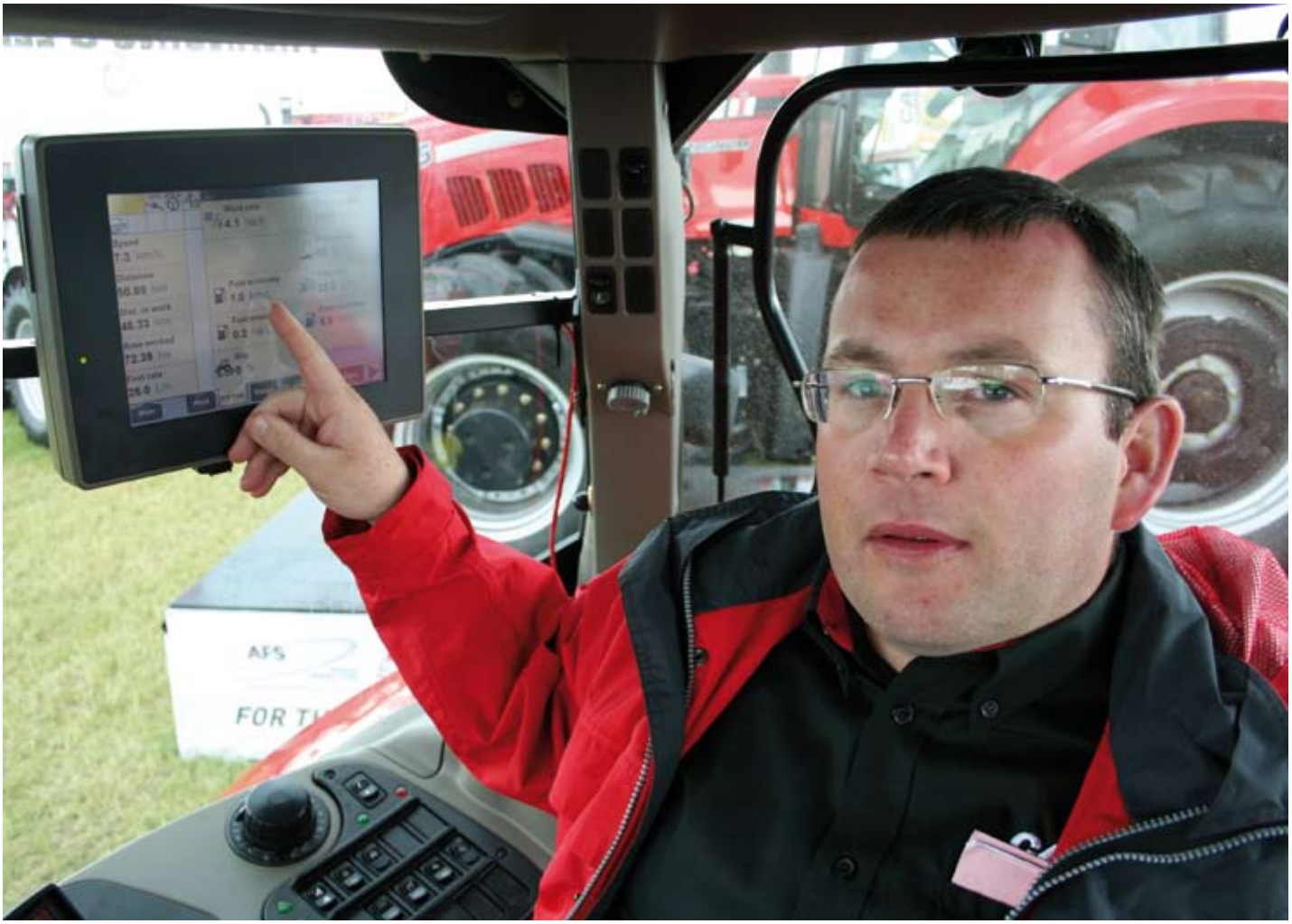

Information at your fingertips – Michael Gillon points out the numerous fuel consumption read-outs on the Case IH monitor available for Puma and other tractors.

All systems go for cutting fuel costs

There were plenty of tips and technologies at Cereals 2008 to mitigate the rising price of diesel. From 'fuel-considerate' tractor driving to low-draft implements for cultivating and drilling, they could have a significant impact on fuel bills. *Peter Hill* reports

If ever the messages from equipment manufacturers at the Cereals event had a common thread, it was no more apparent than this year's dominating theme: How to cut fuel consumption.

Tractor makers emphasised fuel-saving engine and transmission technologies and urged drivers to make good use of them, while tyre makers promoted a best-practice approach to ballast and inflation pressure management.

Tillage equipment firms, meanwhile, highlighted "low-draft" tine designs and use of implements in combinations. They also said growers could save fuel by working a little shallower and by avoiding "cosmetic cultivation" to improve a cobbly seed-bed, the cost of which outweighs any agronomic advantage.

Specialists in the drill sector, naturally, pushed direct drilling as an obvious fuel-saving option. They acknowledged it was not for everyone, but argued a case for strategic use of the technique.

Employing a contract direct-drilling service when individual crops, soils and conditions present an opportunity would be a useful cost-saving option, they suggested, while sticking with a minimum or conventional establishment approach for most of the acreage.

High fuel prices are unlikely to go away, but the cumulative effect of various economy measures will help offset them.

TRACTOR TIPS AND TECHNOLOGIES

Get to know the power and torque characteristics of your tractor and get them working in your favour. That was the advice from tractor specialists at Cereals to operators keen to shave litres off their annual fuel consumption.

"There is no point running modern engines at full speed, because that is not where they produce the most power or torque," said Paul Wade, product specialist at McCormick. "Most engines develop maximum power a few hundred revs lower down the speed range, closer to where torque output is highest."

Mr Wade's advice for draft work: Keep changing up to get the engine working hard, but with some torque in reserve to cope with the extra load imposed by moving into a patch of stiffer soil.

"You'll not only see an improvement in productivity, it'll also make a tremendous difference to fuel consumption by running the engine at peak efficiency," he said.

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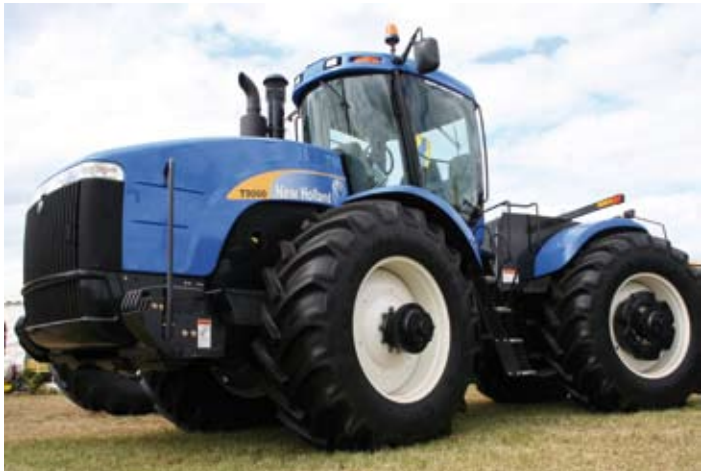
Paul Wade's top tips

- Learn how to exploit the power and torque characteristics of modern engines
- Load the engine for maximum fuel/output efficiency – high revs equals more fuel consumed for no gain
- Ensure tractor is regularly serviced, especially air filters to keep the engine breathing freely
- If hydraulic oil drawn from transmission has been over-filled to tip big trailers, revert to correct fill level to cut drag



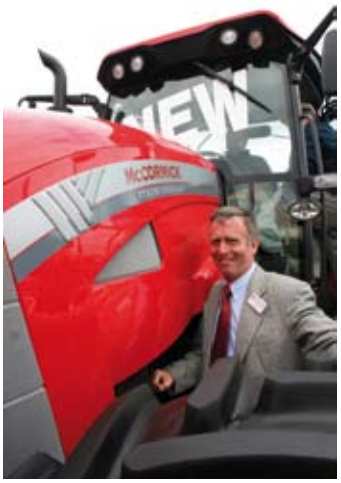
Power rather than economy is the focus of the T9000 series four-wheel drive tractors launched by New Holland at the Cereals event. That said, the turbo-compounding technology used on the 541hp T9050 is reckoned to make it especially fuel-efficient for its size. Having passed through the turbocharger, exhaust gases then spin a power turbine connected to the engine's crankshaft by a fluid coupling and spur gears. Compared with the bigger-volume engine in the T9050's predecessor, engine power output is increased by up to 8% and fuel consumption is down about 3%, says New Holland.

Multi-powershift transmissions – such as the eight-speed unit on the 167/171hp McCormick XTX165 and 198/213hp TTX210 shown at the event – can help by giving operators close steps and plenty of ratios within typical working and transport speed.

Automatic shifting technology can also help, because operators are often inclined to find a comfortable gear and stick with it rather than keep shifting. Most semi-powershift gearboxes have auto-shift for road use, but Massey Ferguson Dyna-6 AutoDrive and Claas Hexactiv, which both have a four-range, six-speed powershift configuration, also have auto-shift for field work.

By allowing the operator to set the engine speed for upshifts at between 1600 and 2200rpm, AutoDrive allows users to tailor the system for individual jobs and operating conditions. Massey Ferguson field comparisons between manual and auto shifting show a 10% improvement in area worked and a near-12% reduction in fuel consumption.

A well-matched engine and step-→p18



Technology can help improve fuel consumption, but operators must learn how to make the most of it, said McCormick's Paul Wade.

less transmission can also yield fuel savings. At Cereals 2008, Fendt made much of the performance of the 200hp 820 Vario TMS tractor in trials carried out by the DLG organisation in Germany. It came out top for fuel economy versus rivals for heavy cultivation and mixed work, a close second for pto operations and first overall.

"Compare the 'powermix' result for the Fendt and the worst performer and the difference is a staggering 9.4 litres/hour," said Tony Bourne, product specialist. "At 65p/litre, that's a potential saving of more than £6000 over 1000 hours."

On transport operations, CVT transmissions will automatically "gear up" and allow engine revs to fall off once the required cruising speed has been reached. Powershift tractors with "economy" 40kph gearing will do the same, with revs typically allowed to fall to 1800rpm once the tractor has accelerated up to speed.

The 40kph Eco transmission on the New Holland T7000 tractors has a direct-drive design that minimises power loss through the transmission. In top gear, drive goes through the power take-off shaft from the engine and is picked up by the rear axle through a set of transfer gears.

Lemken's Tom Hirst with the Tansanit "intelligent" plough. The key feature is the large hydraulic top link, which, under electronic control, transfers up to 2.5t to the tractor's rear axle to give it plenty of traction.

"Combined with good fuel management to the engine, this system can help drive down fuel consumption during road transport," said Richard Hollins of New Holland. "In comparative tests, we have seen a T7000 tractor use 15% less fuel than a competitor."

Valtra has taken a different route with its EcoPower tractors, using engine control electronics to provide two sets of power and torque characteristics.

"In Power mode, rated engine speed is around the universal 2200rpm; Eco mode drops the rated engine speed to just 1800rpm," said product specialist Andy Miller.

"Despite this speed reduction, torque is increased by between 5% and 20% with a wide, constant range and with maximum torque coming in between 1100rpm and 1200rpm."

The slower engine speed of the Eco mode not only reduces engine wear and noise, but also fuel consumption. Valtra claims about 10%, but real-life comparisons of daily →p20

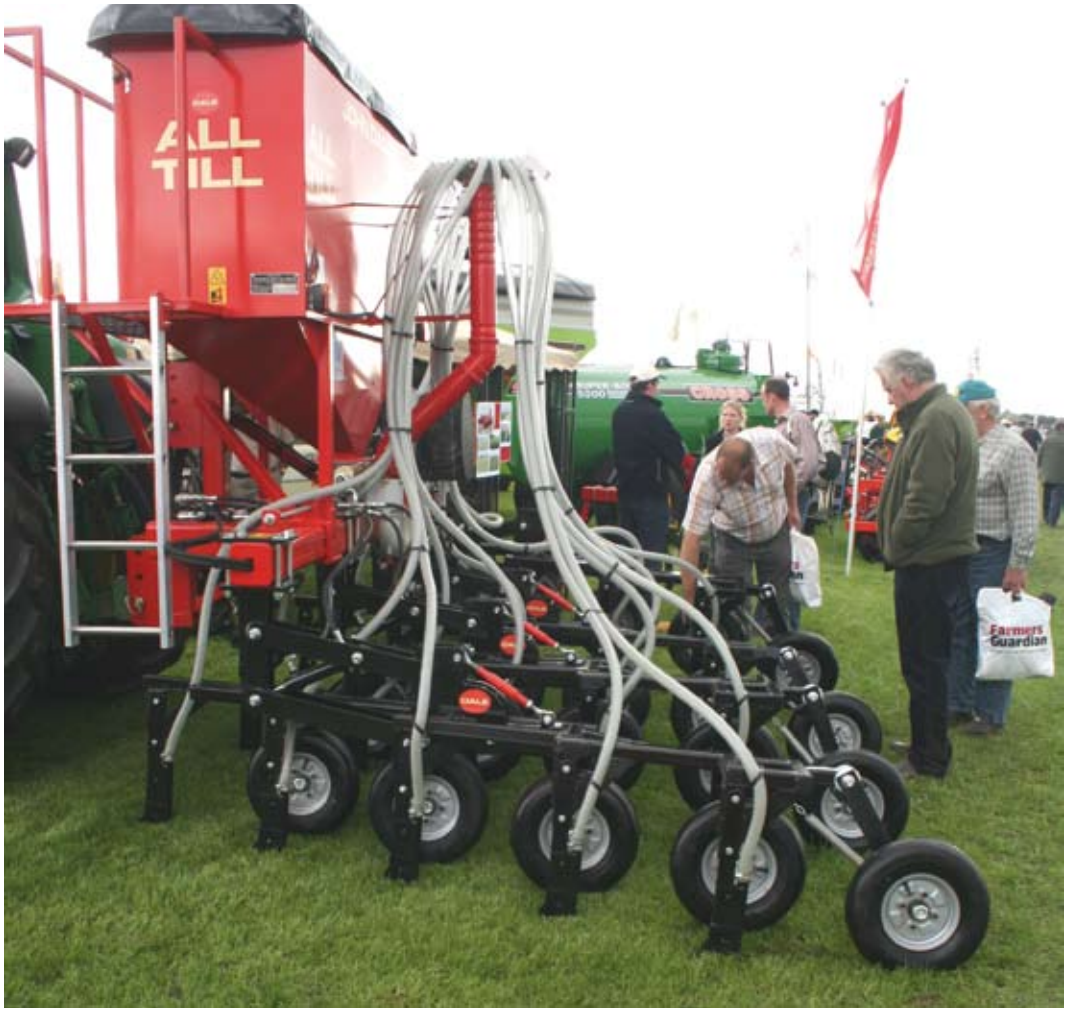
work routines are said to be showing bigger savings than that.

Giving operators good information about fuel consumption would encourage them to be more fuel-efficient, said Michael Gillon, product specialist at Case IH.

"Some read-outs give you litres per hour, but that's a very narrow viewpoint and of limited value if you are trying to improve fuel consumption," he said. "Consumption has to be related to work done, so the pillar display on our Magnum, Steiger and CVX tractors shows litres/hour and litres/ha."

Add an ISOBUS-standard Case IH AFS monitor to set up and control tractor and implement functions and the driver gets more information, including fuel consumption by distance as well as area and fuel efficiency measured as kW/litre.

"Once armed with that information, operators can experiment with different driving strategies to find out what gives the best balance between productivity and fuel usage," said Mr Gillon.

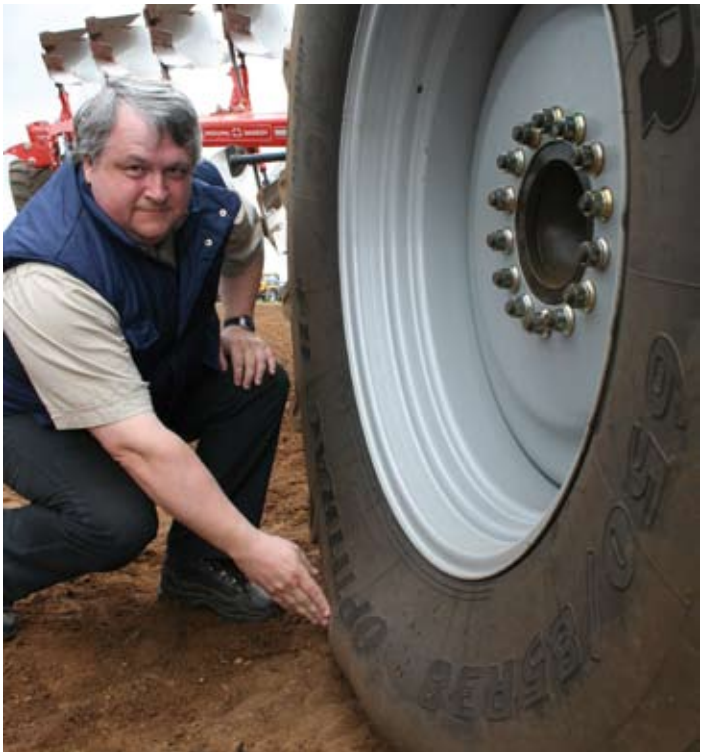


The All Till has a tall, slim hopper to keep the weight as far forward as possible. It holds about 1200kg of wheat and uses an Accord seed metering and distribution system.

PULLING POWER

A new generation of "intelligent implements" could help growers curb fuel costs by enabling mid-size tractors to match the output of thirstier, higher-powered models.

The first such implement, Lemken's Tansanit reversible plough, is already putting this theory into practice. Its key feature is an active hydraulic top link with an electronic control system that automatically transfers weight to the tractor's rear axle to improve traction.



Mark Turner of Goodyear points out the tough but flexible sidewall that allows the Optitrac R+ to support heavy loads, but to operate at low inflation pressures.

"It's a cross between a mounted plough and a semi-mounted plough that combines the best features of both," said Lemken's Mark Ormond. "A mounted plough is good for weight transfer in work, but a big tractor is needed to lift it. A smaller tractor can handle a semi-mounted implement of the same size, but lack of weight transfer means traction is often a limiting factor."

The Tansanit's three-point linkage headstock incorporates a pivot that allows the plough to trail on its support wheel during transport. For work, the pivot is locked and the support allowed to castor so that the plough swings round behind the tractor; it needs headlands little wider than when using a mounted plough.

Pressuring the hydraulic link transfers the equivalent of up to 2.5t to the tractor's rear axle, but it will still extend and retract to compensate for undulations.

"It makes a huge difference to traction," said Tom Hirst of Lemken. "We've achieved the same outputs using a 160hp tractor as much bigger power units working with a mounted plough and the difference in fuel usage can be dramatic."

In one case this spring, on light, sandy soils, the seven-furrow Tansanit worked alongside a farm's six-furrow mounted plough pulled by a 260hp tractor.

"The farmer didn't believe we could pull it, let alone achieve a decent work rate," said Mr Hirst. "But we pulled the plough, recorded a slightly higher output and then pointed out we'd done it with the tractor in two-wheel drive."

Comparing the on-board read-outs showed the smaller tractor consuming fuel at 25 litres/hour running at 6.7kph to plough 2.1ha/hour, which equates to 11.9 litres/ha. The bigger tractor consumed fuel at 45 litres/hour to record 2.01ha/hour output – resulting in a consumption figure of 22.4 litres/ha.

Over 400ha at 65p/litre, ploughing with the 160hp tractor and →p22

Tansanit plough would be £2730 cheaper in fuel cost alone.

"Studies with an instrumented plough show how the weight transfer system results in very consistent traction and plough performance," added Mark Ormond.

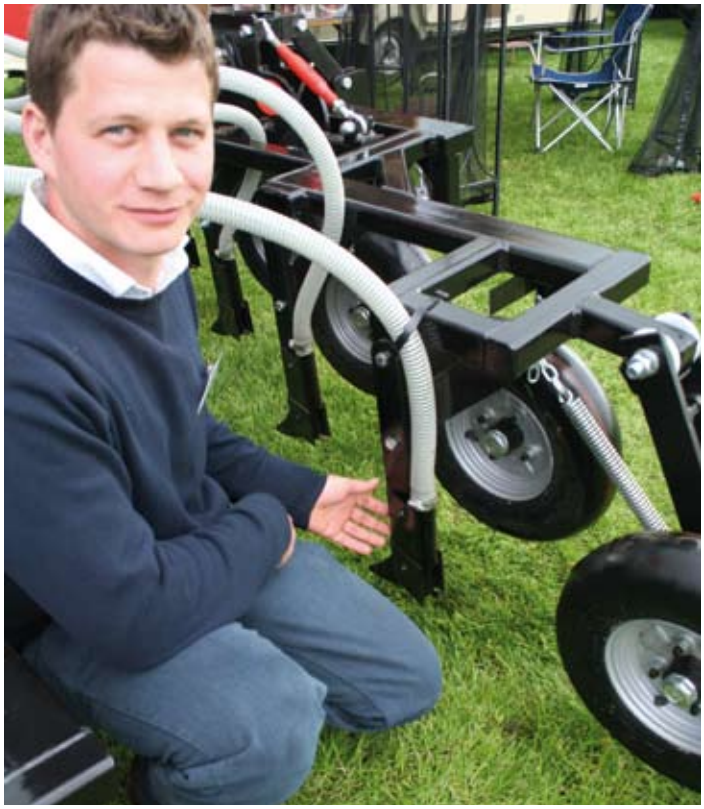
At £36,881 with the new auto-reset system and hydraulic variable width, the Tansanit costs about the same to buy as a conventional semi-mounted plough and perhaps £10,000 more than an equivalent mounted plough.

TYRE TORQUE

Active management of tractor ballast and tyre pressures would pay dividends in power and fuel efficiency, said Mark Turner of Goodyear at Cereals.

"Remove ballast when it's not needed, add enough in the right place to get maximum traction. Then alter tyre inflation pressures to the optimum for each job and you'll make best use of the fuel the engine burns."

In terms of tractive efficiency for draft work, a radial tyre performs at its best with slip levels of between 9% and 15%. Anything more wastes fuel and causes excessive wear; anything less fails to make the most of the tyre's pulling power.



Jack Dale with the pivoting multi-tine coulter assembly on the latest All Till direct and minimum tillage seeder from John Dale Drills.

Goodyear's Optitrac R+ traction tyre, seen for the first time in action on JCB's new 195hp 7200 Fastrac, is designed to cope with heavy loads and high travel speeds, but also to operate at low inflation pressures in lighter-load situations.

"This versatility makes it possible to adjust the inflation pressure to the optimum for each situation," said Mr Turner.

"The biggest size in the range, 710/75R42, can be inflated to carry a load of 10,240kg, which sets new industry standards. But it can also be operated at just 0.6 bar (9psi) carrying a lighter load for maximum grip and flotation."

Like the other eight sizes in the range, which provide matched sets of tyres for upper-medium horsepower tractors, the 710/75R42 is officially rated to 65kph, but can be operated at up to 70kph.

Other sizes span 540/65R28 to 650/85R38 and, following a series of tests with tractor manufacturers, are approved for use by Claas, Deere, Fendt and JCB.

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