

Feeling the HEAT

Tyre blowouts are dangerous and expensive. Kevin Swallow discovers that identifying external heat might just prevent them from happening

There is no doubt about it; tyre pressure monitoring systems (TPMS) help an operator to get the best from a tyre, not only in terms of mileage but fuel efficiency as well. TPMS fitment is likely to be made mandatory on new trucks in 2022; in the meantime, the focus from the industry - third party suppliers and OEMs - is specific to tyre pressure and heat generated by subsequent changes in tyre pressure.

Currently, many of the OEMs offering TPMS do so as an option. A notable exception is DAF, which has offered a TPMS system that includes tyre pressure and heat sensors since late 2017. Using Bluetooth, it feeds back information and uses a traffic light system to warn the driver: green if it goes 20% below prescribed inflation levels, yellow if the temperature inside the tyre goes over 100°C and red if the tyre pressure goes below 60% of its pre-set level.

Alternatively, truck operators like Hamilton Waste & Recycling retrofit TPMS systems such as Continental Tyres' ContiPressureCheck. Keir Hamilton, a director of the family-owned business, says: "With every truck equipped with ContiPressureCheck, all drivers have an in-cab monitor showing real-time pressures and temperatures for each tyre. This means we can spot and repair

possible punctures before a tyre is destroyed as a result of running flat."

David Howe, Goodyear's commercial sales general manager for UK and Ireland, says its Proactive Solutions TPMS system uses a rim-fitted sensor to collect and monitor tyre pressure and temperature data in real time (pictured below, right). The system uses this data to detect under-inflated tyres, air leaks and mechanical issues. He says that operators using its system have benefited, as tyres work up to 15% longer and they see an 85% reduction in tyre-related breakdowns.

Howe lists the main reasons for a tyre to fail: "Rapid wear through misalignment, road hazards and underinflation. The latter causes tyres to heat up far beyond normal operating temperatures, and can be exacerbated when driving long distances. The heat can cause the rubber to degrade, resulting in a rupture in the sidewall, or tread separation."

That identification of heat triggered by changes in tyre pressure is reactive, but it also points to a fourth reason why a tyre might fail, and that is heat generated externally from the hub and brakes.

Continental's technical services general manager Steve Howat says that tyre temperature gauges can point to mechanical influences nearby



raising temperatures. For example, he says that it works for certain fleets whose primary focus is temperature and not pressure as an early indication of vehicle maintenance issues, such as those related to brake and hubs. He explains: "There are instances where trailer fires occur, and the main cause of this is related to faults such as brake binding. When a certain temperature threshold has been exceeded, ContiPressureCheck can trigger a warning to both the driver and remotely back to the fleet depot." The system includes a sensor mounted inside the tyre and a cab-mounted display (both pictured, right).

However, he admits that its main focus is the tyre itself. In fact, Continental is also working on algorithms that accurately relate tyre temperature to hysteresis in the tyre (the cycles of bending that occur as the tyre rotates). This helps to understand the effect of tyre temperature on fuel consumption.

Adding a heat measurement in conjunction with TPMS provides a more specific diagnosis, contends Nigel Blackwell, commercial director of Hampshire-based RL Vehicle Management Solutions, which markets TyreWatch. Rising heat and loss of pressure points to a slow puncture or air loss through the valve, whereas rising



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heat and increasing tyre pressure points to axle, hub and/or brake issues.

One of the most recent products to market is the Giti Fleet SMART system from Giti Tire (UK). It monitors heat and pressure; any significant change in either and it will send a notification. Tony McHugh, Giti's TBR sales and marketing director UK, says the TPMS system uses a software algorithm to predict the tyre's life once it is damaged or losing pressure, and adds that picking up changes in heat acts as an early warning system for tyre, hub and brakes.

Tyre blowouts are caused by excessive heat in the tyre. As they are rarely due to the tyre itself, it is important to know why the tyre heated up prior to failing. "The transfer of heat from the hub and the brakes means that the one

thing that will go first is the tyre rather than the metal," argues Gary Thomas, group director of Wheely-Safe, which partnered with Michelin to market its TPMS, wheel loss sensor and heat sensor system on licence for the truck market.

Its alarms are set to go off when pressure deviations exceed a certain percentage of its calibrated pressure. If pressure drops 7.5% or goes 20% above the calibrated pressure, Wheely-Safe delivers a maintenance alert via the telematics to the office, but not the driver. If it goes below 15% or above 30%, the driver is then warned. It also issues a warning if the tyre loses more than 2psi per minute. The system replaces the dust caps, with each using an LED light for identification if there is a problem.

Wheely-Safe's heat alarms are set at specific temperatures: 100°C for the tyre gauge; 90°C for the external heat sensor for the hub. This is combined with a wheel loss sensor that will issue an alarm if a wheel nut moves 1mm.

"Nobody else has got this - combining a wheel loss sensor and a heat sensor," Thomas claims. "It alerts the driver that his brakes might be inefficient and if the hub is breaking

down, so it's a pre-alert."

Based on his own personal transport experience,

Thomas argues that the nearside rear tyres are the most likely to pick up damage during operations, as the sidewalls are more likely to come into contact with the kerb. Another tyre prone to being overlooked is the inner tyre of a twin, usually on a drive axle. That can be difficult for the driver to check properly for damage, and even more so for hub and brake heat issues.

One aid may be remote sensor technology, according to Darren Hartley, sales, marketing and technical support for Autogem, a supplier to the automotive industry, which launched its i-sensor TPMS system for commercial vehicles at the Automechanika 2019 trade show in Birmingham last month. The system, which sends tyre pressure and heat information to handheld or truck-mounted systems, as well as to back-office systems, is brand-agnostic. Third party suppliers like Autogem can access the radio frequency sent from PCB sensors. He says i-sensor is already compatible with systems from DAF Trucks, Mercedes-Benz, Continental's ContiPressureCheck and WABCO's OptiTire, and adds that it can provide blank sensors that can be programmed to replaced damaged ones. [TE](#)

