calendar for such things being 2024. “Very often, as manufacturers, we’re offering things as options for early adopters which will become mandatory in the fullness of time.”

Arguably the most advanced system currently on the market is Mercedes-Benz’s Active Drive Assist, which the

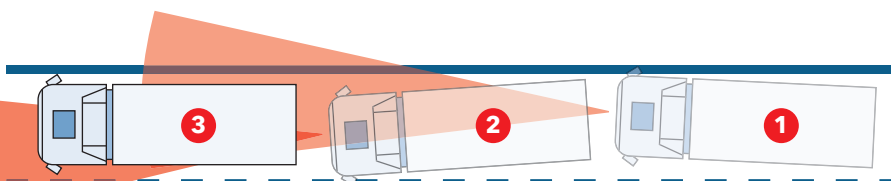
author drove in late 2019 on its Actros 5 tractor. It is designed to be a level 2 autonomous driving system, which means it enables partially-automated driving with the driver still in control at all times. Combined with MirrorCam, which reduces the amount of head movement needed at junctions, ADA claims to dramatically reduce driver fatigue. And when driving this was actually noticeable, even over a 90-minute test drive.

In practice, ADA differs from the others in that you can physically lift your hands from the wheel and watch it perform full steering movements, while the adaptive cruise control and Proximity Control Assist (pictured, p11) take care of maintaining speed. This driver found it deeply disconcerting to start with, although it did eventually prove possible to relax enough to stop fighting and over-correcting it. Half of that battle was making use of the functions that allow you to set a preferred distance from the kerb. The other half was simply time.

Still, the Actros 5 with ADA is no more a self-driving vehicle than any of the other examples. “The driver is supported by these safety assistance systems, but is still under an obligation to adjust their driving style and speed to the prevailing conditions, as all systems have their limits,” cautions Jamie Fretwell, Mercedes-Benz PR & corporate communications manager. “The person in control of the vehicle is responsible for the entire process of driving, at all times.”

The driver’s presence is confirmed via two sensors on the steering and another under the seat, and if it detects a ‘hands-off situation’, a cascade of visual and audible warnings is triggered after 15 seconds. The latest version, Active Drive Assist 2 with Emergency Stop, is available from June, and does what it says on the tin. If, after 60 seconds of increasingly regular and frenetic alerts, the driver still hasn’t put hands back on the wheel, the vehicle will bring itself to a standstill.

Needless to say, the ‘eyes’ behind this are the camera and radar at the front of the truck, combined with the GPS-guided elements of the predictive cruise control. But the electrically-assisted Bosch Servotwin steering that allows the truck to use all this data is, unfortunately for us in the UK, situated in the space where a lift axle would normally rise. This means that Active Drive Assist is not available on 6x2 mid-lift tractors, for the foreseeable future. [IE](#)



*A diagram of automated lane keeping controls. A front-facing sensor detects the lane markers and prompts multiple course corrections. Image: Scania.*