

At face value, increasing fuel efficiency via low rolling resistance tyres seems to be an obvious win, particularly for OEMs that are measured on transport decarbonisation. But for operators, there is a balance to be struck between saving money on fuel, only to spend it again replacing tyres. Is it possible to have it all, asks Lucy Radley



Tyre choice is all about resolving a variety of conflicting interests," states Steve Howat, general manager, technical services at Continental Tyres. "Not all of these requirements complement each other, so there are always key conflicts that tyre manufacturers must bridge to achieve the best results for our customers. Mileage and rolling resistance are two typical target challenges."

Continuing technical advancements in tyre contour, pattern, construction and the compounds themselves all help narrow the gap. But Continental's philosophy is that the best way to reach a balance is by using tyres specific to the application, such as long-haul versus more regional distribution. This means for each application using different compounds - blends of rubber, various fillers, carbon black and silicon, or silane - and applying other technologies seen in the company's car tyre ranges to commercial vehicles.

One example pertinent to the tyre wear versus rolling resistance dilemma is cap and base technology. "This system sees the cap compound, which is in contact with the road surface, focus on transmitting forces to the road effectively," Howat explains. "Meanwhile, the base compound -

ROLL CALL

THE SMALL PRINT

Bridgestone claims that a 6x2 tractor pulling a tri-axle trailer fitted with Ecopia across all axles could result in a net saving as great as £6,000. Here is an explanation of how that figure was calculated.

This rough estimate assumes that the tractor unit rides on 315/70R22.5 tyres (by far the most common size on Euro VI trucks) pulling a tri-axle semi-trailer riding on 385/65R22.5 tyres. The application is UK regional distribution, from hub to single drop and empty return that runs 200,000km per year, possibly a trunking operation.

Technical manager Gary Powell states: "If the truck is currently achieving 10 mpg, and fuel is £1 a litre, and is running on tyres that all have a D fuel rating, the annual fuel cost will be just under £56,500. If we then change to Ecopia A-A-A rated tyres, we could expect 11.5 mpg, an annual cost of £49,235, giving an annual saving of over £7,000. The increased tyre bill from higher initial cost and lower mileage would be in the region of £700 to £900 per year, giving a net saving of more than £6,000."

which is underneath the cap compound and reduces heat build-up - focuses on lowering rolling resistance."

When it comes to whole-life cost, Continental is focused on this area, and continues to invest significantly. But while it now utilises various analytical tools to monitor and calculate the balance between fuel efficiency and wear, this is not without inherent difficulties. "The concept of energy-efficient tyres has been around for over 30 years," the general manager points out. "However, the real challenge has always been filtering out external varying factors from the actual direct benefit an operator will reap by switching to energy-efficient tyres." Things like vehicle load changes, differences in driving style, topography and weather conditions will inevitably muddy the water, after all.

MANY LIVES

Don't forget, however, that there is potentially more than one 'life' to be had from a premium tyre. "All Continental energy-efficient tyres are retreadable and regroovable," Howat



“There will come a time when a high-grade silica truck tyre will either equal or out-perform a pure carbon-black truck tyre in wear performance”

Gary Powell



assures. “Retreads are one of the most effective ways to increase the overall lifespan of a tyre and meet customer demand for efficient tyres which maximise value and improve bottom line margins.”

Bridgestone, for one, invests in research and development into tyre compounds in a bid to help solve this conundrum. A successful example of this is Techsyn. “This combines chemically optimised synthetic rubber with tailor-made silica,” explains Gary Powell, Bridgestone’s technical manager. “It creates tyres with up to 30% better wear efficiency, and a rolling resistance that is reduced by up to 6%.”

For decades, truck tyres have been made using carbon black as a filler and reinforcement agent, improving the physical properties of rubber and intensifying the vulcanisation – or hardening – process. Next came silica, which improves rolling resistance, and was first added to tread compounds over 30 years ago, reducing energy loss. Now, we’re a step on again, with new high-grade silicas and mixing techniques.

Unfortunately, as Powell points out, there’s still a downside – wear resistance of silica compounds is less than that of carbon black compounds. “Because of this, tyre designers and engineers work tirelessly on improving

wear performance by advancements in casing, tread pattern and groove shape design,” he says. “There will come a time when a high-grade silica truck tyre will either equal or out-perform a pure carbon-black truck tyre with regards to wear performance.”

In the meantime, Bridgestone is confident that the use of any of its range of existing low rolling resistance tyres will result in sufficient fuel savings to outweigh their relatively shorter lifespan. Its flagship product for highway usage is Ecopia (pictured below), for which it has a A-A-A rating. Powell claims that, on a 6x2 tractor pulling a tri-axle trailer, use of this tyre across all axles could result in a net saving as great as £6,000 or more, assuming a 200,000km annual mileage (see box, left, for calculation.) Bridgestone also has low rolling resistance products specifically aimed at regional and on/off road applications within the range.

“As a premium tyre manufacturer, total cost of ownership is a fundamental business strategy, as we compete with all players within the tyre market, whether they be budget or premium,” Gary Powell adds, finally. “Therefore, new, regroove, retread first life and retread second life, is essential for maintaining strong value for our customers.” Indeed, Bridgestone tyres are built to be regrooved and

retreaded. “It is not a cheeky add-on, but an integral part of the design.”

Michelin’s take on all this is rather less detailed, instead going straight to the bigger picture – and to the point. “The rolling resistance of all tyres reduces as the tyre wears down,” says Rob Blurton. He’s Michelin’s senior technical field engineer in the UK and Ireland. “Michelin engineers its tyres to be as consistent as possible down to the last millimetre,” he continues, “at which point they can be re-grooved, extending the life of that tyre by up to 25% during the phase where it offers the best fuel economy.”

MATERIALS AREN'T EVERYTHING

Blurton is keen to remind us that this isn’t all about the material the tyre is made of. “The rubber compound is only one aspect of tyre design,” he says. “The casing and tread pattern also impacts its performance, and Michelin offers a range of tyres depending on the specific needs of a customer.” This is, perhaps, the key, as is good tyre management on the vehicle. “Provided the operator chooses the right tyres for the vehicle,” Blurton concludes, “it can enjoy fuel savings and long tyre life.” Especially if the tyres are re-grooved and re-treaded and then re-grooved again: “All Michelin commercial vehicle tyres are retreadable and regroovable.” **TE**

