

# Seeing all the angles

Wheel alignment is an often-neglected tool for reducing running costs. Will the introduction of so-called 3D technology change that, asks Richard Simpson

The benefits of wheel alignment checks on commercial fleets cannot be overstated. They were quantified in before-and-after studies undertaken as part of the government's Freight Best Practice initiative a decade ago (see links). These real-life exercises demonstrated that, across a fleet, fuel savings of from 3% to almost 19% could be generated; steer axle tyre life increased by 22% and drive axle tyre life by over 10%. In addition, drivers reported that vehicles with correct alignment were easier to handle.

There is a strong argument on both economic and safety grounds for wheel alignment on trucks and trailers to be checked regularly. But when, and how often? Sooner than one might expect, argues Andy Cornish, managing director of mobile CV wheel alignment service provider Steertrak. He says: "Most people think that the alignment on a new vehicle will be spot on, and it is true that most of them are more or less right when they leave the factory. But most new vehicles are fairly poorly



aligned when they first enter service.

"Wheel alignment changes when a vehicle is first put under load. It can change when the weight of the body is added by an intermediate manufacturer, and it will almost certainly change again the first time the vehicle is loaded with cargo. And there is a further period of bedding in when the vehicle is first in service. So, ideally we'd recommend that the wheel alignment is checked at PDI and again the first time the vehicle goes in for its six-weekly inspection. After that, they will be pretty sturdy, and an annual check undertaken prior to the submission for MOT testing should be sufficient, unless the vehicle is working in a combined on/off-highway environment, or has been damaged in an accident," Cornish advises.

In between alignment checks, drivers and inspectors should, as part of their routine checks, be monitoring tyre tread depths. A tyre showing abnormal wear on the inside or outside of the tread is an indication that wheel alignment is out.

As the vehicle ages, repairs may also cause problems. "When a vehicle gets older, steering and suspension components will wear out," Cornish warns. "Every time a part, such as ball-joints or draglinks, is changed, the wheel alignment should be checked. If the vehicle is still on a repair and maintenance contract, it's too easy for the dealer to regard wheel alignment as a discretionary procedure that can be dropped to save money."

## HOW IT WORKS

Like most modern wheel alignment providers, Steertrak uses laser technology. Bars with measuring gauges are attached to the front and rear of the vehicle using the centreline of the chassis as reference, and laser projectors are precisely attached to each wheel using the centre of the axle stub. Cornish argues that a weakness of many car-based systems is that they often attach the lasers to the wheel rim, so their readings can be compromised by distortions in the wheel. The check should ensure that non-steered axles



**JUMBO 3D**

While 3D alignment systems are currently largely confined to the car market in the UK, Indian company Manatec Electronics has developed a truck-specific machine, the Jumbo 3D Super aligner rig, which is said to be able to handle trucks, buses and semi-trailers, including the complex five-axle rigid trucks found in its home market.

The supplier claims that by using the Jumbo 3D Super, one operator can complete all necessary measurements on a five-axle truck in three minutes, compared to 40 minutes using conventional equipment.

Manatec is currently seeking a UK agent. Video - [www.is.gd/emudav](http://www.is.gd/emudav)

are positioned perpendicular to the chassis centreline, and that the axles themselves are centred correctly, parallel to one another and to the ground.

Steered axles need to be adjusted to give the correct amount of 'toe-in' or 'toe-out' (the degree to which the wheels point towards or away from the centreline of the vehicle) on both sides. Dedicated truck systems need to be accurate to within 0.15° because of the vehicle's size. Car systems are generally less accurate; some have a margin of error of as much as +/-0.75°.

An industry insider who did not want to be named says: "Many of those coming from a car background do not realise how exact a science wheel alignment is for trucks. Because of the size of the vehicle and distance between the axles, a small deviation can make a big difference to the truck's handling."

From the point of view of a driver pulling on a steering wheel, the front axle should also have the same number of turns from centre to full left lock as from centre to full right lock. This indicates that the steering box is correctly positioned, and that the Ackerman angle (which ensures both steered wheels rotate around the same centre point in a turn) is true. Twin-steers will also need checks on the second steering axle to ensure it is true, not only to itself, but also to the lead axle.

Recent developments in the

passenger car market have seen 3D wheel alignment services being heavily marketed. These use chequered reference boards attached to the wheel rims, which are scanned by cameras to establish relative wheel positions, which are then compared with a database of vehicle specifications stored within the alignment equipment, to indicate which adjustments, if any, need to be made.

The process certainly appears scientific. However, Cornish is sceptical: "Branding these systems 3D implies that other systems are only two-dimensional, and that really isn't the case. All truck wheel alignment is three-dimensional. Attaching target boards to wheel rims means wheel run-out and even tyre fitting can make a difference, so the vehicle must be moved half a wheel revolution and rescanned to take this into account."

**MECHANICAL ADJUSTMENTS**

He continues: "It's the mechanical adjustments that take the time: between 30 minutes and an hour on a commercial vehicle. To put it into context: I can train someone to take the measurements in a couple of hours, but it takes six weeks to learn how to do the adjustments."

The anonymous industry veteran concurs: "There's now a wide range of measuring technologies available, but the physical adjustment is still the most time-consuming and difficult part of the task. Wheel alignment is about

the whole: camber, caster, turning radius, king-pin inclination and toe angle. One brand's franchised network installed a truck wheel aligner in every workshop, then ended up removing them because of the difficulty in getting staff [sufficiently] competent to make the adjustments." **TE**

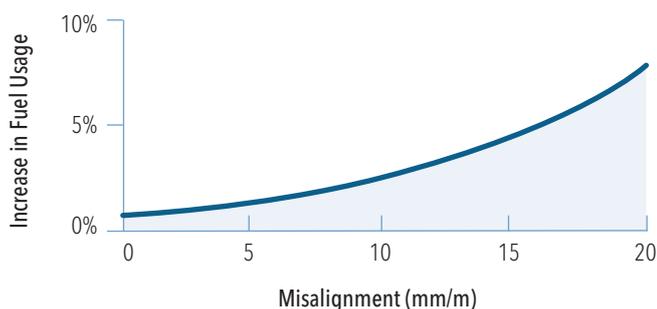
**FURTHER INFORMATION**

*DfT's Freight Best Practice (archived)* – [www.is.gd/ajamaj](http://www.is.gd/ajamaj)

*Manual wheel alignment (video)* – [www.is.gd/dayuwu](http://www.is.gd/dayuwu)

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