



A weary TASK

The answer to the first question is of course no. They should not rely solely on brake pad wear monitoring systems, as any technician who has been licensed under irtec would know. (The scheme offers a measure of confidence that all parts of a vehicle will be inspected properly, as only competent technicians are awarded a licence - see also www.is.gd/vofabe).

There are a number of reasons why relying solely on automatic monitoring systems is not a good idea. Firstly, any electrical or mechanical system can become faulty and provide inaccurate information. While that is relatively unlikely, many brake pad warning lights will only be activated when brake pads are approaching the end of their useful lives. Monitoring the wear rate up to that time should ensure that dash warning light does not come as a surprise. "An overly aggressive brake can generate excessive heat, which can both damage the integrity of the pad (with segments crumbling) and cause cracks on the disc," explains Neill Groves, sales and marketing director at brake manufacturer BPW.

Of all the safety critical systems on board a truck, brakes grab headlines when things go wrong. Brake pad wear monitoring systems provide fleet engineers with another tool. Should operators be happy to rely on this automatic monitoring system on its own, or take a more active role in monitoring brake lining wear, asks John Kendall

The second reason is that vehicles or trailers with drum brakes (pictured p20) are unlikely to be equipped with an automatic monitoring system. The method for assessing the state of wear for drum brakes is the time-honoured process of making a visual inspection of the linings through the brake drum backplate inspection cover. This would normally take place during a planned maintenance visit.

HOW IT WORKS

Traditionally, disc brake pad wear sensing has been carried out by sensors that wear out with the brake pad and need to be replaced when new pads are fitted. The sensors are mounted on the brake pad, and when the pads are worn to the extent that replacement will be needed fairly soon, the sensor will illuminate a warning light on the dash panel.

Multi-stage monitors enable the system to not only warn when replacement is essential but also calculate the remaining life of the brake pad. To quote from Bosch's brake pad wear sensor description: "Multi-stage sensors have resistor circuits at different heights in the sensor housing. When the first resistor circuit breaks, the vehicle's information centre will start calculating the remaining brake pad life using various inputs such as mileage, wheel speed, brake pressure, brake temperature and brake operating time."

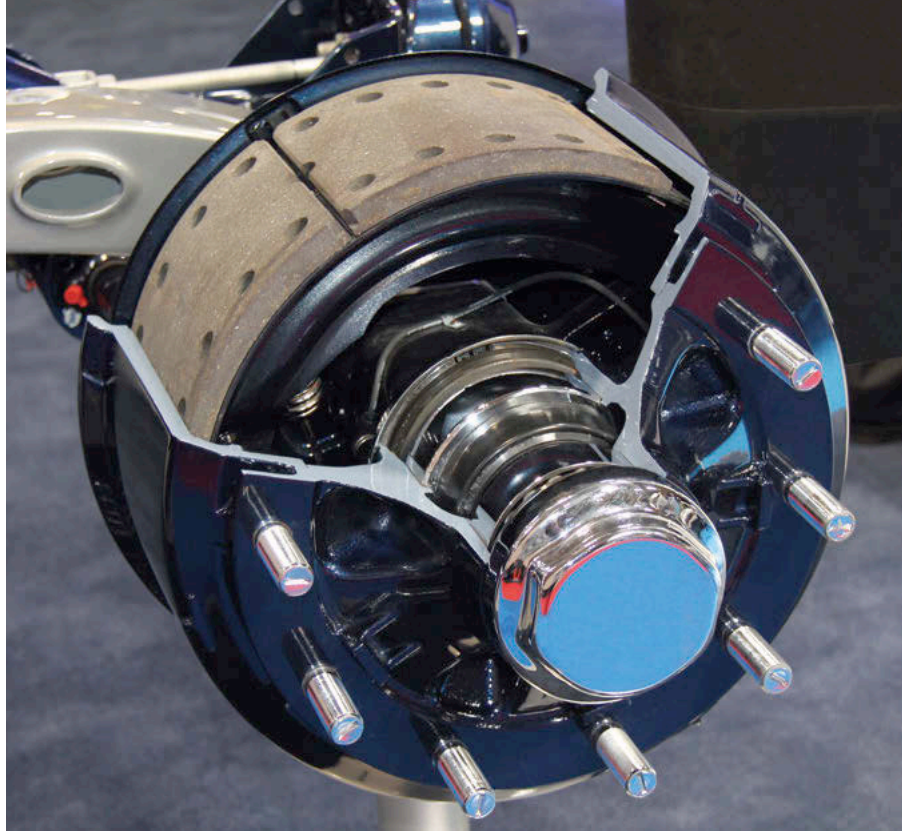
Aaron McGrath, technical manager at Scania Trucks (GB), describes how this process works on a Scania. The brake pad wear monitoring is performed by the brake calliper potentiometer, which measures the remaining thickness of the brake pads. The potentiometer signal is interpreted by the EBS control

module and then broadcast on the vehicle's CAN bus system. The driver can view the brake pad wear directly in the instrument cluster menu. A warning comes on in the instrument cluster when there is less than 5% of the wheel brake wear surface left, or if the difference in wear exceeds 25% between wheels on the same axle. Operational data from the vehicles is sent to Scania servers via remote diagnostics, and from there parameters such as brake pad wear are visible to anyone within the Scania dealer network.

UNEVEN WEAR

Apart from differences in wear on the same axle, traditionally, brake pads do not wear out evenly front to rear. The front brakes on any vehicle will tend to have higher wear rates because they perform more of the braking than the rear wheels.

EBS systems can help to compensate for this, and Volvo Trucks uses such a system, called 'lining wear control', as product quality engineer Paul Bodycot explains. "Lining wear control will try to balance the brake pads out so that they are all changed together, so you're not



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changing the front axle one month and then, two months later, you change the rear axle. What it will do is try to balance the brake pads out to wear them evenly."

The pad monitoring system is designed to maximise brake pad life, and in the process, minimise the amount of service downtime. This doesn't always work out in practice, though. Bodycot adds: "Some customers don't want to come in between services because it keeps the truck off the road, so we kind of do a predictive thing in the workshop." This involves reviewing the vehicle's service record, which might indicate, for example, that at the last service, the brake pads had worn 4mm, while they will need changing after

another 4mm of wear. In that case, the workshop might choose to change the brake pads early. "In practice, it would be really nice to wait until the warning comes on and then you bring it in, but with customer demand, that's not always the case."

Trailer axle manufacturer BPW's monitoring system operates in a similar way to those on tractors and rigids: by measuring the travel of the pistons in the callipers to indicate how far they have moved, and therefore how much of the pad is remaining, explains Groves. The sensors are linked to a control unit, so both brake pad and disc wear can be viewed via the Idem Cargofleet 3 web platform, and also on the Driver app. **TE**

THE NEXT STAGE?

A modern truck is constantly producing massive amounts of data - from brake wear pad monitors, for example, or from forward-facing cameras, telematics, load monitoring, or vehicle security. Multiple systems are generating and storing data around the vehicle. It may be useful for some of that data to be shared, for example, case of breakdown.

One supplier, at least, is now offering this service. Innovative Safety Systems (ISS) began by

producing camera systems for vehicles. These would store information on accidents and incidents, and an obvious addition was to include mapping information so that the event could be given a location. This evolved into providing tracking information and is now evolving again to include data from the vehicle.

Clearly there are sensitive data issues, and OEMs will not share some data, but as Gavin Thoday, chief executive officer at ISS

(pictured) explains, over 90% of the key information is available. Taking the case of a brake pad warning light, Thoday says: "That information and our technology will go straight through to the workshop over the air via 3G/4G and it will tell the workshop that it needs to order a new set of brake pads and get that vehicle in."

