



**Tyres may not be the most glamorous of truck and trailer components, but, reporting from the IRTE Conference 2012, John Challen finds that a vehicle's boots influence its operational costs, efficiency and safety**

**H**istorically, tyres have not been given the attention that some now argue they deserve. That's probably because most fleet managers have been happy enough once they've found tyres that offer a long enough sustainable life, with good traction and wet braking ability at a reasonable price.

Hence, low rolling resistance tyres and other technical innovations, such as tyre pressure monitoring systems (TPMS) and laser-based tread depth scanners, had, until recently, largely failed to register with many operators.

But Greg Ward (left), Bridgestone UK's commercial director, told delegates at the IRTE 2012 Conference in September that the industry is seeing big changes, partly prompted by advances in tyre technology, but also the urgent need to cut fleet

# Rubber

diesel costs. "Some operators have fuel bills that run into millions of pounds and we need to reduce these costs, and see what we can contribute to the industry through tyre technology," he stated.

Ward made the point that tractor axles – both steer and drive – have been the first to see green tyres. "But 50% of the potential savings come from tyres used on the trailer, and the force and drag they create," he insisted. That matters, he added, because at a constant 80kph, about 40% of fuel consumption is caused by tyre rolling resistance – the other elements being aerodynamic drag (50%) and mechanical friction forces in the drivetrain (10%). As a result, there is plenty to be gained from introducing low rolling resistance tyres across fleet combinations.

So what's the difference? "The construction of low rolling resistance tyres is different to that of standard units, notably in terms of tread design, casing and compound material," explained Ward. Bridgestone, he said, has developed what it calls NanoPro-Tech, a material based on silica and rubber in the top compound, cooked and baked using a new process. That leads to green tyres, offering reduced friction and energy losses – so less fuel consumption – without compromising performance, in terms of durability and abrasion.

To prove the claims, Ward pointed to trials undertaken at Millbrook Proving Ground on a Mercedes-Benz Axor 2543 tractor unit (with a 428bhp Euro 5 OM457LA engine) coupled to a flatbed tri-axial semi-trailer, half loaded at 22 tonnes. In this test, the best conventional steer and drive

tyres in the Bridgestone line-up were pitted against its Ecopia and Ecopia II low rolling resistance fuel efficient tyres (315/70R22.5).

Millbrook engineers performed the tests and, on a high-speed, steady-state cycle, where speeds of up to 90km/h were maintained, the Ecopia tyres, fitted to both tractor unit and trailer, helped achieve a fuel consumption figure of 9.5mpg. Compare that with the company's standard R297s on the tractor unit and R168s on the trailer, which notched up only 8.9mpg.

Then on the city cycle, following a typical stop-start pattern, although the variance was not so great, it was still significant, at an average of 7.2mpg for the all Ecopia tyres line-up versus 6.9mpg for the standard tyres.

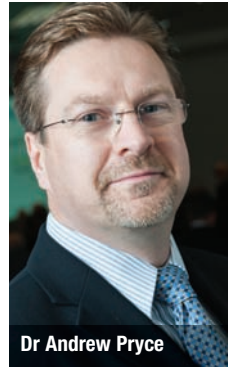
Putting these figures into context, Ward showed a

pressure, temperature and battery status.

But it's not just about rolling resistance or pressure, conference heard: tyre age and condition matter, too. Tyres gradually improve in rolling resistance with age – meaning there is sound financial sense in keeping tyres on vehicles for as long as possible not only to save the cost of replacement, but also to keep running costs as low as possible. However, that requires a change to tyre condition monitoring and management, as the next speaker, Dr Andrew Pryce, managing director of Sigmavision, told the Gaydon delegates.

**Age and condition**

“Tyre wear can be accelerated for a number of reasons, including inflation, problems with the vehicle [wheel alignment and condition] and even the driver,” he suggested, pointing to aggressive driving behaviour.



**Dr Andrew Pryce**

# resources

computer model, and gave the example of a fleet of 50 trucks averaging 7.5mpg and covering 150,000km a year. “Despite fuel efficient tyres costing 10% more and having a life expectancy of 90% of our regional products, you can see a potential saving of £181,211 per year across all the axles,” Ward calculated.

**Handle the pressure**

Beyond the tyre itself, though, TPMSs are starting to grab the attention of fleet managers. Quite rightly, according to Ward, who presented data demonstrating that a 20% drop in tyre pressure cuts tyre life by as much as 25%. And there's increased fuel consumption on top, with Bridgestone claiming that tyres inflated to 9bar fall back to 7bar after 16 weeks, resulting in a 5% increase in fuel burn. Clearly, if you're not monitoring pressures regularly, there's little point in fitting low rolling resistance tyres: all the gains will be lost in waste.

Bridgestone has developed its own TPMS with food distribution giant Arla, which has already seen significant benefits. Quoting Peter Eriksen of Arla Denmark, he said: “Using this device on all our vehicles' tyres in Denmark, Sweden and the UK saves us 350,000 litres of fuel and 945 tons of CO<sub>2</sub> emissions annually... Furthermore, we can now detect punctures faster and avoid potential breakdowns.”

Ward explained that Bridgestone's TPMS monitors each tyre's pressure either as the truck passes through a 'gate' or via a handheld receiver. The sensor sends a data package, containing wheel ID,

“Yet, as an industry, we use primitive techniques to measure tread depth and tyre wear – risking excessive fuel usage, and CO<sub>2</sub> emissions and ultimately compliance.” And he pointed to the fact that tyre condition, and in particular tread depth, is the second highest reason for failure at MoT testing.

“We have a lot of sympathy with fleet checkers and tyre inspectors who have limited time to inspect a vehicle. We think it isn't a question of working harder, but more working smarter,” reasoned Pryce. “The tools used are the weak link here, so that is why we are applying laser-based technology to tyre management.”

And for those who may have heard it all before, he went on to catalogue reasons for failure with various proposed tyre monitoring technologies, including laser systems. Citing eddy current sensors, he commented: “They measure the steel cord, but this changes as the tyre wears. As a result, accuracy and reliability have proved an issue.” And he agreed that some laser-based systems and scanners have also proved ineffective, particularly on wet and dirty tyres.

“We would say, an essential attribute for a good tool is repeatability. It must not depend on where you put the gauge, the angle you use or how hard you push. It also needs to be non-contact and fast, because we need to make it easier for the guys working on the tyres.”

And hence his company's systems, developed as a hand-held scanner and drive-over pad. “If we can extend the lifetime of the tyre, we can reduce operators' fuel costs, CO<sub>2</sub> emissions and tyre costs. And if, through better management, tyres don't get down to dangerous tread depths, we have an improvement regarding compliance.”

**Left: Greg Ward  
“Some operators have fuel bills that run into millions and we need to reduce these costs ... through tyre technology”**