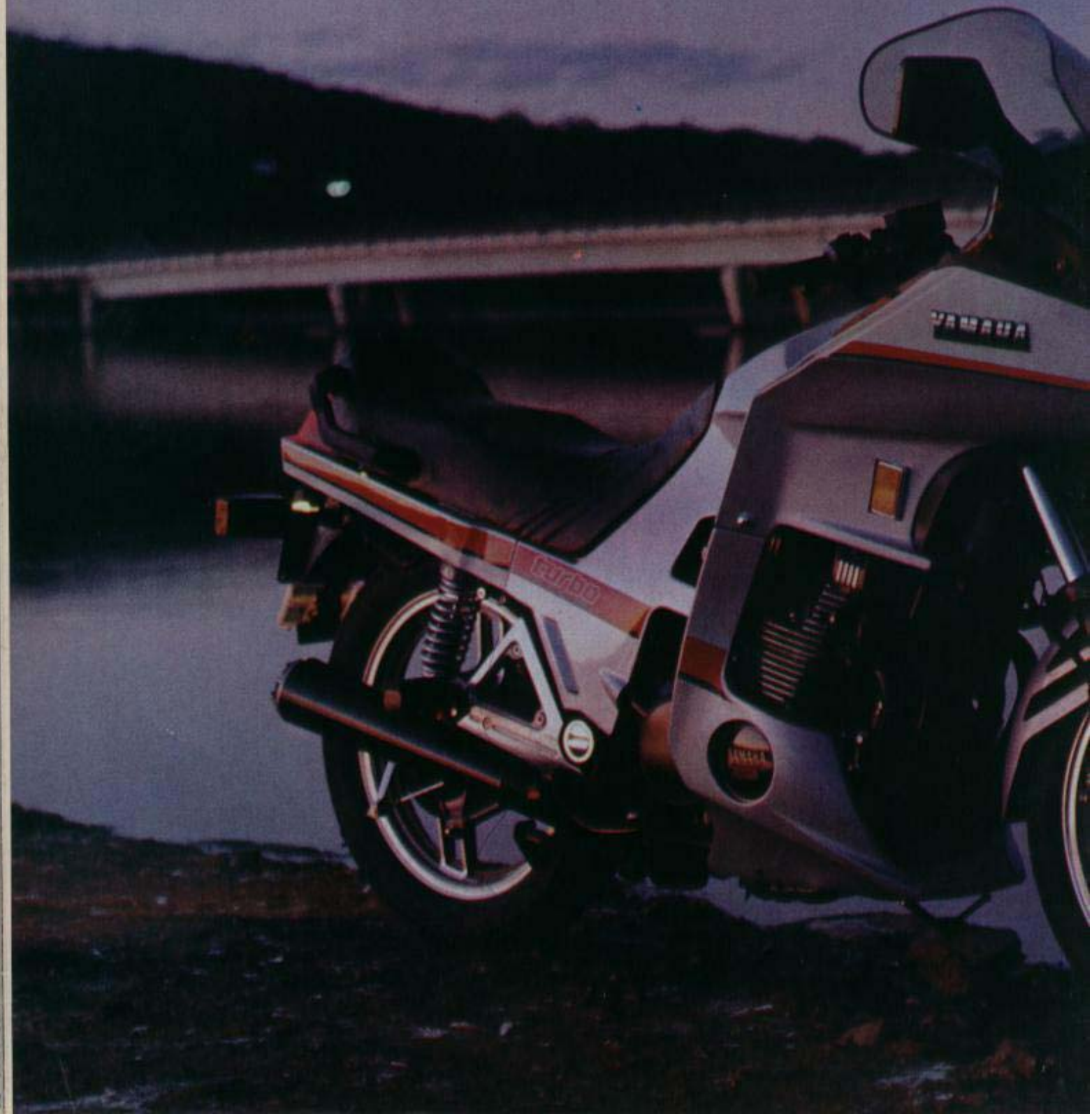
Road Test

A MILDER PUFF

Yamaha's XJ650LJ turbo fits an age in which the emphasis is shifting to mild cigarettes and low-alcohol beer. But turbo-freaks might like their smokes full-flavoured and their grog with a bit of a kick.



YAMAHA'S XJ650LJ is a turbobike for the non-turbo rider. Owners will miss some of the thrill of riding a "hard" turbo motorcycle like Honda's CX500TC, which — as a result of the dramatic difference between boost and no-boost performance — gives the illusion of being super-powerful. In compensation, the Yamaha offers a far more competent effort off-boost, and is much easier to manage in day-to-day riding, particularly in an urban situation. Mountain roads and hairpin bends are also more its style. But whether non-turbo motorcyclists will buy even a mild turbobike is the question which has still to be fully answered.

Like Honda's Turbo, the XJ650LJ stands out in a crowd. Its long-snouted, silver-grey fairing is not only aerodynamically sound but looks decidedly aggressive as well. Most mechanical components are finished in black (the exhaust headers and silencers getting the now fashionable black chrome treatment), as are the fork sliders and frame, and the whole effect is one of business-like, futuristic good looks.

While the fairing does protect a medium-height rider quite well (hands cop a blast from the side windstreams), the panelling over most of the bike leaves only two small fairing pockets to carry gear if the passenger's seat is occupied. At least the lids lock and are watertight.

Riders in colder climes will also wish the leg guards deflected more of the icy blast away from their shins. The fairing is little affected by cross-winds and Yamaha claims wind tunnel tests show a reduction in drag over the same bike unfaired.

The frame of the LJ is similar to that of the unblown XJ650 except for one millimetre larger fork tubes, a 5 mm increase in wheelbase and a slight

increase in fork rake and trail. New cast wheels with four pairs of parallel spokes replace the curved spoke jobs used on the XJ650.

Tipping the scales at 230 kg, the XJ650LJ is no lightweight. The ordinary XJ650 is 26 kg lighter and Kawasaki's GPz1100 weighs only 6 kg more. Nonetheless, Yamaha's Turbo undercuts the portly Honda Turbo's weight by 9 kg.

Air-assisted forks and rear shock absorbers with adjustable damping are part of the LJ package, as are a space age set of instruments including a boost gauge, a microprocessor-monitored graphic warning panel for everything from "sidestand down" or "oil level low" to "you forgot to brush your teeth this morning", a new seat with integral tail light and side grab handles, and padded non-cast handlebars.

The Turbo gets a new compound G514 Bridgestone Mag Mopus rear tyre in place of the Mag Mopus originally fitted to XJ650 back wheels. We found no cause to complain about the performance of the OE tyres.

Other changes made to the XJ650 en-route to becoming the LJ include a half-litre reduction in petrol tank capacity to 19 litres and a raise of the overall gearing brought about by swapping the 49/36 tooth bevel gears at the driveshaft's front end for a 48/37 tooth pair (all other ratios, including the internal gearbox ratios are as for the XJ650).

At $4999, the Yamaha Turbo will set you back around a grand more than either a Suzuki or Kawasaki 1100 sportster, but $700 less than the Honda turbo. Whether owning the first turbo motorcycle on the block is worth this much money only you can decide.

Tougher internals

Changes to the XJ650's motor to ensure its reliability in forced induction form include easing the compression ratio from 9.2 to 8.2:1, cross-drilling the crankshaft's main bearing journals, the substitution of heavy crowned forged pistons in place of the cast pistons used in the stocker, the addition of an oil spray hole aimed at the underside of the piston crown, an uprated oil-cooler and pump, a 750 Seca's clutch with heavier springs, specially heat treated gears and a new cylinder head casting which provides greater fin area.

A semiconductor strain gauge is used to monitor inlet vacuum (or boost) and this information, along with engine rpm, governs ignition timing subject only to one additional, cunning input — that of the engine's knock sensor. This pickup, residing at the front of the block between barrels two and three, senses the high frequency oscillations accompanying engine knock and causes the ignition timing governor to retard spark lead until the detonation disappears. It overrides all other timing sensor inputs and is fail safe — should the knock sensor fail, ignition timing is automatically fully retarded at engine speeds in excess of 5000 rpm.

The turbocharger itself is a Mitsubishi unit even smaller than the tiny IHI turbo on Honda's CX500TC. Its turbine wheel is just 39 mm in diameter and spins to 210,000 rpm in the usual floating bearings used in turbochargers. The turbine/compressor assembly on the Yamaha nestles immediately behind and below the gearbox, tacked onto the end of a crossover collector manifold.

The aircleaner box is conventionally located. A duct feeds the compressor, while a second tube routes boosted air back up to a surge tank behind the carbs. A reed valve between the air

The Yamaha says "flash" from front wheel to rear guard. Fairing-housed instruments work well (top left) — and have all those cute little pictures too! Fuel gauge isn't the most honest bloke in town, though. Lower left: This bike listens to you — it must, because it's got ears. Sometimes you really need 'em to hang on under acceleration.

cleaner box and the surge chamber allows air to be drawn directly through (bypassing the turbo) under no-boost conditions. At maximum boost, the turbine diverts gases to the right-hand muffler via a pre-set wastegate. A relief valve on the surge tank acts as a fail-safe in the event of a wastegate jamming.

The Yamaha's setup follows an unconventional path in that the carbs are fed pressurised air. This calls for special seals around the throttle shafts and cold-start plunger, and a fuel pump to force petrol into the float chambers.

Yamaha claims 62.5 kW for its turbo 650 — twelve percent up on the unblown XJ650's 54.5 kW — and 73.6 Nm of torque. By comparison, Honda reckons its turbo is good for 60 kW and 75.4 Nm of torque.

Not a fast waker

Nine times out of ten our test bike needed a lengthy run of the starter before it would fire up. It didn't matter whether the engine was stone cold or hot at the time, it just wasn't a fast waker, definitely not the bike for a fast getaway after a holdup. Perhaps the electric fuel pump needs time to properly pressurise the fuel supply system and carb float chambers?

If the bike has been standing overnight some 30 seconds of idling is required before the oil pump will have pumped enough oil to refill the turbocharger's oil galleries and pick the pressure up to that necessary for its bearings to be properly protected. This period is longer if the bike hasn't been used for a week or more. Yamaha stresses the importance of allowing this idling period before riding off.

Once running, the engine warms up quickly. It will happily accept moderate loads from cold without misbehaving, with its YICS sub-port system aiding low-speed performance. Largely because of the bike's weight and gearing, however, it still feels much less responsive at low speeds than an unblown XJ650 (perhaps on par with 400 to 500 cm^3 fours). Nonetheless, the Yamaha's off-boost performance is much livelier than Honda's turbo can manage and this makes the XJ650LJ a whole lot easier to live with in situations like suburban or city commuting.

Unlike the Honda, the 650LJ is not a particularly quiet bike. Its progress through the countryside is marked by an exhaust drone and a veritable orchestra of mechanical noises. The drone is more noticeable to the rider and passenger than bystanders and is something we could do without on long tours. The multiplicity of mechanical sounds — cam chain rustle, gear whines, valve gear noise and a hint of turbocharger whistle at high revs — makes the bike feel unnaturally busy out on the open road, an impression enhanced by the vibrations that find their way through at certain cruising speeds. The Yamaha was busy and tiring alongside the Honda on the open road — an environment in which the loping CX500TC twin has it all over the four. We judged the Yam better around town but the Honda tops once clear of city limits.

We thought the Honda turbo's petrol appetite quite reasonable in view of the bike's performance potential and expected the four carb four to be thirstier. However, we were pleasantly surprised to find the reverse. The XJ650LJ returned 17.6 km/litre for solo touring, 16.3 km/litre around town and 14.4 km/litre when hustled along. The 19-litre tank allows a touring range of 300 km with another 30 km in reserve if things get desperate.

Yamaha XJ650LJ

ENGINE

Air-cooled, transverse four-cylinder four-stroke. Chain driven double overhead camshafts, two valves per cylinder. One-piece crankshaft, plain main and big end bearings, wet sump lubrication, oil cooler. Exhaust-driven turbocharging.

Maximum rear wheel power	43.7 kW at 8000 rpm
Maximum torque	53.7 Nm at 7500 rpm
Bore x stroke	63.0 x 52.4 mm
Displacement	653 cm^3
Compression ratio	8.2:1
Maximum engine speed	9500 rpm
Carburetion	4 x 30 mm Hitachi CV
Air filtration	Pleated paper
Starter system	Electric only
Ignition	Solid state battery/coil

TRANSMISSION

Gear primary drive through wet, multiplate clutch to five-speed, constant-mesh gearbox. One-down, four-up pattern. Final drive by shaft, sealed in left swinging arm leg.

Ratios (overall:1)	
First	14.55
Second	9.98
Third	7.67
Fourth	6.21
Fifth	5.40
Primary reduction	1.672:1
Secondary reduction	1.368:1
Final reduction	2.909:1

FRAME AND BRAKES

Welded tubular steel double cradle frame. Tapered roller steering head bearings and needle roller swinging arm bearings. Air-assisted, oil-damped telescopic coil spring forks, twin spring/damper rear suspension units with adjustable damping and spring preload. Twin disc front brakes, single piston floating hydraulic calipers. Rod operated single leading shoe drum rear brake.

Front suspension travel	140 mm
Rear suspension travel	80 mm
Fork rake	28 degrees
Fork trail	116 mm
Front brake diameter	270 mm
Rear brake diameter	210 mm
Front tyre	3.25 V19 Bridgestone Mag Mopus
Rear tyre	120/90 V18 Bridgestone Mag Mopus

DIMENSIONS

Dry weight	230 kg
Seat height	780 mm
Wheelbase	1440 mm
Ground clearance	135 mm
Fuel capacity (incl. reserve)	19 litres
Fuel reserve	N/A
Engine oil capacity	3.5 litres

CALCULATED DATA

Weight to power ratio (90 kg load)	7.32 kg/kW
Specific power output	66.9 kW/litre
Mean piston speed at redline revs	16.6 m/sec

PERFORMANCE

Acceleration	
Standing 400 m	12.8 secs at 168 km/h
Average of last three runs	12.95 secs
Zero to 100 km/h	4.8 secs
Maximum speed	204 km/h
Braking	
From 100 km/h to zero	34.7 metres
Average of last three stops	34.9 metres
From 60 km/h to zero	12.1 metres
Average of last three stops	12.2 metres
Fuel consumption	
Touring	17.6 km/litre
City	16.3 km/litre
Hard riding	14.4 km/litre
Average on test	16.5 km/litre

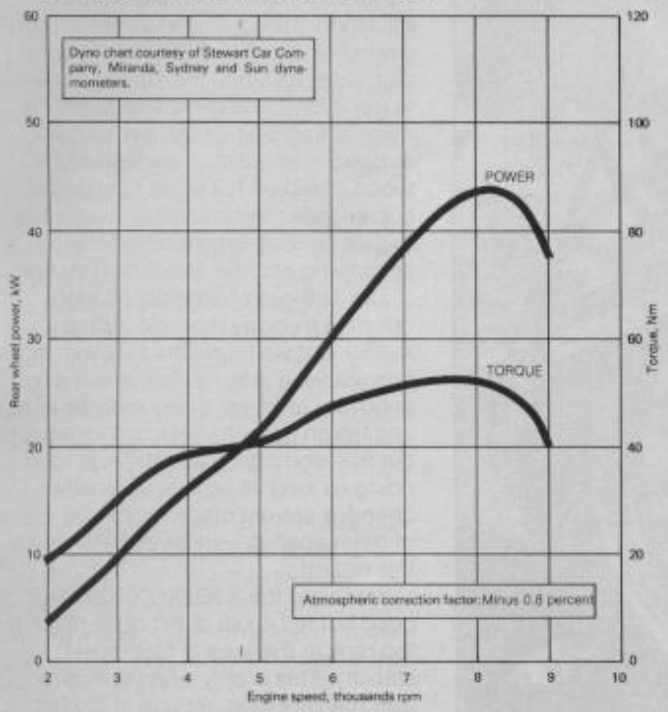
TEST MACHINE

Manufacturer	Yamaha Motor Company, Iwata, Japan
Test machine	McCulloch of Australia, Seven Hills, NSW
Price	$4999

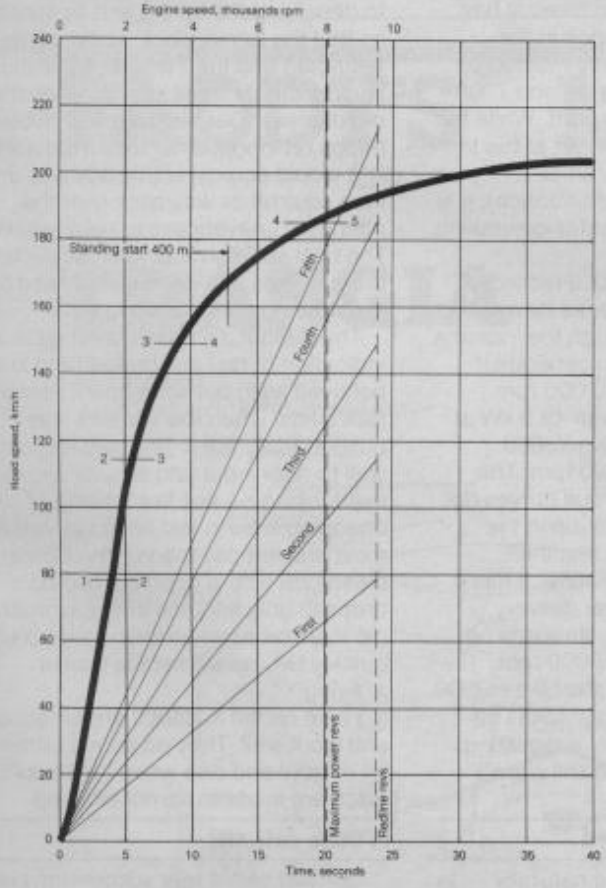
Best points: Easy-going all-rounder has acceptable off-boost performance and gentle transition to turbo-on conditions. Good fuel economy. Handling, braking and comfort good. Eyecatching styling, effective fairing, quality finish.

Worst points: Overshadowed by Honda CX500 Turbo in comfort, high-speed handling, and throttle response at 110-120 km/h. High level of mechanical noise and four-cylinder tingles detract from open-road comfort. No stronger on dyno than a good 750.

CHASSIS DYNAMOMETER

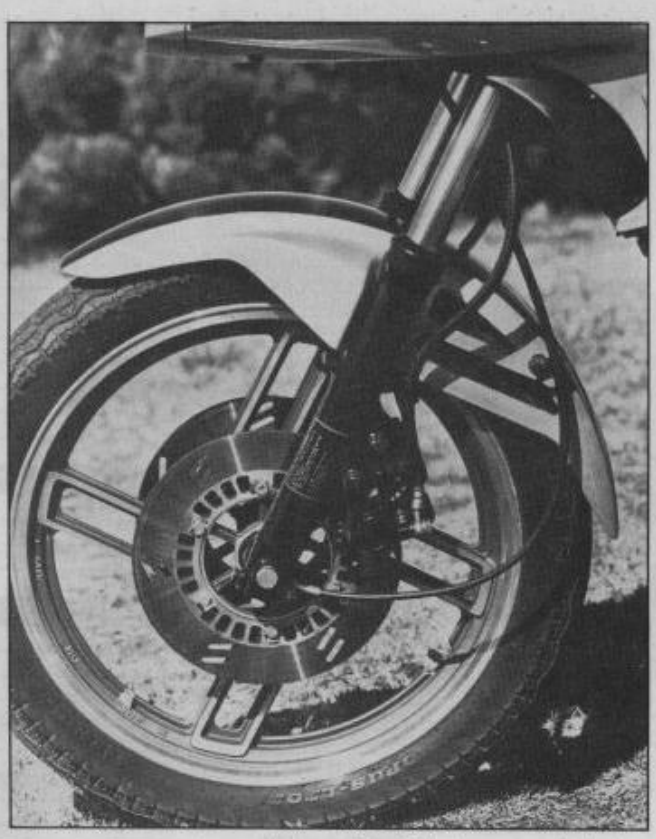


ACCELERATION



SUMMARY

RATINGS	Poor	Below Average	Average	Above Average	Outstanding
ENGINE					
Responsiveness				●	
Smoothness				●	
Bottom end power			●		
Mid range power				●	
Top end power				●	
Fuel economy					●
Starting			●		
Ease of maintenance			●		
Quietness		●			
Engine braking				●	
TRANSMISSION					
Clutch operation				●	
Gearbox operation				●	
Ratio suitability					●
Drivetrain freeplay			●		
HANDLING					
Steering				●	
Cornering clearance					●
Ability to forgive rider error				●	
High speed cornering				●	
Medium speed cornering					●
Bumpy bends				●	
Tossing side to side				●	
Changing line in corners					●
Braking in corners				●	
Manoeuvring				●	
Top speed stability					●
SUSPENSION					
Front					●
Rear				●	
Front/rear match					●
BRAKES					
Resistance to fading				●	
Stopping power					●
Braking stability				●	
Feel at controls					●
CONTROLS					
Location of major controls					●
Switches				●	
Instruments					●
TWO-UP SUITABILITY					
Passenger comfort				●	
Stability with pillion				●	
Cornering clearance two-up			●		
GENERAL					
Quality of finish					●
Engine appearance					●
Overall styling					●
Seat comfort					●
Riding position					●
Touring range				●	
Headlight					●
Other lights				●	
Stands					●
Rearview mirrors				●	
Horn					●
Toolkit				●	
VALUE FOR MONEY				●	



Larger diameter fork tubes, slotted discs, new guard and different wheels. Note how far forward the nose-cone of the wind-tunnel designed fairing protrudes. Opposite page: The XJ650LJ is one imposing package in its silver and black livery. We do wonder, though, how many new owners will have been fooled by the exhausts; on non-boost, exhaust gases exit only through left hand muffler.

Against the clocks

The Yamaha finished its sessions at the drag strip with figures of 12.8 seconds at 168 km/h on the board for the standing 400 metres. Like the Honda, its performance over the quarter is hardly earth-shattering, particularly compared with our test XJ650H of two years ago, which ran 12.7/168. The turbo lost out in the 0-100 km/h region, to the tune of 0.2 seconds. Above that mark, it would have been moving far quicker than the normally-aspirated 650.

The Yamaha's problems off the line were typical of turbo bikes — how to get the thing moving quickly in that period before the turbo starts boosting properly? Whereas the Honda has enough flywheel mass to spin the rear wheel off the line, the XJ needs to have its clutch slipped. Neither approach is particularly conducive to good starts, as the figures testify — though quicker than the Yamaha at 12.6 seconds and 172 km/h, the CX500TC can still be seen off by any self-respecting 750.

We also found the Yamaha's performance in top-gear roll-ons from 80 km/h to be disappointing. Compared with an unblown XJ650 and the potent Honda CBX550, the turbo was consistently outpointed. Under the same circumstances the Honda turbo is slower yet again, but proved to be enormously strong in the 100 km/h-plus region, at which point the XJ turbo was only just able to keep the unblown bikes at bay.

The model's performance in the 5-6000 rpm bracket is only mediocre, and it has to be spinning beyond 7000 rpm before the fireworks start. While the Honda is only a little stronger at the top end (hence the relatively small difference in ultimate performance), it is far stronger in the crucial-for-overtaking 5000 to 7000 rpm area.

On the dyno the XJ650LJ recorded precisely the same power as Kawasaki's Z750GT, 43.8 kW, although the Yamaha only needed 8000 rpm to generate it while the GT called for 10,000 rpm. Honda's Turbo ran out with 49.0 kW at 8500 rpm and the unblown XJ650 peaked at 38.1 kW at 9500 rpm. The Yamaha's power and torque curves do not show the gigantic kick-up in the 3500 to 5500 rpm range that the Honda's exhibited. The XJ650LJ has a much more gradual power delivery although its power curve steepens up significantly as it passes 5000 rpm. Surprisingly — in view of the bike's 9500 rpm redline — power began to tail off quickly beyond 8500 rpm, suggesting that perhaps our test bike still wasn't quite giving its best.

Quality cogs continued

The transmission of the naturally aspirated XJ650 is good and the Turbo's box follows suit. Gears can be swapped with great surety, with the changes bordering on notchy when the engine is thoroughly hot. Selection is positive — not a single false neutral occurred throughout the test. Both internal and overall ratios are well chosen and the clutch seems up to the slipping required to get most turbo bikes smartly off the mark at traffic lights two-up. On two occasions at the strip we detected a touch of slip on full boost upchanges, but we took the hint and allowed a five minute cooling-off period before continuing and the clutch held up fine.

The Turbo probably has no more driveline freeplay than the ordinary XJ650, but we found the LJ's lash more noticeable in stop/go traffic and mildly annoying at times. Some shaft-drive rise and fall on gearchanges can be detected but this won't pose a problem in road riding as long as vicious up or down changes are not made in corners. Plenty of other shaft-driven bikes are worse in this regard.

We found the XJ650LJ's handling good but felt it just didn't quite reach the top rank in the area of high-speed stability. This is only when compared with the very best, though. It still felt reassuringly stable at high speeds.

The bike's steering is well balanced, perhaps a little better at low speed than at high. Careful attention has been paid to designing the fairing and its ancillaries so that the turning lock would not be restricted and the Yamaha can be turned in surprisingly small spaces when the need arises. Our test bike was not overly happy on longitudinal road irregularities — it would squirrel a little one way and then squirrel its way back over the offending unevenness to begin again. The best solution was to cross such irregularities at a decent angle and to avoid riding the bike along them.

The XJ650LJ's frame never gave any indication of real discomfort (and in fact behaved well) but somehow it seemed to lack a little when the Yamaha was pushed really hard. The bike responds well to rider input and is quite forgiving, overlooking no-nos like braking or changing lines in fast bends as well as most present day machinery. Cornering clearance solo is good but two-up it drops to only fair, and any reasonable dip in a corner taken even moderately quickly two-up will set the sparks a 'flying.

Forks on the XJ650LJ are air-assisted and work well. They do permit rather a lot of front end dive when the double discs are made to earn their keep.

A little soft aft

Our test bike's rear suspension (with over 6000 km on it) was very compliant, but we felt the rear springing was a trifle

soft. Solo riding needed spring preload four and damping position four and even the maximum settings on the rear units were not really adequate for two-up use. Hard running on undulating roads for more than quarter of an hour or so also brought about significant damper fade.

The Turbo 650 comes with the same stoppers as the conventional XJ650 — a pair of front discs and a single leading shoe drum at the back. It stops well without being outstanding in this area. Both the power of the brakes and their fade resistance is satisfactory although the rear drum faded noticeably in the last few stops of our test — it felt particularly dead on the seventh crash stop from 120 km/h although it held up well for the first four. The disc stoppers were fine, recovering quickly from the abuse and returning to as good as new a couple of minutes later.

The brakes gave ample feedback to the rider and worked well in wet conditions. The Yamaha remained reasonably stable in desperate stops but the suspension didn't handle extreme braking loads on poor surfaces as well as we had hoped.

In comfort too, the XJ650LJ ranks as good but not great, for the rider at least. The seat is well shaped and quite low and the handlebars and footpegs are well positioned. Pillion passengers unfortunately, don't fare as well — their footpegs are high and the wind blast off the fairing pushes forward on their shoulder blades giving rise to back aches on long rides.

Control location is well thought out. Our only gripe here is a minor one and relates to the new position of Yamaha's high beam switch — it is no longer in a natural position for a finger to be left on it for country night riding. The old position was better. We liked the Turbo's quality finish and its pair of sensibly loud horns but were less impressed by the fitting of only one helmet lock and the non-linear, four lock LCD fuel gauge. Quarter tank increments are too far apart even allowing for the inaccuracy of the rest of the system. Oh well, there's always reserve.

Looking at the XJ650LJ, the conclusion is that $5000 seems a lot to pay for Battlestar Galactica looks and 12 percent more power than a standard XJ650. The bike has too many goods and not enough greats to justify its price tag.

The Yamaha is a better motorcycle than Honda's turbo offering in several respects. It is simpler, lighter and more capable off-boost. But in one critical area — the illusion of performance — it isn't as good. And it seems to us that this is the main reason people would buy a

turbo anyway. Simply, there is no point to a mild turbo, particularly when the power advantage is negated by a pile of heavy, dress-up gear.

On the other hand, the same turbo installation fitted to an otherwise stock, lightweight XJ650 could well be a very good idea . . .

— C.M.