

Toby Clark examines the whys and wherefores of good alignment, and considers the latest technological aids

Crossing the line

Periodically checking and adjusting wheel alignment may seem obvious, but there's evidence that plenty of operators don't even think it's necessary. John Pullin, consultant for manufacturer Haweka, says: "The biggest challenge is getting people to appreciate why they need wheel alignment. Many workshops, when they replace a drag link, will count the turns on the old one [and] put a new one on with the same number of turns." They won't even check that setting.

Chris Ivory, product manager for Pro-Align, which supplies Hunter equipment, states: "As an industry I don't believe there's that focus on it, because they are not perceived as performance vehicles."

However, the benefits can be significant: according to fleet management firm Tructyre, tyre life is reduced by up to 50% with a 0.5° misalignment, and on a single axle a 1° misalignment could increase consumption by as much as 5%. Other problems include tyre deformation and handling issues.

It's not just management that needs to be convinced, says Tom Coad, technical demonstrator for Josam alignment equipment. "The guys being trained really have to buy in to wheel

alignment" – otherwise, he says, the equipment may be installed but then ignored and pushed to the back of the workshop.

Training is vital. "Wheel alignment is a specific trade in its own right," says Andy Cornish, MD of mobile service Steertrak. "When I recruit a new technician, it takes us four to six weeks of one-to-one training. It takes about two years to acquire the full range of competences."

Derek Godden of Lasalign reckons: "It takes three months to train somebody to a reasonable standard. You've got to understand what caster, KPI [kingpin inclination angle], camber and toe-out are, and what you're trying to measure." (A diagram is shown on p32.)



Simon Waye, technical support engineer at ATS Euromaster, says: "Any technician would go through a full geometry course, then receive secondary training on the equipment."

The equipment suppliers argue that while modern systems are easier to use, appropriate training, usually at least a day, is key. It's important to deal with more than the basics. And support needs to be for the longer term, and it's important to remember staff turnover, says Josam's Coad: "It shouldn't be left to just two sessions; we suggest a six-month top-up, and more as needed."

Cornish breaks down wheel alignment into three elements: measurement, adjustment and knowledge – "what to adjust, how to adjust, what to set it to".

But first, according to Pro-Align's Ivory, "you need to inspect the vehicle and replace all worn or broken equipment. Then measure and make adjustments." Godden reckons this is an advantage

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Andy Cornish

of more traditional measurement techniques: “If you jack the vehicle up you can feel for loose and damaged wheel bearings and worn kingpins.”

Haweka’s Pullin points out: “A common complaint is that the steering is pulling to the left or right. Very often that’s not because wheels are out of alignment: the steering box isn’t centralised.” Similarly, he adds: “On a driven axle, if the toe or camber is above a few minutes of angle [60 minutes equals 1°] that could indicate the axle is bent” – perhaps due to overloading – “and on a solid axle we measure axle offset to the side.”

He says the process is fundamentally different from a car, where “wheel alignment is basically aligning the front wheels to the back wheels”. Conversely, on a truck each axle should be checked against the chassis (or if the chassis side members are not parallel, the centreline of the angle between them).

Most procedures work from front to back. “On a twin-steer, we make sure toe is correct on the first steer axle,” says Ivory, “then we adjust the second axle to be parallel. We can adjust

camber, but most of the time we’re looking at toe.”

After measurement comes adjustment. Cornish calls this “the bit that takes the most time and effort. It’s not always obvious what to adjust and in what sequence – adjust one thing and something else moves.”

Knowledge comes with experience, says Godden. For example: “On a trailer with fixed axles, the nearside rear tyre always wears faster than the others.” Cornish says: “In my opinion, to get good tyre wear and fuel economy, you need to work to a tolerance of +/-1mm/m, whereas a typical manufacturer’s range is +/-4mm/m.” Setting the vehicle in the middle of the specification, he adds, “is logical, but often wrong”.

When should alignment be tested? After an accident, of course, but also whenever a steering component is changed. “Some operators will only come in when they notice uneven tyre wear,” says Simon Way, “but a check is worth doing every six months.” Godden reckons trucks should be checked at least annually, as a truck wheel may do one million revolutions per week. **TE**



DEVELOPMENTS IN EQUIPMENT

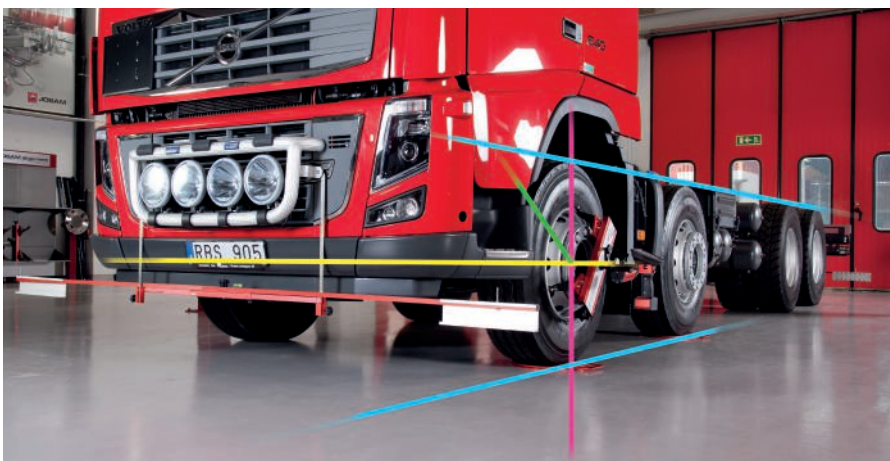
Any alignment measurement can be taken with traditional optical gauges, but lasers and camera-based equipment have made the task easier and quicker. New systems include step-by-step graphics to walk the technician through the process, before-and-after printouts and sometimes the facility to export results.

Haweka’s camera-based AXIS4000 allows measurement of alignment parameters while the vehicle is on the ground (with steering wheels on swivel plates to prevent scrub), transmitting data wirelessly to an external computer and display.

Similarly, Josam’s Cam-aligner sensor, mounted to each wheel in turn, transmits data from the camera as well as a gyroscope and inclinometer.

Hunter’s Heavy-Duty Truck Aligner can “do all three axles in one hit”, according to Chris Ivory. “The equipment is very quick and it’s repeatable. It gives live readings throughout the process, and uses a bar graph so it’s easy to see when you’re moving in the right direction.”

At the high end, the TruckCam system is used by manufacturers to check alignment at the end of the assembly line. Josam’s related i-track system, which uses mobile target scales or floor-mounted scales installed in a bay, can be similarly rapid: the firm claims that “a single operator will take under four minutes to measure a 6x2 vehicle”.



The basic wheel alignment measurements each relate the wheel to an axis passing through the wheel hub (picture: Josam). Camber: the angle of the wheel from vertical about the longitudinal axis **BLUE**; positive if the top is tilted out away from the centreline of the vehicle. Caster: the angle of the steering axis from vertical about the transverse axis **YELLOW**. Toe: angle of the wheel about the vertical axis **MAGENTA**; toe-in if the front of the wheel is tilted in towards the centreline of the vehicle. KPI: the angle of the kingpin axis **GREEN** relative to the vertical **MAGENTA** axis.