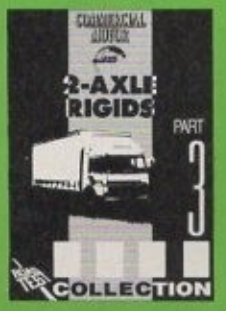
COMMERCIAL MOTOR

CRANE FRUEHAUF

3-AXLE TRACTORS

PART 2



ROAD TEST COLLECTION

ROADTEST
LEYLAND DAF 20.35

EAGLE FLIES FOR LEYLAND

Leyland Daf's 20.35 twin-steer is now available with the Interstate cab and Perkins' 800-350Ti engine. Fleet buyers will like the Roadtrain's performance, economy and payload.

■ The appearance of Leyland Daf's Roadtrain 20.35 twin-steer tractive unit with its Perkins Eagle 800 and distinctive Interstate sleeper cab at last year's Motor Show marked the end of a busy year for Perkins. It also signalled the beginning of a highly traumatic one for the Lancashire truck builder.

For a major truck manufacturer, the introduction of a roomy high-roof sleeper cab option was rather belated but somehow typical of Leyland, whereas the choice of the re-engineered and uprated Eagle engine was much more far-sighted. It gives the twin-steer Roadtrain a much more powerful, economical option from the range of 12.2 litre air-to-water charge-cooled engines that run from 198 to 261kW gross (265 to 350hp).

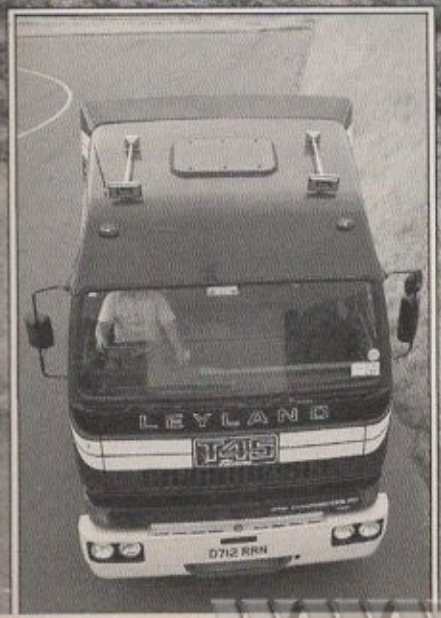
In the 20.35 Interstate test vehicle, and coupled to our Crane Fruehauf 12.2m tandem-axled curtain-sider, its performance ranks among the best in its class and power band.

■ PERFORMANCE

Fully laden to 38 tonnes and in favourable weather it returned 40.7lit/100km (6.94mpg) at an overall average speed of 71.9km/h (44.7mph). ▶

IN BRIEF

Price as tested: £50,545 retail (plus VAT). Includes £2,625 for Interstate cab package, £350 for second folding bunk, £470 for Eberspacher night heater and £1,600 for aluminium wheels.
Design GCW: 40.00 tonnes.
Tested GCW: 38.00 tonnes.
Payload as tested: 24.61 tonnes.
Overall fuel consumption: 40.7lit/100km (6.94mpg).
Overall speed: 71.9km/h (44.7mph).
Power to weight ratio at 38 tonnes: 6.3kW/tonne (8.6hp/ton).



ROADTEST
LEYLAND DAF 20.35

Compared with other 6x2s with similar power outputs, such as the MAN 20.331, Iveco 220·30 and Mercedes-Benz 2033S, its overall fuel consumption is about on a par, particularly over the severe gradients and tough motorway section of our test route.

On A roads, where the 64 and 80km/h limits apply, the 350Ti engine pulls sweetly at around 1,500rpm in top gear. Here it is running very efficiently, close to where its specific fuel consumption bottoms out at 196g/kW/hr (0.322lb/hp/hr) at around 1,450rpm.

Out of the group shown in our comparison charts the Scania P112MA with its low-line cab and air-to-air charge-cooled 11 litre engine is outstanding. Its 38.1lit/100km (7.4mpg) fuel consumption ranks as the best of the 240kW-plus three-axled units tested, but on performance it falls some way behind the 20.35.

On MIRA's test tracks the Interstate's 0-80km/h acceleration figure was some 25% quicker than the Scania's and slightly ahead of the two normally speedy West German models.

These margins were also reflected in the timed hill climb. On the severest climb, up Blackhill, the Interstate Roadtrain was over a minute quicker than the Scania, and its overall time over our test route was some 45 minutes quicker.

The Interstate's full-width GRP roof extension adds 600mm more headroom to the standard Roadtrain sleeper.

Anti-roll bars front and rear combine with the taper leaf semi-elliptics to control the ride well. The closer the imposed load gets to its maximum rating the better the suspension likes it.

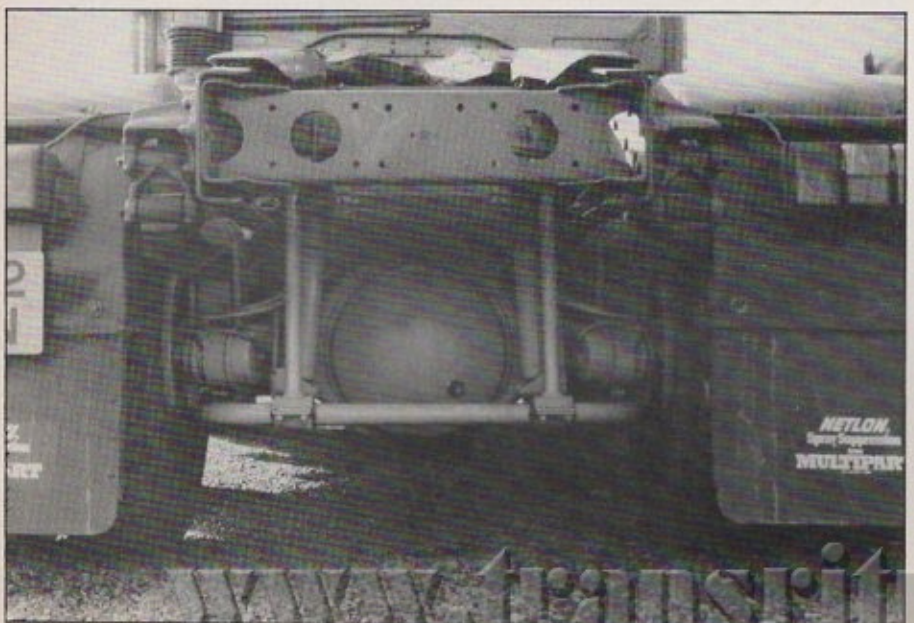
■ GEARBOX

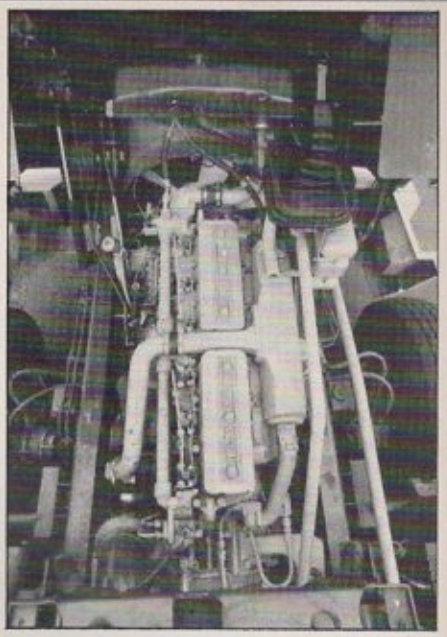
This disparity might have been even greater but for an awkward stiffness in the lower gears that slowed down critical changes. This is out of character for Spicer units, which can normally be operated with ease.

Its upper ratios are a very good match for the 350Ti, particularly on single and dual carriageway work. Approaching roundabouts usually calls for just one full downchange to eighth with a single split to power away if necessary.

Its stiff lower cogs felt slightly out of tune, especially when starting from lights on hills, such as those found in and around Edinburgh. Here it is necessary to use first with a split to second then a whole stick movement out from behind reverse into third.

On long sharp hills where every second counts its stiffness proves both fuel and time consuming. It is not helped by having a handbrake in which we have little faith, but which was never called upon in crisis. Only on MIRA's 20 and 25% test hills did it fail to hold, a problem which called for nimble footwork and a soft shoe shuffle across the pedals to determine the 20.35's hill start capability.





The Perkins 800-350Ti Eagles are 75mm narrower and 114mm lower than earlier Li engines. With a front-mounted exhaust there is scope for under-cab insulation to bring the noise levels down still further.

Interestingly, on the 25% slope slight hesitancy on the pedals allowed the engine revs to fall well below 1,000rpm before picking up and successfully completing the climb. This bears testimony to the engine's impressive torque delivery.

■ ENGINE

At the heart of the 20.35's strong, fuel-efficient performance lies the re-engineered and redoubtable 12.2 litre Eagle '800' series.

Internally there is a larger capacity oil pump, and oilways in the crankcase have eliminated the need for plumbing, but the major changes have been to the cylinder heads to improve their breathing.

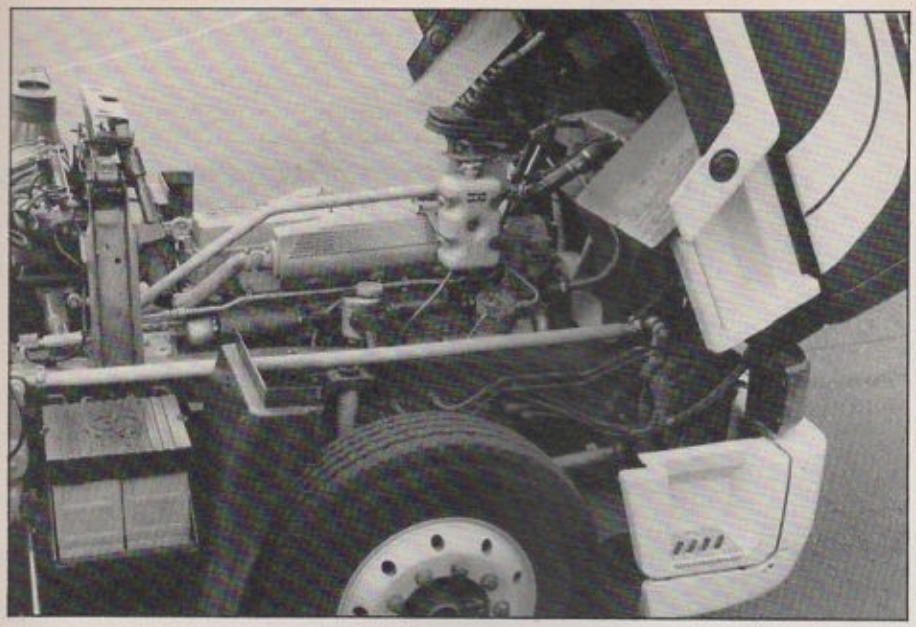
Ports are larger and reshaped, particularly the inlet which has a helical throat to improve swirl. There are also slightly deeper and smaller diameter toroidal chambers in the pistons to further improve the mixture movement; this has raised the compression ratio to 15.9:1.

With slightly higher injection pressures from the slim Bosch injectors, the overall effect has been to boost bottom end torque and improve claimed economy by around 8% over the Eagle 340Li engine.

In the 800-350Ti, says Perkins, these characteristics encourage the use of slightly higher gearing. On the road the 20.35 with its 0.77:1 top gear and 4.43:1 final drive is able to lug down well — and it is deceptively quick into the bargain.

Over the lower approaches to Shap on the M6 it was necessary to drop into ninth gear on two occasions, but more in anticipation of over-taking than from necessity. For the last long climb towards the summit it hung on well at around 1,400rpm in top gear.

The appearance of the 20.35 Interstate around our Scottish test route provoked considerable interest among fellow travellers. Their reactions, which were the usual mix of friendly Anglo-Saxon/



Above: Steering movement to the intermediate axle is via a link-arm running along the outside of the chassis.

Left: The folding second bunk costs £350, is comfortable enough and within easy reach of the lockers in the headboard or the skylight.

Above: Track tests showed good peaks of braking but delays of up to 0.4 second in reaching them, resulting in longer-than-usual stopping distances.

Gallic gestures and muted greetings, seemed to say "Looks great, but too late".

Nevertheless few fully-laden artics overtook the Roadtrain over the long climb towards Shap and Beattock.

■ IN CAB NOISE

Noise levels over these gradients tend to rise to around the 77/78 dB(A) mark when pulling, but are never uncomfortable.

Some of the extra noise might simply be due to the cab's increased volume or to the basic coating of insulation beneath the cab panels. There is considerable scope to improve on the latter because of the large gap created between the cab and the compact and 114mm lower 800-350Ti engine. The extra space is achieved by lowering the charge-cooler and Holset turbocharger, then routeing the air trunking between the rocker covers.

Unfortunately the twin-steer Roadtrain's congested chassis does not help matters. Out of necessity Leyland Daf has routed the exhaust system towards the front (in Pet-reg style) with the silencer sited behind the air dam. This reflects the noise upwards and would justify the use of additional insulation.

■ CAB COMFORT

With the factory-fitted full-width GRP roof extension the cab is by no means lavishly equipped, but it looks both attractive and aerodynamic. It adds about 600mm in headroom to a standard Roadtrain sleeper cab and includes GRP side extensions to help close the gap between the cab and the semi-trailer.

Externally the cab height is increased to 3.6m, and this is obviously a point that must not be overlooked. Entry to the T45 cab is via the usual wide but high steps. Once inside its added expanse and excellent side and forward vision make driving extremely pleasant.

Twin sets of electric switches operate each door window and a skylight allows extra ventilation. Its standard bunk is deep enough to be comfortable while the optional extra folding bunk (priced at £350) is just a nice reach away from the pockets in the headboard.

These should have support brackets and a pull-out tray to rest things on, but both bunks will accommodate six-footers quite easily.

The extension is well finished with a warm, noise-absorbant lining that matches the standard grey and damask trim and brown curtains. The cab's overall high standard tends to emphasise problem areas such as the over-strong accelerator pedal return spring, the breaking away of the exposed door seal by the top step and, in contrast to the quite effective foot-brakes, an exhaust brake that is totally ineffective.

Feeding the steering wheel through the hands on tight turns can be painful thanks to the ash-tray lid on the drivers door which catches knuckles on the way past. Although its ride was generally firm and well controlled, over some undulating roads the cab managed to produce what seemed like an excessive amount of fore-and-aft movement, probably due to the way that extra weights on the test trailer were biased away from the king pin. An earlier drive in the same vehicle using a platform-bodied semi-trailer with rows of fixed concrete blocks had shown up none of these nodding movements.

■ SUMMARY

Leyland Daf's 20.35 twin-steer with the optional Interstate cab adds yet another dimension to the Roadtrain range. Equipped with the Perkins Eagle 800-350Ti, the 20.35 produces the kind of strong, economical performance that will bring benefits to fleets.

Its payload potential is also outstanding but some of this has been bought-in by fitting £1,600 worth of aluminium wheels.

The semi-elliptic steel suspension on the rear axles has a basic simplicity and versatility that should appeal to busy fleets, especially those working with unaccompanied trailers. Lack of an air suspension option will limit sales, but perhaps this is something that will come under closer scrutiny via the Daf influence.

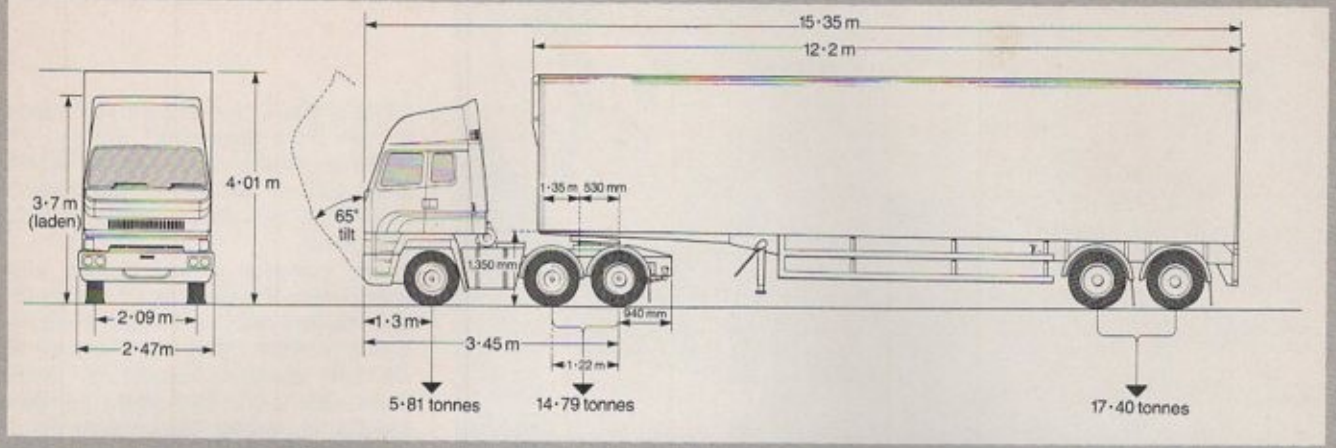
In busy depots its short wheelbase and small turning circle make it a highly manouevrable vehicle but its brakes, especially the park brake, do not match the sparkling performance of the Perkins Eagle engine.

How long a future the '800' series has with Leyland Daf is open to question, but ERF and Seddon are evaluating it, while Foden is type approving it for its 6×2 and 6×4 chassis. Perkins plans to boost production to 1,000 units per year.

Should Leyland Daf or any of the others continue to use proprietary engines into the 1990s there will be further spin-offs once Perkins begin to market the air-to-air charge-cooled Eagles that are under development.

☐ **by Bryan Jarvis**

DIMENSIONS



SPECIFICATION

Model: Leyland Roadtrain 20.35 6×2 tractive unit with Interstate twin-bunk sleeper cab.
Design GCW: 40.00 tonnes
Design GVW: 22.34 tonnes
Manufacturer: Leyland Daf Trucks, Lancaster House, Leyland, Preston, Lancashire.

ENGINE
Type: Perkins Eagle 800-350Ti four-stroke, direct injection, turbocharged, air-to-water charge-cooled diesel.
Cylinders: Six in-line.
Bore/stroke: 130.2×152.4.
Swept Volume: 12.7 litres.
Compression ratio: 15.9:1.
Cooling: Liquid with thermostatically-controlled fan.
Max net output: 240kW (322hp) at 1,900rpm (EEC80/1269).
Max net torque: 1,555Nm (1,147lb/ft) at 1,100rpm (EECB0/1269).

TRANSMISSION
Clutch: 356mm diameter, twin dry plate with manual adjustment. Ceramic facings. Air assisted hydraulic operation. Pedal effort: 20kg maximum, 15kg to hold down.
Gearbox: Spicer SST 1410, 10-speed, twin countershaft, constant mesh.
Ratios: 8.86, 6.83, 5.04, 3.89, 2.98, 2.30, 1.74, 1.34, 1.00 and 0.77:1. Reverse 8.86 and 6.83:1.
Final Drive: Leyland Albion, spiral bevel with epicyclic hub reduction. Differential lock standard, 13-tonne capacity rating. Standard ratio (as tested), 4.43:1.

BRAKING SYSTEM
Type: Full air Grau Girling Twin Stop wedge-actuated foundation brakes. Automatic wear adjustment, load sensitive apportioning valve on drive axle. Grau Girling Skidchek anti-lock on semi-trailer.
Air reservoirs: Aluminium construction. Service, 3×20 litres; spring brake/trailer, 1×20 litres; trailer service, 1×20 litres and 1×10 litre sensing with automatic drain.
Parking: Spring brake actuators on front and drive axles.
Exhaust brake: Air-actuated butterfly valve with floor-mounted control button.
Trailer connection: Two/three line.
Brake dimensions: Drum diameter (all axles), 394mm; width of linings (first and drive axles), 203mm; intermediate axle, 102mm.

STEERING
Type: ZF 8043 Recirculating ball with integral power assistance. Ratio: 20.2:1. Number of turns lock to lock: 5.3.

CHASSIS
Frame: Open channel section, bolted construction. Tubular and channel crossmembers.
Side-member section: Depth 201mm at front, 305mm at rear. Flange width: 70mm at front, 90mm at rear. Thickness: 8mm.
Suspension: Taper leaf semi-elliptic leaf springs. Two-leaf front, single-leaf centre and three-leaf on drive axle. Anti-roll bars front and rear with telescopic dampers all round. Design ratings: 6.61 tonnes front, 4.73 tonnes centre and 11.00 tonnes rear.
Wheel and tyres: 8.25×22.5 10-stud spigot-mounted aluminium wheels on test vehicle (steel wheels are standard) with 295/80R 22.5 low profile tubeless radials. Goodyear G291s fitted on test vehicle front and centre, Goodyear G167s on drive axle.
Fuel tank: 1×400 litre square-section wedge-shaped steel tank mounted on nearside between front and centre axles.

ELECTRICAL SYSTEM
Battery: 24V negative earth system, 2×12V 128Ah batteries.
Generator: 35 amp alternator.
Headlights: 4×178mm diamter halogen lights, 70/75W.
Trailer: Crane Fruehauf 12.2m curtain-sided semi-trailer.

SPEED AND FUEL CONSUMPTION

Average speed, day one: 83.1km/h (51.7mph).
Average speed, day two: 66.8km/h (41.5mph).
Average speed, day three: 69.7km/h (43.3mph).
Total distance: 1,180km (733.9 miles).
Total fuel used: 480.7 litres (105.75gal).
Average fuel consumption: 40.7lit/100km (6.94mpg).
Average speed: 71.9km/h (44.7mph).

PAYLOAD COMPARISONS

Model	Tonnes
Leyland 20.35	24.61
MAN 20.331	24.24
Mercedes-Benz 2033S	23.71
Iveco 220.30	23.85
Scania P112MA	24.42
ERF E14.32	24.13

WEIGHTS

	Tonnes
Kerbweight as tested with full tank	7.39
Unladen semi-trailer	6.00
Payload	24.61
Total	38.00

ACCELERATION

Km/h(mph)	secs
0-32	11.0
0-48	21.2
0-64	33.7
0-80	57.1
48-80 (gears 8 & 9)	34.0
64-96 (gears 9 & 10)	50.4

TERMS OF WARRANTY

Vehicle: Two years on parts and labour, unlimited distance (covers all components).
Engine: Additional warranty available from Perkins includes Fairdeal five-year cover on major engine components for an extra £125, or Power Assurance which covers full parts and labour for five-years/400,000km for £580.

BRAKE PERFORMANCE

From	peak g	average g	stopping distance
32km/h	0.69g	0.47	9.2m
48km/h	0.67g	0.5	19.1m
64km/h	0.65g	0.5	35.5m

Brakes pulled up straight on each application with no wheels locking on a dry surface. Park brake held on the 16.6% (1-in-6) but failed to hold on any steeper slope.

TURNING CIRCLE

Left lock ..... 14.38m between kerbs
15.58m between walls
Right lock ..... 14.42m between kerbs
15.62m between walls
5.3 turns lock-to-lock.

IN-CAB NOISE

Km/h	dB(A)
48 (8th gear)	74
64 (9th gear)	74
80 (10th gear)	74
96 (10th gear)	78

GRADEABILITY

Theoretical maximum restart gradient at 38.00 tonnes, 22% (1-in-4.5).
Test vehicle restarted on 25% (1-in-4) on a dry surface in spite of a park brake that failed to hold on the same gradient.

OPERATIONAL TRIAL RESULTS

		Distance		Day's driving time		Average speed (from fuel point)		Average fuel consumption	
		km	miles	hrs	mins	km/h	mph	lit/100km	mpg
A5 fuel station Burton Services	(F)	241.4	150	2	59	80.9	50.3	37.02	7.63
Gretna	(F)	106.4	66.1	4	11	88.6	55.1	36.58	7.71
Total		347.8	216.1						

Wind Direction: East, average speed 15km/h, average temperature 16°C, dry.

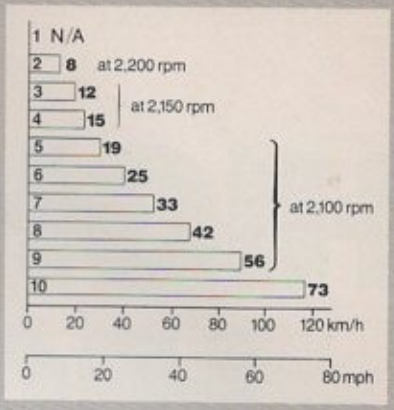
Gretna	(F)	121.3	75.4	1	33	78.3	48.7	41.00	6.89
Jedburgh		296.9	184.7	6	16				
Total		418.2	260.1						

Wind Direction: North-West, average speed 16km/h, average temperature 16°C, dry.

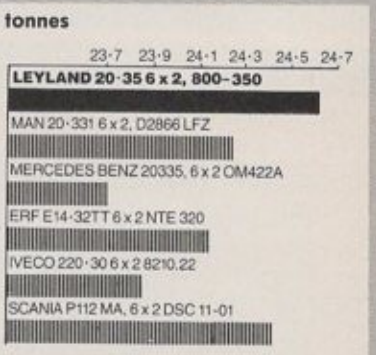
Jedburgh Rochester	(F)	330.3	205.3	0	36	62.1	38.6	42.87	6.59
Neville's Cross	(F)	85.4	53.1	2	12	53.4	33.2	55.07	5.13
Darrington	(F)	139.8	86.9	4	12	76.3	47.4	39.13	7.22
A5 fuel station	(F)	156.2	97.1	5	56	88.0	55.0	38.70	7.30
Total		415.5	258.3						

Wind Direction: South, average speed 14km/h, average temperature 14°C, Mainly dry, a few light showers.

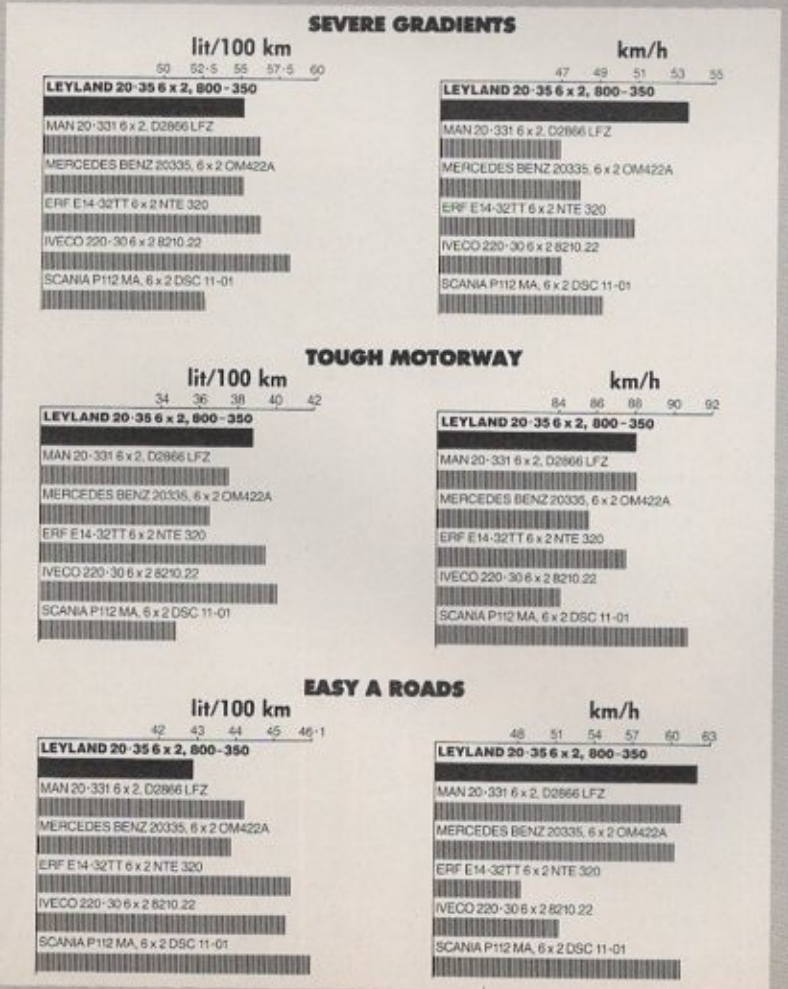
MAX. SPEED IN GEARS



PAYLOAD COMPARISON



FUEL AND SPEED COMPARISONS



WORKSHOP TIMES

Manufacturer's standard workshop hours

Replace clutch centre plate	6.4
Reline brakes (per axle) maximum	8.5
Remove and refit steering box	3.2
Replace set of injectors	1.6
Remove and refit engine (includes changing over parts)	13.7
Replace front spring	2.9
Replace cylinder head gaskets	13.5

PARTS PRICES

Manufacturer's parts prices (retail excluding VAT)

Laminated windscreen	£130.80
Set of brake linings (front or rear axle)	£183.76
(centre axle)	N/A
Door shell	£309.48
Radiator (new)	£641.47
Front spring	£152.76
Rear spring	£155.50
Clutch plate	£91.98
Clutch assembly	£419.25
Half shaft	£174.65
Piston and liner set	£212.27

DEALERS AND SERVICE POINTS

Daf and Leyland jointly have 165 main and service dealers in the UK. The two networks are to be rationalised into a single Leyland Daf group.