

MOTOR CYCLING

MAY 1982 80p

ATC's
Uncle Bunt's Yamahas
Kawasaki 50-80cc service

Tests.

Hesketh V1000

BMW 4-valve

Ducati 600

Pantah



Plus Kawasaki Z440 LTD
belt-drive

Elastoblaster

Kawasaki's band aid for custom crazes

Let's face it, motorcycle drive chains are nasty, noisy, dirty, troublesome devices which deserve to be as extinct as solid tyres. Despite recent attempts to improve their poor wear, reliability and convenience factors by making them self-lubricating, endless, heavier and much more expensive, chains still cause more aggro and demand more maintenance than any other feature of a modern machine

Shaft snags

Shaft drives avoid most of the problems of chains, but have a much higher initial cost, absorb power and add considerably to unsprung weight. These three features effectively limit their application to 500ccs and over.

What is needed is an alternative means of driving small to medium-weight machines so that chains can be left to the jobs they are suitable for, like joining ships to their anchors.

Belts may seem an unlikely candidate to bridge the transmission gap, since they slipped into disuse way back, when bikes started developing enough power to pull skins off rice puddings. But their lack of strength and grip have now been overcome by modern technology.

To prove the point and to offer belt drive as a viable and desirable alternative to chains, Kawasaki have introduced the Z440 LTD Belt Drive to test public reaction. This dipping of the Japanese toe into the turbulent waters of the European market may seem overcautious considering the claimed advantages of the new drive system and the fact that Z440s have been happily belting around the States for a couple of years.

But the Nips have learnt that the average

British bikist doesn't necessarily want what is good for him, (like monocoque frames for instance) and that pilot schemes can save the embarrassment of full scale production of unmarketable ideas. When did you last see a Honda 400 Automatic or a Suzuki RE5 Wankel?

The Kawasaki isn't the only machine to be unchained and released into the world. Harley-Davidson's Sturgis is propelled by a slightly different toothed belt drive and we shall be taking a closer look at this big belter very soon. Our guess is it won't be long before other manufacturers jump on the rubber-band wagon.

Ironically, the 'saki's belt is called Poly Chain by its makers, Gates of Denver, Colorado. It consists of a broad band of polyurethane elastomer which is toothed on its inside face. Within the main body of the belt are eleven radial cords of Kevlar, the latest miracle material from Du Pont. Kevlar has colossal strength combined with flexibility, so allowing the belt to flex but not stretch.

Square teeth

The teeth are faced with nylon for minimum wear and, in case you're interested, have a truncated curvilinear shape. Roughly translated this means the teeth are rectangular with their edges rounded off. (The Harley's belt teeth are more semi-circular in cross section.)

Sprockets are made of cast iron, so not surprisingly they don't wear at all and never need replacing. Unfortunately these hefty castings mean there is no weight saving over chain drive.

According to Kawasaki, the Poly Chain lasts between twice and five times as long as the conventional chain drive on their 440, depending on how much care and attention the metal chain receives. They know that most owners adjust, clean and

lubricate their drive chains less often than they should and lazy bikers can expect a drive-life improvement of around four to five times if they belt up.

Poly Chain *does* need adjusting, but only once or twice during its service life. When clapped out the belt drive will have only stretched by 4mm, a tenth of the elongation of an equivalent metal chain when it is ready for that great grease bath in the sky.

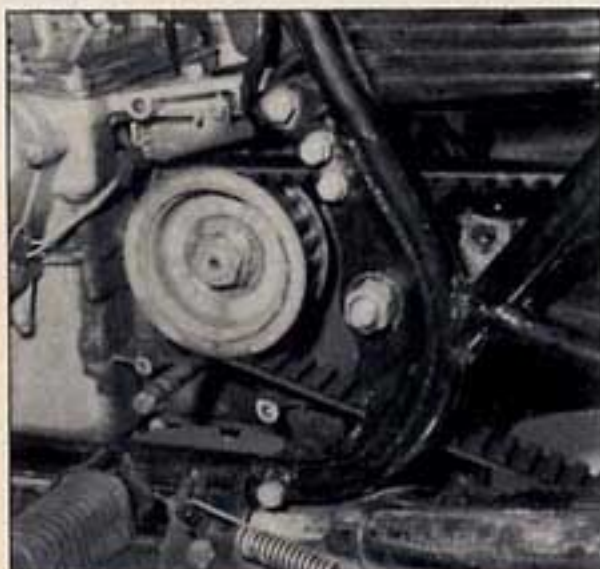
Adjustment is much the same as for chain drives. The guard must be removed to give access to the belt's top run, which, with the bike on its centre stand, should deflect by between 8.5mm-17mm (0.35-0.67in.) when a 10lb. force is applied. As you can see the belt is intended to run tight and in practice, an occasional prod with a finger will reveal if all is well.

Vital coating

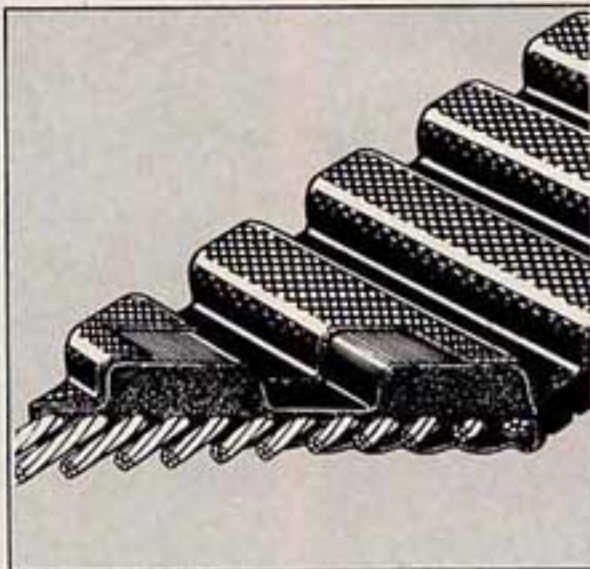
It is a good plan to give the teeth a visual inspection from time to time, say Kawasaki, since the belt will wear rapidly and may fail if the nylon tooth coating is worn through anywhere. Replacing the belt involves removing the swinging arm, but as the same applies to the endless chains fitted to most modern bikes, this may not be the big disadvantage it seems.

A new belt for the Z440 LTD costs £31.84 inc. VAT compared with £20.65 for a genuine Kawasaki replacement chain for the Z440. This suggests a saving of between 25 and 75 percent in the long term for belt-drive bikers, *before* taking into account the saving on sprockets and chain lube.

Perhaps the worst news for owners of standard, chain-drive Z440 LTDs is that they cannot convert their bikes to belt drive, their crankcase castings being too narrow and clutch release arm mechanisms being in the wrong place. Both versions of the LTD cost the same, £1199 inc. tax.



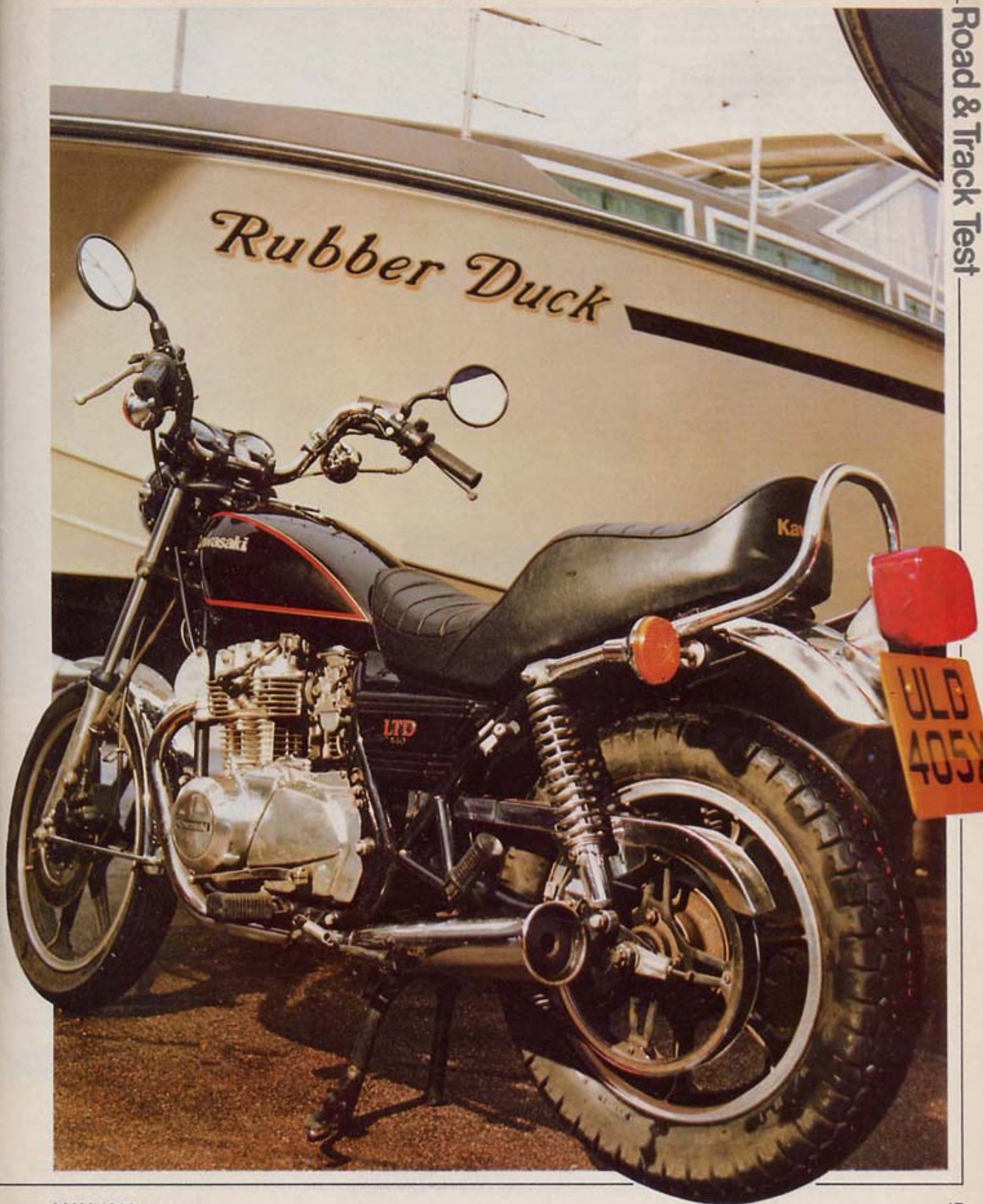
The belt's truncated curvilinear teeth (Yorkie bar shape) mesh with cast iron sprockets



Gates' Poly Chain is a polyurethane elastomer reinforced with Kevlar and faced with nylon



Big, broad rear sprocket is heavy, negating unsprung weight saving of drive belt



So much for theory. Out there on the road is where it counts, and the Z440LTD Belt-Drive gives a very different ride to its chain-driven brother.

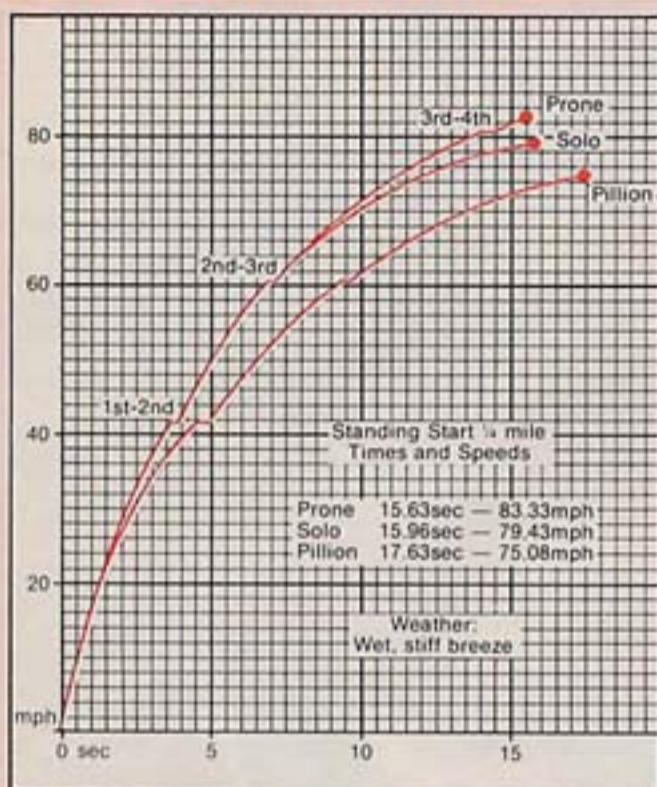
Gone is the rustle, clatter and whirr of chain rollers slapping against sprocket teeth. Gone is the snatch and tug of the transmission when rolling the throttle on or off. Gone is much of the harshness of

gearchanging.

If it weren't for a faint buzz on the overrun, that feathered-throttle condition when the motor is neither driving nor retarding the rear wheel, you wouldn't know the bike's drive existed.

Once accustomed to this quiet smoothness it was very easy to forget the belt. No checking, adjusting or lubing —

PERFORMANCE CHART



FLEXIBILITY IN TOP GEAR(sec)

mph	30-50	40-60	50-70	60-80	70-90	80-100
solo	9.65	12.30	—	—	—	—

Oil used

Negligible

MAXIMUM SPEEDS and SPEED RANGES

Gear		mph max	mph min	mph 1000rpm
1	solo	41.97	4.25	5
	prone	—	—	—
2	solo	60.36	6.06	7
	prone	—	—	—
3	solo	79.98	8.46	9
	prone	—	—	—
4	solo	84.47	11.03	11
	prone	—	—	—
5	solo	81.93	13.70	12
	pillion	82.11	—	—
6	solo	77.96	16.58	14
	pillion	80.76	—	—
	prone	89.42	—	—

Best one way speed: 95.49mph

SPEEDO

ind	true
30	29
40	39
50	48
60	58
70	67
80	77
90	—

BRAKES(both)

mph	solo ft	pillion ft
30	Wet Track	
40		
50		
60		
70		

MPG

Best	55
Worst	46
Overall	52

Milometer

Accurate

Performance figures obtained at: M.I.R.A. Test Track, Nr. Atherstone, Warks.
Test Riders: Bob Goddard, Neil Miller.

COMPARISONS

Make	Speed prone	SS 1/4 mile prone	Dry weight	Claimed bhp	mpg	Price inc. Tax
Z440LTD Belt-Drive	93mph	15.63sec/83mph	337lb.	40 @ 8500rpm	52	£1199
Kawasaki Z440C	98mph	14.37sec/87mph	366lb.	41 @ 8500rpm	49	£1129
Honda CB400N	103mph	15.49sec/83mph	337lb.	43 @ 9500rpm	50	£1160
BMW R45	94mph	17.05sec/74mph	452lb.	35 @ 7250rpm	58	£1995
Yamaha RD350LC	104mph	14.39sec/92mph	315lb.	47 @ 8500rpm	35	£1266
Suzuki GSX400	97mph	15.01sec/85mph	386lb.	41 @ 9000rpm	53	£1083

TECHNICAL SPECIFICATIONS

ENGINE

Type: Air-cooled, DOHC, parallel-twin four-stroke. Bore x stroke: 67.5 x 62.0mm. Displacement: 443cc. Compression ratio: 9.2:1. Carburetors: Two Keihin 36mm CV types. Max. bhp: 40 @ 8500rpm. Max. torque: 26lb. ft. @ 7000rpm.

TRANSMISSION

Overall gear ratios: 1st 16.73, 2nd 11.53, 3rd 8.67, 4th 7.22, 5th 6.30, 6th (top) 5.77:1. Clutch: Wet multi-plate.

FRAME and FORKS

Frame: Welded, tubular steel, double cradle. Front suspension: Telescopic forks with oil damping, coil/air sprung and adjustable air preload. Rear suspension: Swinging fork with two oil-damped, coil-sprung shock absorbers having five preload adjustments. Front travel: 5.9in. Rear travel: 4.5in. Trail length: 4.4in.

Castor angle: 62 degrees 30 minutes.

WHEELS and BRAKES

Front tyre size: 3.25 x 19. Rear tyre size: 130/90 x 16. Front brake: Single 9in. dia. hydraulically-operated disc. Rear brake: 6.3in. dia. SLS drum.

ELECTRICS

Ignition: Transistorised using battery and coil. Battery: 12V, 12Ah. Alternator: 210W @ 10,000rpm. Headlight: 35/35W. Tail/stop lamp: 5/21W. Indicators: 21W. Warning lights: High beam, neutral, turn, oil pressure, stop lamps, 3.4W.

DIMENSIONS

Seat height: 29.1in. Length: 83.5in. Width: 32.3in. Height: 45.6in. Wheelbase: 54.7in. Ground clearance: 5.5in. Dry weight: 377lb. Fuel tank: 2.64 gal. inc. res.





transmission, thus improving economy. Our average fuel figures were 3mpg up on the standard 440 and the 2.64 gallon fuel tank gave a 135 mile range, with 110 before reserve.

Eddie Lawson used belt drive on his KR250 in most of the '81 US road races and won the series, with maximum points at four events, so we can safely assume the belt is not a power drain. Being much lighter than conventional chain (the Sturgis' standard chain weighs 11lb., its belt 2lb.) the belt drive requires less energy to make it follow the contours of the sprockets.

Gearchanging was positive, if a little notchy, but clutchless upchanges were very slick.

Fine view

There was less vibration from the LTD's counter-balanced, SOHC motor than we experienced with the previous Z440, and the well-positioned mirrors gave a good field of view which suffered negligible blurring.

The riding position was excellent around town but the very tall seat step caused some spine-numbing on long trips. The pillion grabrail was good and rear seat comfy, but looking over the rider's head doesn't aid passenger confidence.

Suspension is much improved, both in comfort and handling. The rear shocks were soft but well damped and the new air-assisted but unbalanced front forks also gave a soft, controlled ride with minimal fork dive under braking. Handling, especially in fast corners, was better, and far superior to our expectations from a custom variant.

The Yokohamas reacted to white lines, as usual with widely different sections, but gripped surprisingly well in the wet. Steering was a little vague, but didn't start to get twitchy until over 80mph.

Both the single front disc and rear drum brakes were powerful yet easy to control, and were both weatherproof. The LTD's electrics weren't so clever, and water robbed us of the headlamp (which wasn't much cop anyway, being 35/35W) and the indicators' self cancelling function, which had been very good.

Pannier problem

The ignition key also opens the fuel cap and seat, the latter revealing an average toolkit but no storage space. Bungee hooks are useful, but the position of the rear wipers prevented the use of fixed or throwover panniers when two-up. The ignition switch steering lock was good, although it was too easy to switch past 'lock' to 'park' and leave the light on.

The Z440LTD is an odd choice for an opinion testbed. The people most likely to gain from the undoubted benefits of belt drive are commuters, dispatchers and long-distance tourists. Custom variants appeal more to the short-hop rider who wants to be noticed and is therefore more likely to spend time cleaning, polishing and fettling his bike.

However, there is already a KZ440 Belt-Drive in existence and strong rumours of Z200 and Z250C chainless wonders. They can't come too soon.

The belt drive experiment has proved a great success. Its adaptation to existing models is so simple that all may continue unchained. The rest of the world's bike manufacturers had better get a belt on, or risk being caught with their trousers down.

Bob Goddard

The growth of the LTD's left handlebar console (inset left) contains the speed and distance calculator for the flashers' auto-cancel device. (Below) Poly Chain, fat sprockets and guard to not detract from the 440's cool custom looks. Seat has a giant step for mankind



and no greasy crud slathered all over the rim, tyre, swingarm and numberplate either. Despite the large rear sprocket and fat chrome guard, few people noticed the belt drive without it being pointed out.

Power delivery was excellent. Apart from a hesitant cough when rolling on the gas from low rpm, the motor pulled fast and strong in all gears with a flat torque curve from 6000rpm on.

Around town there was more than enough power for ripping up the traffic, but out of town the high-bar riding position caused the 40-horse lump to gasp in headwinds. With a hill to climb as well, the LTD was struggling to stay over 70mph (67 true). The effect of this can be seen in our performance figures when compared with those for the earlier, 41bhp Z440C. The LTD is 5mph down on top speed, and one and a half seconds slower on the standing quarter, although strong crosswinds and puddles on the LTD's test day may be partly responsible.

If the custom version is slower, it's not readily apparent on the road, since the bars put a 70mph limit on cruising speed for anything more than 10 miles. There is no evidence to suggest the belt drive robs power from the motor. Gates even claim their Poly Chain is 10 percent more efficient than metal chain in power