

Near perfection

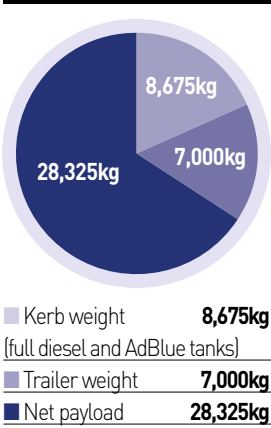
Behind the wheel of the Scania S500, CM finds the Swedish manufacturer continues to push the boundaries of truck design and engineering

By **Colin Barnett**

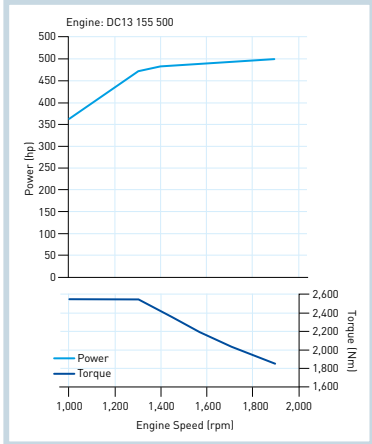
Images: Tom Cunningham



Test weights



Power graph



THIS IS ONE of the most keenly anticipated road tests for some time. Of course, we have already driven examples of the new Scania tractor range, but the longest spell at any one time has been less than an hour. During those drives, we have yet to find anything significant to criticise, although we have not carried out any meaningful fuel consumption testing. So have we missed something? Is the cab as driver-focused as it appears? Will the new 500hp 6-cylinder be as impressive? How will the new fast-shifting gearbox cope with the challenges of the A68? The only way to answer these, and many other questions, is to subject it to two days on the road around CM's traditional test route.

The 500hp rating, introduced at the launch of the Next Generation R- and S-series, is the first of the current engines to feature SCR-only emissions control, although this has since been extended to most of the product line-up. Background research before the test uncovered an old CM road test of a Scania R440 from 2008 that, ironically, made great play of it being the first Euro-5 truck without AdBlue. What goes around, comes around.

The test truck is as close to being a regular fleet truck as any S500 flagship can be, with modest cloth trim but including the full set of safety and productivity aids and the latest infotainment system.

Technical
Of course, any new Scania is significant, but probably the most significant feature is the 12+2 Opticruise transmission, with its compact layshaft brake. Layshaft brakes are nothing new. We first find mention of one in a patent filed by Henry Ford in 1924 and, more relevant, another by Eaton in 1949. They then appeared in various production trucks throughout the next 30 or 40 years, but like many innovations from the early days of road vehicle engineering, they were gradually set aside until advances in lubrication,

Specification

Website	scania.com
Vehicle	Scania S500 A6x2/2NA
Cab	Highline flat-floor sleeper
Engine	DC13 155 500 in-line 6-cylinder with Scania XPI fuel injection. Euro-6 OBD-C emissions via AdBlue SCR and DPF
Bore x stroke	130mm x 160mm
Capacity	12.7 litres
Compression ratio	20.0:1
Maximum power	500hp (373kW) at 1,900rpm
Maximum torque	2,550Nm at 1,000rpm to 1,300rpm
Transmission	GRS905R Opticruise 12-speed direct-drive top gear with automated change
Gear ratios	16.41 to 1.00:1; reverse 14.77-11.95:1
Final drive ratio	2.59:1
Clutch	Single dry plate with automated operation
Brakes	Disc brakes, with full EBS and Advanced Emergency Braking
Parking brake	Electronically controlled spring brake acting on first and third axles
Secondary brake	Scania Retarder, 4,100Nm, plus engine brake, 265kW at 2,400rpm
Brake dimensions	410mm x 50mm
Chassis	Bolted and riveted ladder frame
Chassis dimensions	270mm x 90mm x 9.5mm
Suspension	Front, 2 x 32mm parabolic; rear, air with lifting second axle
Steering	Power-assisted recirculating ball
Turns lock to lock	4.7
Wheels and tyres	22.5 x 9in wheels with Michelin 315/70R22.5in tyres
Fuel/AdBlue tank	300/80 litres
Electrical system	24V negative earth return
Battery/alternator	2 x 12V, 180Ah/100A
Trailer	13.6m-long, 4m-high curtainside
Plated weights	24,000kg GVW, 44,000kg GCW, (45,000kg design), front axle 8,000kg, mid-axle 6,100kg, rear axle 10,200kg, rear bogie 16,300kg

materials technology and, crucially, electronic control, caught up. The Holy Grail has always been the same; to provide the means of matching the speed of the internal gearbox shafts to provide smooth gear changes in all situations by drivers of varying levels of skill. Of course, in the past 20 years, the adoption of synchromesh on heavy-duty gearboxes provided the answer, but then came the current generation of automated manuals. These incorporated basic speed-matching functions by adjusting engine speed to match road speed, and allowed synchromesh to be dispensed with, saving weight, complexity and cost. While automated manual transmissions (AMTs) now provide reliable shifting, they are not always smooth and are not especially quick. On a truck, the speed of the gearshift is not just a performance issue. As we are aware from previous road test experiences, too slow a shift on a steep climb can often



result in complete loss of forward motion, as road speed decays faster than the shifts can be made. Also, the longer the shift takes, the more chance there is of traction being lost.

Enter Scania's answer to gearbox shaft speed matching for the modern age, the new layshaft brake, fitted inside the clutch housing and weighing just a few kilos. Working in conjunction with electronic control of engine speed, it delivers shifts in a fraction of the normal time.

Cab comfort

Let's start where Scania says it started with the clean sheet design; the driving position. Given the undoubted driver appeal of Scania products, we have never understood the way many drivers seem ashamed to be seen at the wheel, hiding behind the B-pillar and a frilly curtain. Unless you are shaped like a four-limbed spider, the more conventional layout means that is no longer an option.

Reaching the driving seat involves the not-insignificant climb to the floor level above many people's head height, but a decently wide door opening and no issues with step and grab rail positioning make it easier. Once aboard, the first thing you notice, of course, is the unfamiliar flat floor in a Scania. The relatively basic



fleet-friendly seats, including a fixed passenger seat with B-pillar mounted seatbelt, are trimmed in a sober grey cloth on this example, but no doubt Scania will be happy to provide more luxurious perches for the discerning owner-driver. Basic or not, we don't experience any

Operational costs

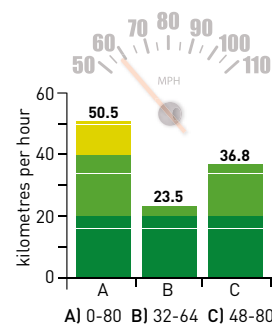
	Make and model	Scania S500 Highline	DAF XF 510 FTG 6x2	Volvo FH500 Dual Clutch
Residual value:	Three /five years (from test) [CAP trade value]	Not yet available	£32,650/£19,825	£34,200/£21,300
Parts prices:	Headlamp	£672	£318	£792
	Oil filter	£16	£96	£21 each
	Air filter	£59	£97	£84
	Front bumper (complete)	£659	£229	£160
	Mud wing	£363	£373	£129
	Windscreen	£220	£231	£385
	Turbocharger	£851	£2,917	£1,183
Warranty:	Basic cover, years/km	Three years, including R&M, inspections and MoT preparation	Three years (third year driveline only), break-down and three years preventative maintenance	First year/unlimited mileage. Second year/ driveline 300,000km, asset care unlimited
Contract maintenance:	First three years included 120,000km per year	First three years included	First two years included, £102/month over three years	£299/month (Volvo Gold Contract)
Service points		90	134	85

AdBlue*

Scania S500 Highline	7.8%
DAF XF 510 FTG 6x2	3.8%
Volvo FH500 Dual Clutch	7.8%

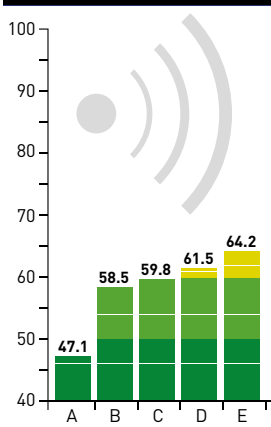
*AdBlue consumption as percentage of diesel used during road test

Acceleration (seconds)





In-cab noise



A) Tickover B) 48km/h C) 64km/h D) 80km/h E) Max limited speed

Security

Engine immobiliser	✓
Alarm	✗
Central locking	✓
Dead locking	✗
Secure bonnet	✓
Locking fuel cap	✓

issues with getting a suitable driving position and staying comfortable for two days at the wheel. Mirrors are suitably large but with reasonable space around to reduce blind spots, while all of the mirror functions, together with controls for all lighting and locking, are accessed from the top of the driver's door panel. Sun visors are traditional items with drop-down lower extensions. At tickover, and later when on the move, the S500 proved exceptionally quiet with only a small amount of wind noise occasionally evident.

Sitting comfortably

Sitting at the steering wheel, which with its associated column stalks is home to almost every control you will need while driving, you are faced with a soft feel dash and an instrument panel that is tastefully restrained and clear; white on black with bright trim reminiscent of Scania's Audi cousins.

The speedo dial incorporates a large digital speed display and odometer in its centre, with the fuel gauge below. The matching rev counter on the right incorporates a clock, external temperature and AdBlue gauge, above the engine temperature. Between them is the information display, controlled by the right thumb on the steering wheel. It is surrounded by four customisable

sectors, which can be programmed to display your own choice of frequently required information. We chose fuel flow and cruise control status.

To the left of the panel is a group of switches controlling the trip reset, panel brightness and, in a nod back to the SAAB, a black dash. However, unlike some rivals, this turns off the display without retaining a dim view of the speedo. The centre of the dash is dominated by the truck's one extravagance; the top-of-the-range Scania Infotainment Premium unit. Among its features are a touchscreen colour display, truck-specific satnav, DAB radio, two SD card slots, but no CD, as is the modern way. Then there is dual Bluetooth connectivity, traffic information, camera input and a variety of apps, not forgetting the access to Communicator 300, Scania's third-generation telematics system.

Lower down is the panel for the dual-zone climate control with integrated night heater, and cooler, if specified. Dash sockets, USB and aux on the left and another USB on right, provide charging and music input.

The driving seat has a foot pedal on the side, so you can slide it backwards or forwards while sitting on the bunk. There is a reading lamp and two bins at each end of the bunk and a storage net on the rear wall, while we count at least six coat hooks. A fixed panel and another on a

detachable wander lead control just about every night-time electrical need you could imagine. Beneath the bunk is the fridge and a storage bin. A second bunk, with an integrated ladder and safety net, is standard, but there is the option of storage units at the top of the rear wall that use the bunk mounts. Even without these, there is plenty of storage space. There are two external lockers on each side that cleverly permit access to the large upper from inside, but can't be used to access the cab from outside. Above the windscreen are three large lockers, the

one on the left being lockable, and a smaller shelf on the passenger side. The space is shared with a supplementary panel housing the tachograph together with switches for the roof vent and tachograph remote download.

Lower down, there is a pull-out dash table on the passenger side, and two larger than A4 drawers – one deep, one shallow – below the usefully large flat central portion of the dash. There are three cupholders and large bottle holders in the door pockets.

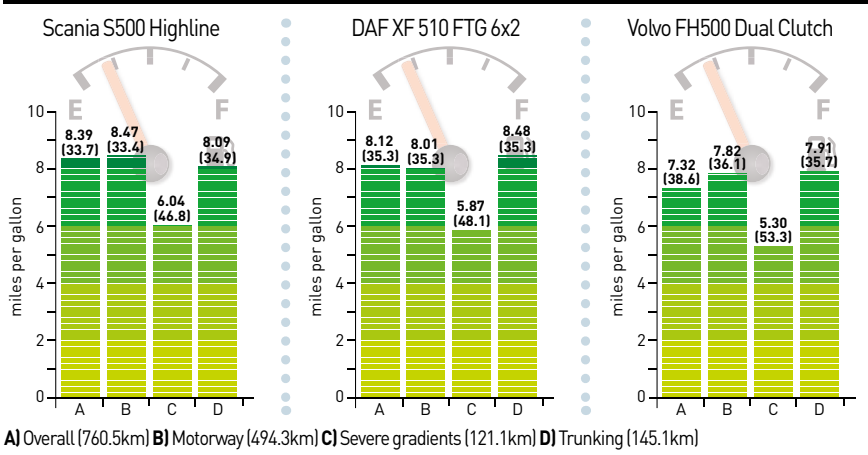
On the road

Before heading for the open road – well the A5, anyway – we spent some time experimenting at the proving ground. We initially carried out the basic 0km/h to 80km/h acceleration testing in Power mode, then repeated it in Standard and Economy modes. The results from these two were identical, but were 2.7 seconds slower than in Power mode and made one less gear change on the way. In both modes, single shifts were made from 7th upwards, but Power used gears 1, 3 and 5 on the way up, instead of 1 and 4. Whether this slightly faster acceleration is worth the undoubted extra fuel cost over the course of a working day is debatable, and we made the decision to run the route in Eco mode.

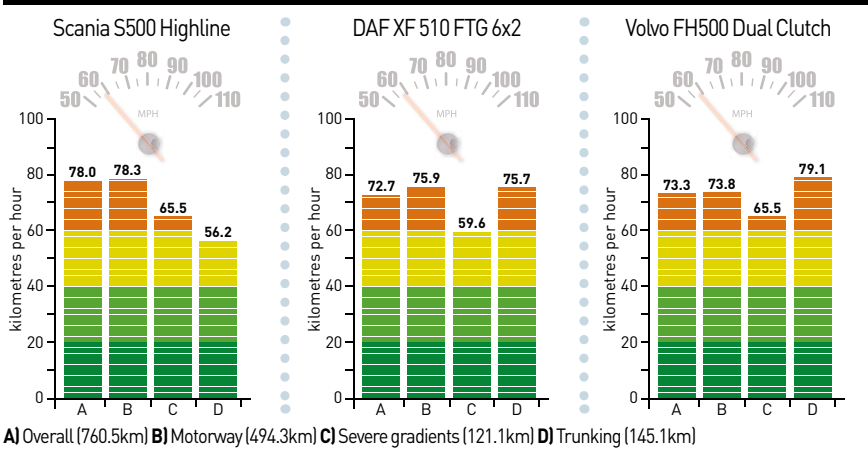
Before setting off, we took advantage of the key fob's



Fuel economy mpg/(litre/100km)



Average speed: km/h (speed limiter: 85km/h)



Hill climbs

Commercial Motor

Scania S500 Highline

Holmescales Hill (M6 J36 5.8km) 04:08

Broomhaugh Hill (A68 1.9km) 02:54

DAF XF 510 FTG 6x2

Holmescales Hill (M6 J36 5.8km) 04:26

Broomhaugh Hill (A68 1.9km) 02:53

Volvo FH500 Dual Clutch

Holmescales Hill (M6 J36 5.8km) 04:18

Broomhaugh Hill (A68 1.9km) 02:42

handy walk-around feature, which cycles through every light in turn before you even open the door.

The main right-hand column stalk controls the gears, twist for direction of travel and push down for manual override. Until now, the latest Scania's have retained a traditional parking brake on the dash, but since the test an electronic option has arrived with the launch of the Scania XT heavy-duty range. Once under way you



experience an unfamiliar sound during gear shifts – disconcerting until you know that it is chirping from the turbo wastegate as it plays a part in speed-matching.

Ironically, it isn't until the second day that we really experience the gear change; even the hilly M6 from Charnock Richard to Gretna doesn't require a downshift. However, in the stop-start conditions of the A5, it is obvious that changes are fast and perfectly timed. Where safe and appropriate, we make full use of the full set of electronic aids – active and downhill cruise control, active prediction and EcoRoll.

Digging deep

What remnants of challenging hills on the M6 reveal is the 500 engine is impressive as it digs in deep until below 900rpm. The notorious Kiln Pit Hill, the scene of many road tests grinding to a halt, is achieved in cruise control, dropping from 9th to 6th at just the right time. Running in Economy mode means a few more block shifts, giving a slightly more leisurely feel, but in reality it is hard to see the benefit of Power mode except in the toughest of terrain.

The S500 delivers a smooth ride, with just a touch of bouncing on low frequency road imperfections, while the steering and braking cope comfortably with some of the A-road sections that have become more challenging since the speed limit was raised. The engine brake on the test truck is complemented by the optional five-stage retarder, both having separate controls if, for example, you are travelling on a low-grip surface, and seamless blending with the service brakes. An option worth considering, and one that could save money on brake life, if used properly. ■



Test results

Access to cab	■■■
Bunks	■■■
Dash layout/controls	■■■■
Driving position	■■■■■
Storage	■■■
Fit and finish (perceived quality)	■■■■■
Visibility	■■■■■
Ride comfort	■■■■■
Steering and handling	■■■■■
Gearshift	■■■■■
Lugability	■■■■■
Braking	■■■■■
Noise	■■■■
Performance, engine refinement and gearing	■■■■■
Manoeuvrability	■■■■■
Fuel economy	■■■■■
Payload	■■■■■
Cost of ownership	■■■■■

Total 88/100

How we score: Each of the above scoring criteria has been weighted to reward vehicles that push the boundaries of expectation. A score of 50% means the test subject has hit our expert's industry-wide basic standard for that class of vehicle, be that on seat comfort, engine performance or fuel economy.

Test verdict

So was our mission to find previously unseen shortcomings successful? Given that there was not a lot wrong with the previous generation, Scania's aim to improve every aspect of the new model created a tough challenge.

Starting with the driveline, this new 500hp rating is possibly the best 6-cylinder engine Scania has ever made, thriving on hard work with impressive levels of flexibility. Behind it is the ultimate development of the traditional single layshaft gearbox, giving shift speeds approaching more sophisticated dual-clutch transmissions. Pulling these elements together is a package of electronics that ensure they are always working at optimum efficiency.

When it comes to reading the fuel consumption figures, it should be considered that the central part of the second day, the trunking section from Nevilles Cross to Barnsdale Bar, coincided with a storm on the last day of August that will be remembered by many Yorkshire residents. Approximately 40mm of rain fell in one hit, and the flooded surface on the A1 meant that this normally easy, steady-speed run was a nightmare of stop-start progress. We would normally expect an average speed of around 75km/h instead of the 56km/h we recorded. This had an obvious effect on fuel consumption, and by substituting fuel usage from previous tests we calculate it cost around 0.2mpg on the overall figure.

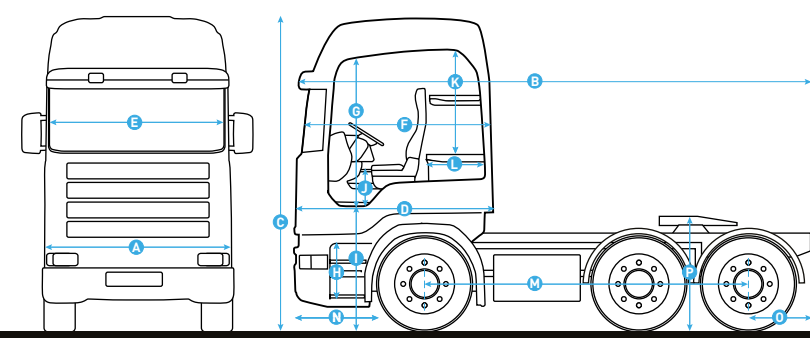
Putting the fuel economy into perspective, even with the freak weather encountered, the S500 is the best full-sized Euro-6 tractor we have tested, falling not far behind Mercedes-Benz's Actros with the slightly smaller and aerodynamically optimised StreamSpace cab.

So did we find anything serious to criticise? We did have one issue where the fuel gauge inexplicably displayed its last red segment when there was still 100 litres remaining, but that was it. The perfect truck will probably never be built, but Scania has had a damn good go at it.



88%

Vehicle dimensions (mm)



a) Overall width	2,310	i) Cab floor height	1,690
b) Overall length	6,235	j) Engine cover height	0 (flat)
c) Overall height	3,841	k) Internal height above bunk	1,570
d) External cab length	2,265	l) Bunk	lower: 2,175 x 1,000 x 150 upper: 1,940 x 800 x 150
e) Internal cab width	2,175	m) Wheelbase	4,050
f) Internal cab length	2,060	n) Front overhang	1,410
g) Interior cab height (over engine tunnel)	2,070	o) Rear overhang	775
h) Step heights	450, 315, 310, 295, 320	p) Fifth wheel height	1,285