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**TESTS: HUSQVARNA XC250,
BMW R80ST, HONDA CX650E**

**MOUTH-TO-MOUTH FOR
YER TIRED JAP FOUR**



**DO BMWs REALLY
HANDLE?**

sweet-torquing BIG BROTHER

The specifications of Honda's CX650E read like a CX500 owner's vision of Utopia, with more grunt from a bored and stroked powerplant, and better handling from a beefed-up front end. For the next step in the refining process, Honda now needs to look at the rear end ...

IF you were to survey the Honda CX500 owners of Australia and ask what would they like for Christmas/Bathurst or whatever, many of them would say they'd like lots more midrange power, a shade more top end, a front end that doesn't flex, half a pound of dope and a 16-year-old girl.

Now, while they might not be able to get everything they want for Christmas, there is every likelihood that their motorcycling wishes will come true for them if they find a Honda CX650ED Shadow in their stocking.

The CX650 offers significant improvements in the motor department over its little brother, producing much more bottom-end and midrange power than the 500, while also adding a little bit more to the top-end.

The chassis of the CX650, while established in the CX500EC model, represents an improvement over the ubiquitous CX of 1978-1982 vintage. The front forks are much more substantial units than those on the earlier models, while the rear end features the Pro-Link suspension arrangement, which is no better than a sideways step over what has gone before.

Overall, the big-motored CX, although a little overdue, is a welcome arrival on the scene. Here is a product with an outstanding reputation for reliability, and a sane, comfortable and civilised approach to a high-speed motorcycle.

While the badge on the new CX's

sidecover may say it's a 650, the actual capacity is 673 cm³, an increase of 35 per cent on the old CX's 496 cm³. Honda has gained this extra capacity through an increase of 11mm in stroke and 4.5mm in bore, giving dimensions of 82.5mm by 63mm. The result is an increase in power, just where it was needed.

Accompanying the capacity increase, there are other changes to the CX motor. The compression ratio has been lowered slightly, from 10.0:1 to 9.8:1, while 39 mm carburettors have replaced the 35 mm units of the 500. The redline has been lowered by 750 revs to 9000 rpm, but with the increase in stroke, piston speed at redline revs has increased from 16.9 m/sec to 18.9 m/sec.

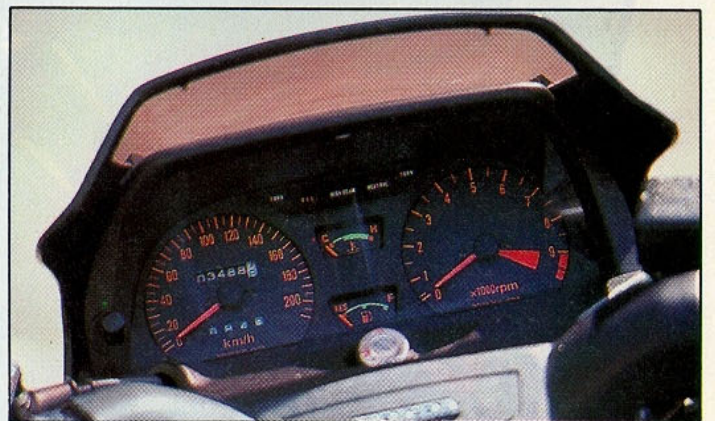
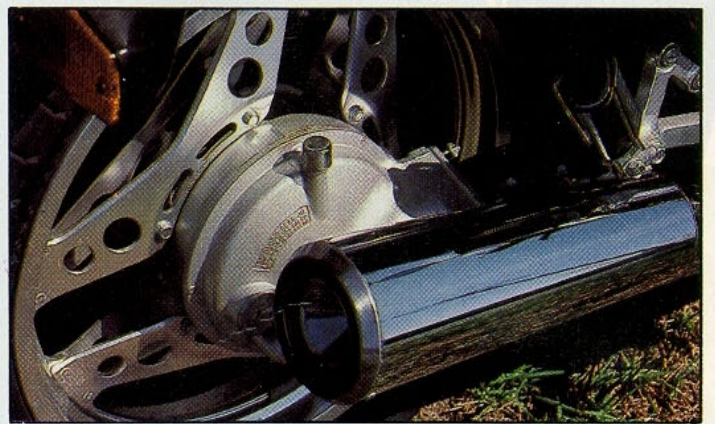
Honda claims 47.5 kW at 8000 rpm for the CX650, an increase of 10.8 kW over the half-litre model, which made its maximum power 1000 revs higher in the range. The claimed torque figure for the 650 is a substantial 61 Nm, developed at 6500 rpm. This compares very favourably with the CX500's claimed 43 Nm, developed at 7000 rpm.

Confirmation in the figures

Our dyno testing of the CX650 confirmed these improvements. Rear-wheel output of the 673 cm³ machine was 35.4 kW, compared with 496 cm³ model's 27.9 kW. But the real differences show in the torque curve, where the peak of 44.9 Nm from the 650 easily betters the 31.9 Nm of the 500. From 4000 rpm all the way



ROAD T-E-S-T



The big CX is a rugged, gutsy, hard-working motorcycle. Performance is all a CX500 owner could have dreamt of, appointments are sensible without being dull, and general handling is good. All we're waiting for now is improved rebound damping to the rear suspension unit.

to the redline, the new model's torque figures exceed the CX500's maximum torque figure. The shape of the respective torque curves is, however, similar.

The unique layout of the Honda CX is now familiar, though when this motor was first introduced, it required a rash of technical articles and long explanations to gain understanding. Underneath it all, it's a pushrod twin — but not any ordinary pushrod twin.

By using an 80 degree V-twin layout, Honda was able to keep the transverse motor quite narrow, while sacrificing only a small part of the inherently good balance that a 90 degree V-twin possesses. Anxious to provide a compact motor, the firm took an interesting step with the CX series and turned the cylinder heads at an angle to the crankshaft. This enabled the carburetors to be tucked close under the tank, instead of jutting out in the breeze against the rider's knees.

However, to use overhead camshafts with the skewed cylinder heads would have required bevel gears (à la Ducati 900), so with the CX, the humble pushrod underwent something of a Japanese renaissance.

The pushrods themselves are short, being activated by a camshaft high in the block, nestled in the crook of the vee. This high camshaft/short pushrod arrangement has been normal in some car motors (like Peugeot, Citroen and Renault) for the last 30 years or more. With the CX, Honda took the idea another step further, using four valves per cylinder and high engine revs.

The use of pushrods is, of course, a bonus for home maintenance. Adjusting the eight easily accessible tappets takes only a few minutes, once every few months. Otherwise, with electronic ignition and linkage-operated carburetors, maintenance on the CX has always been a low-key matter for most owners.

The cooling system is sealed, and unlike the older model CX, uses a thermostatically controlled rather than a constantly engaged fan. The pump for the cooling system is driven from the rear of the camshaft.

The CX650's motor felt harsher than the 496cm³ mill, although after a few days we got used to the vibes. On longer runs, the vibration wasn't of the intrusive sort. As the test bike had done less than 4000 km, we're sure that with another 5 to 10,000 km running in the plain-bearing motor should have even less vibes.

Power — in the right style!

Another aspect of the bigger motor that is immediately noticeable to those who have owned a CX500 is the increase in grunt. The style of power delivered by the new CX puts it among the most useful

sweet-torquing **BIG BROTHER**

motors to come out of Japan. It's grunty, has plenty of midrange, and the free-breathing cylinder heads allow a useful top-end.

Out on the open road, the CX650 is a top-gear motorcycle, something which was never true of the 500. The little (ha) 500 had a much whippier powerband, with a noticeable surge from 6000 rpm. Big brother CX still surges ahead at 6000 rpm, but the surge is less noticeable than with the smaller motor, due to the already rapid progress made in the lower revs.

The grunt is available from go, with good quality pick-up available from 3000 rpm onwards. Overtaking in top gear is usually a throttle-opening matter only, although changing down is still available if you really need to move.

The difference between the CX brothers is substantial in the low and midrange, but the top-end difference is small. The 650 pulls around 190 km/h, which is not its theoretical maximum, but was as far as the motor felt it would readily pull. The new model manages to get to 180 km/h fairly rapidly — the rest is a wait. The 500 was capable of going to 170 km/h easily, with another 10 km/h available if you were really patient.

The ease with which the 673 cm³ engine makes power and runs on the open road is reflected in an improvement in fuel consumption over the 500 versions. We averaged 18.2 km/litre on the CX650, with a best figure of 20.0 km/litre being achieved on a 110 km/h average open-highway run. Our worst figure on test, 16.7 km/litre, was still better than the figures the 500 could sometimes throw at you. Combined with the enhanced economy, the CX650 (like the CX500EC before it) has a larger tank of 19 litres. This should see most riders well past the 300 km mark on each tankful.

The transmission of the big-motored CX has been the subject of much thought and development by Honda engineers. While primary drive is again by helical-cut gear from the front of the motor, and the clutch and gearbox remain adjacent and contra-rotating to the crankshaft, the ratios of the primary drive and gearbox have been altered.

Primary drive ratio is up from 2.240:1 on the CX500 to 2.114:1 on the CX650, while all the internal ratios are, in varying degrees, taller than those of the half-litre CX's gearbox. Final drive ratio, however, remains at 3.09:1.

But never fear, seasoned CX owners will find some of the gearbox quirks and characteristics are still there, including an occasional tendency to reject gears if they are not properly selected, and the odd angel gear. These problems are only occasional — familiarity with the machine will reduce their incidence.

The CX's shaft-drive train, which soldiered on unobtrusively in the 500 models, has signed on for another tour of duty with the 650 machine. In combination with the in-line crank, it gives





HONDA CX650E

ENGINE

Water-cooled transverse 80-degree V-twin four-stroke. One-piece crankshaft, both conrods on common crankpin, plain main and big end bearings. Wet sump lubrication. Single chain driven camshaft; four overhead valves per cylinder, operated by followers, pushrods and forked rockers.

Claimed maximum power	47.1 kW at 8000 rpm
Claimed maximum torque	61.0 Nm at 6500 rpm
Bore x stroke	82.5 x 63.0 mm
Displacement	673 cm ³
Compression ratio	9.8:1
Maximum engine speed	9000 rpm
Carburation	2 x 39mm Keihin CV
Air filtration	Paper
Starter system	Electric
Ignition	Capacitor discharge

TRANSMISSION

Gear primary drive from the front of the crankshaft through wet, multiplate clutch to five-speed constant mesh gearbox. Left foot shift, one-down, four-up pattern. Final drive by shaft.

Gear ratios (overall: 1)

(km/h per 1000 rpm in brackets)

First	16.31 (7.3)
Second	11.18 (10.6)
Third	8.35 (14.3)
Fourth	6.76 (17.6)
Fifth	5.47 (21.8)
Primary reduction	2.111:1
Secondary reduction	3.090:1

FRAME AND BRAKES

Welded tubular and pressed steel frame incorporating engine as stressed member. Front suspension by air-assisted telescopic forks with mechanically actuated anti-dive. Rear suspension by box section swinging arm and ProLink air spring monoshock rising rate system. Twin disc front brakes, double piston floating hydraulic calipers. Single disc rear brake, double piston floating hydraulic caliper.

Front suspension travel	150 mm
Rear suspension travel	110 mm
Fork rake	28 degrees
Trail	105 mm
Front brake diameter	260 mm
Rear brake diameter	260 mm
Front tyre	100/90 x 18 tubeless Bridgestone
Rear tyre	120/80 x 18 tubeless Bridgestone

DIMENSIONS

Dry weight	210 kg
Seat height	795 mm
Wheelbase	1495 mm
Ground clearance	160 mm
Fuel capacity (incl. reserve)	19 litres
Fuel reserve	2.5 litres
Engine oil capacity	3.9 litres

CALCULATED DATA

Mean piston speed at redline revs	18.9 m/sec
Specific power output	52.6 kW/litre
Weight to power ratio (90 kg load)	8.48 kg/kW

PERFORMANCE

Acceleration

Standing 400 metres	13.5 secs at 158 km/h
Zero to 100 km/h	5.5 secs
Maximum speed	190 km/h

Braking

From 100 km/h to zero	35.6 metres
From 60 km/h to zero	13.0 metres

Fuel economy

Touring	20.0 km/litre
City	17.2 km/litre
Hard riding	16.7 km/litre
Average on test	18.2 km/litre

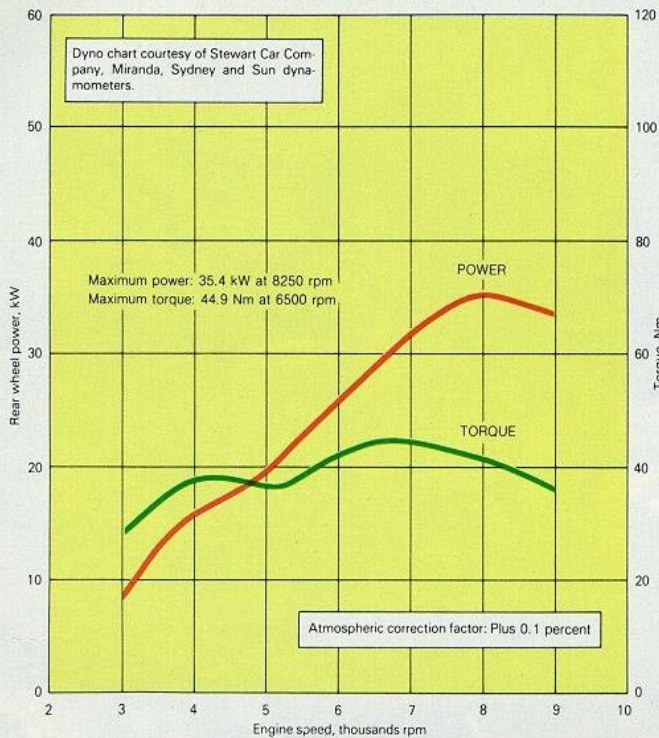
TEST MACHINE

Manufacturer	Honda Motor Company, Tokyo, Japan
Test bike	Bennett Honda, Wetherill Park, NSW
Price	\$3869

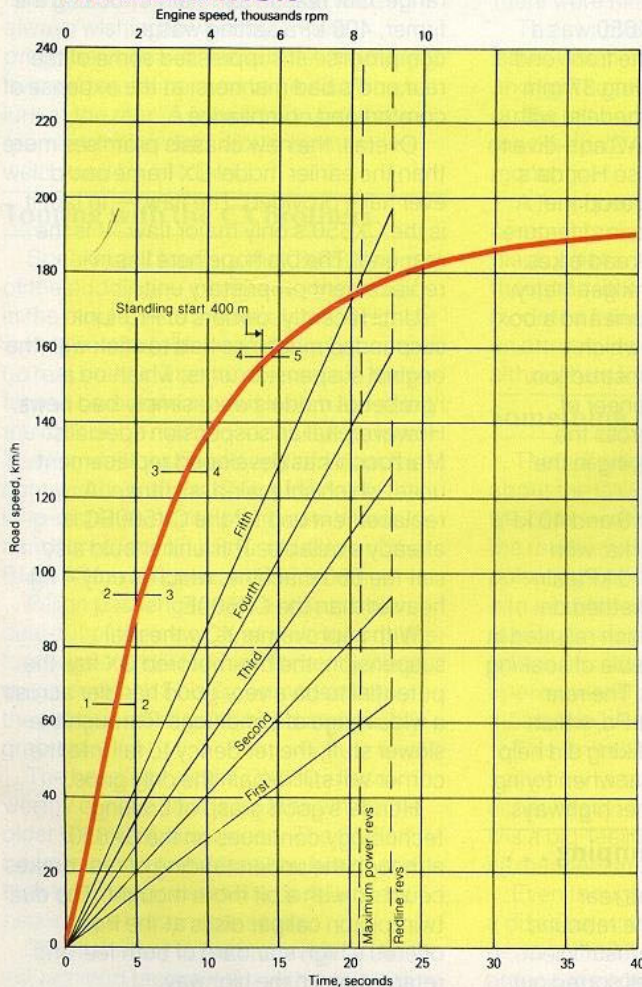
Best points: Finally, the power characteristics CX owners have been waiting for. A good bottom end, strong midrange and a free breathing top end make this one of the best powerplants from Japan. Easy maintenance and a proven reliability record are strong pluses. In addition, bike is comfortable, has a good fuel range, and with a little work on the rear end, should provide very good roadholding.

Worst points: The rear damper unit is the main culprit behind what's wrong with the CX650. At least it should be replaceable, soon. Unlike old CXs, the new CX is no longer cheap, although it's still competitive against similar performance machinery. Optional handlebars, lower exhaust pipes so panniers could be more easily fitted, 10 kg less weight, and 4 litres more fuel capacity would improve package still further.

CHASSIS DYNAMOMETER



ACCELERATION



SUMMARY

RATINGS

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

	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					

sweet-torquing **BIG BROTHER**

the Honda the distinctive characteristics which have become art forms in BMWs and Moto Guzzis — the characteristics are likewise quite endearing in the Japanese twin.

One step forward, one sideways

The handling of the CX500 was never perfect, but with a little modification and tuning, the machine proved itself to be very versatile. The front was far too weak, with owners often switching to heavier weight fork oil, or fitting air caps and fork braces to minimise this deficiency. The poor rear shocks were easily replaced, and replaced they were. The great feature of the old CX was, however, its nimbleness in the tighter going, where its heavy, 200 kg weight belied its ability to be thrown around.

Chassis-wise, the latest CX follows the main changes laid down by the Euro-model CX500EC, although some additional modifications are present. Compared with the CX500EC's 27.5 degrees fork rake, the CX650 has 28 degrees. Both the CX500EC and CX650ED have 105 mm of trail, as against the early half-litre machine's 100 mm, and a wheelbase of 1495 mm compared with the old twin-shock model's 1445 mm. Overall, this adds up to a noticeable change in the style of cornering ability offered by the V-twin Honda.

The "big" CX showed very good high-speed manners on the highway, although when the road deteriorated things changed a little. On smooth roads, the 650 offered a high level of stability and precision when pushed along hard. However, through medium and slower speed corners, its performance, while predictable and steady, was nowhere near as precise and nimble as the older, twin-shock CX's.

Adding 10 kg to an already weight-conscious machine doesn't help your sense of confidence at lower speeds, while the ground clearance of the new model was not as good as the old CX, which was extremely difficult to scrape on a smooth road.

Overall, however, the loss of the old CX500's low-speed precision was countered by the improvement in high-



speed stability.

The suspension of the CX650 was a mixture of good and bad. The front-end proved to be sturdy, employing 37 mm tubes (33 mm on the older models) with air-caps and adjustable TRAC anti-dive to assist matters. There was also Honda's corporate fork-brace sitting atop the mudguard — it's now a standard feature on most new Honda sports-road bikes.

The rear end is by Pro-Link geometry, an air-assisted suspension unit and a box-section swinging arm, all of which appeared quite robust in construction. However, underneath the veneer of solidarity we again came across the problem of insufficient damping in the suspension unit.

Honda suggests between 0 and 40 kPa of air pre-load in the front forks, with anywhere between 0 and 500 kPa air-assistance for the rear. We settled on using 20 kPa in the front, which resulted in a soft ride that was still capable of soaking up quite substantial bumps. The rear suspension was run at 400 kPa, which while a little too firm for our liking did help cure the untidiness in the rear when trying to hustle along on the rougher highways.

Add a little rebound damping . . .

The main problem with the rear suspension seemed to be the rebound damping, which was simply insufficient. The springing rates were well sorted out, with a smooth, compliant ride available with pressures down in the 300 kPa

range. Our reason for finally choosing the firmer, 400 kPa setting was a compromise. It suppressed some of the rear end's bad manners, at the expense of comfort and compliance.

Overall, the new chassis promises more than the earlier model CX frame could ever have provided. The flaw — in fact it is the CX650's only major flaw — is the rear end. The big hope here lies in replacement proprietary units.

Until recently, owners of Pro-Link suspended machines had to stick with the original suspension units, which on a number of models were simply bad news. However, Italian suspension specialist Marzocchi has developed replacement units, which shun air-assistance. A replacement unit for the CX500EC is already available. This unit should also suit the 650 machine, which is only 4 kg heavier than the CX500E.

With improvements to the rear suspension, the big-motored CX has the potential to be a very good handler across a wide range of conditions. Through the slower stuff, the tendency to fall into the corner will still remain the only gripe.

Honda's good grasp of braking technology continues on the CX650, although the understanding of rear brakes could do with a bit more thought. The dual twin-piston caliper discs at the front offered a high standard of both feel and retardation on the highway.

The rear disc was a little too savage for use in the dirt and in slippery road



conditions. In these cases, you were always wishing for a softer, more progressive brake, rather than the hungry, twin-piston caliper and large disc which lurk at the rear. A return to drum on the rear, or smaller disc, would be most welcomed by all tourers.

Touring with the CX brothers

Speaking of touring, the CX650 is proof of the pudding — being a worthy tourer, in the mould of its predecessors. The seat is very comfortable, making long journeys no real bother. The handlebars are those forged corporate models which are doing the rounds on many Hondas these days. They're well positioned and of about the right width. With its 19 litre fuel tank, the long-distance ability of the new V-twin is handsome, even if it is just outside of the BMW/Guzzi/Kawasaki GT750 range.

Pillion passengers get a reasonable deal out of the new CX as well, though the footpegs are still too high for really long-range comfort. This is compensated by the provision of a good sized and quality grab-rail.

The headlight on the CX650 is also worthy of note, for it's an area where the older CXs were dim indeed. The 650's beam is broad and flat at low beam; the high beam penetrates the dark, while still providing a reasonable spread.

The instruments are a conventional speedo and tachometer, with a coolant temperature gauge, and a fuel gauge which told us we'd run out of fuel when

there were nine litres left!

The switches are standard Honda issue, which means they are easy to use and light to touch. The choke is mounted on the left handlebar. In usual CX form, the bike proved to be a ready starter every morning.

A lot of people made favourable comments about the Shadow's grey and black paint scheme, which we at first thought a little dull. The handlebar-mounted fairing, with its chiselled lines is an attractive addition to the styling, although its functional use is only slight.

Something manly in the model

There is something quite masculine about the CX650. When you step aboard the bike — with its hefty 210 kg weight, the relatively high seat height and pulsating low-speed rumble which turns into a burble as the revs rise — it looks manly. Consider, too, the 650s need to be ridden positively and confidently, and, it's appropriate that it might be considered a masculine bike.

This isn't to be misconstrued into somehow meaning the grown-up CX is either heavy, brutish or clumsy to operate. It is a big-feeling bike, but once under way its manners are perfectly gentlemanly.

Even though the rear-end proved to be a disappointment on the bike, with the news of the Marzocchi replacement units around the corner, the only real hurdle to recommending the bike thoroughly could be removed. Once the rear end settles

into civilised shape, the CX650ED will become a good bike; it already has one of the best sets of power characteristics available from Japan.

With so many bikes wasting their energy trying to look like a production-racing champ, with powerbands up in the high revs, where many people will never use them, here is a Japanese bike with a strong bottom end and equally strong mid range.

The ability of the CX650 to cover the ground quickly is enhanced by this handsome spread of power, which means that top-gear running is the easy option, while gear changing and throttle twisting can be taken up if you're really in a hurry.

Topping off the excellent powerplant is a chassis with a lot of potential. The comfort of the CX650, and its very cheap and easy-to-maintain nature, means living with the bike should be a pleasure.

Not only should many a CX500 owner update to the new model, because the bound in power really is a step forward, but motorcyclists who are tiring of supposedly high-power machines which have no go where it's mostly needed should also be looking at the gutsy V-twin.

In this year of many new models and lots of whizzbang motorbikes, the Honda CX650 is, like the CB1100F and Yamaha's XJ900, a refinement of a well-proven design. And as with these two enlarged fours, it's likely that many people will put their dollars into the V-twin's refinement and reliability.

— J.M.