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motorcycle **MECHANICS**

**PIILING ON THE
POWER**

How we did it



Our fastest 750 in years

Day and night on hottest 250

Used bike guide • Oversuits: What to wear

On test

XJ650: A remarkable runner

By Dave Walker

THE PERFORMANCE of the XJ650 Yamaha in this latest 24-hour track test can only be described as remarkable. The total mileage was only sixty-odd down on the 900 Honda run last year — and that was going around the faster Grand Prix circuit!

Add to this the fact that the Yamaha could have coped with fewer tyre changes and you could make out a good case for choosing the 650 in preference to the 900.

With John Robinson's trick Honda going for the distance record, the bog-standard Yamaha was very much an "also ran". We didn't expect it to go very far because we were going to use it for some tyre evaluation tests. This meant changing several sets of tyres long before they were worn out. By going straight from one set of rubber to another you get an instant comparison that isn't possible by normal road testing.

The 650 started with stock tyres and after the drag start was a very close second to the Honda going into Riches. Since the main requirement in these tests is to stay on the bike, speeds through the turns were kept down a touch and the Honda soon

pulled away never to be seen again. The handling of the Yamaha was really impressive, it had stacks of ground clearance and held its line well.

During the few initial practice laps it had wallowed around a bit at Corams but moving the rear shocks up to the third notch reduced this to almost zero. It would have been nice to try still harder settings but the bike had to remain with the one set-up so that the tyres could all be compared under the same conditions.

Somehow we must have started the test with less than a full tank of petrol because after only 37 mins the bike went onto reserve. The system was to signal the pits with three blasts of the horn and do three more laps before coming in. On each "slowing down" lap the horn was to be sounded with two, then one, hoot and the pit crew and fresh rider should be waiting to pounce as you came in.

Screaming up the pit road I made a good

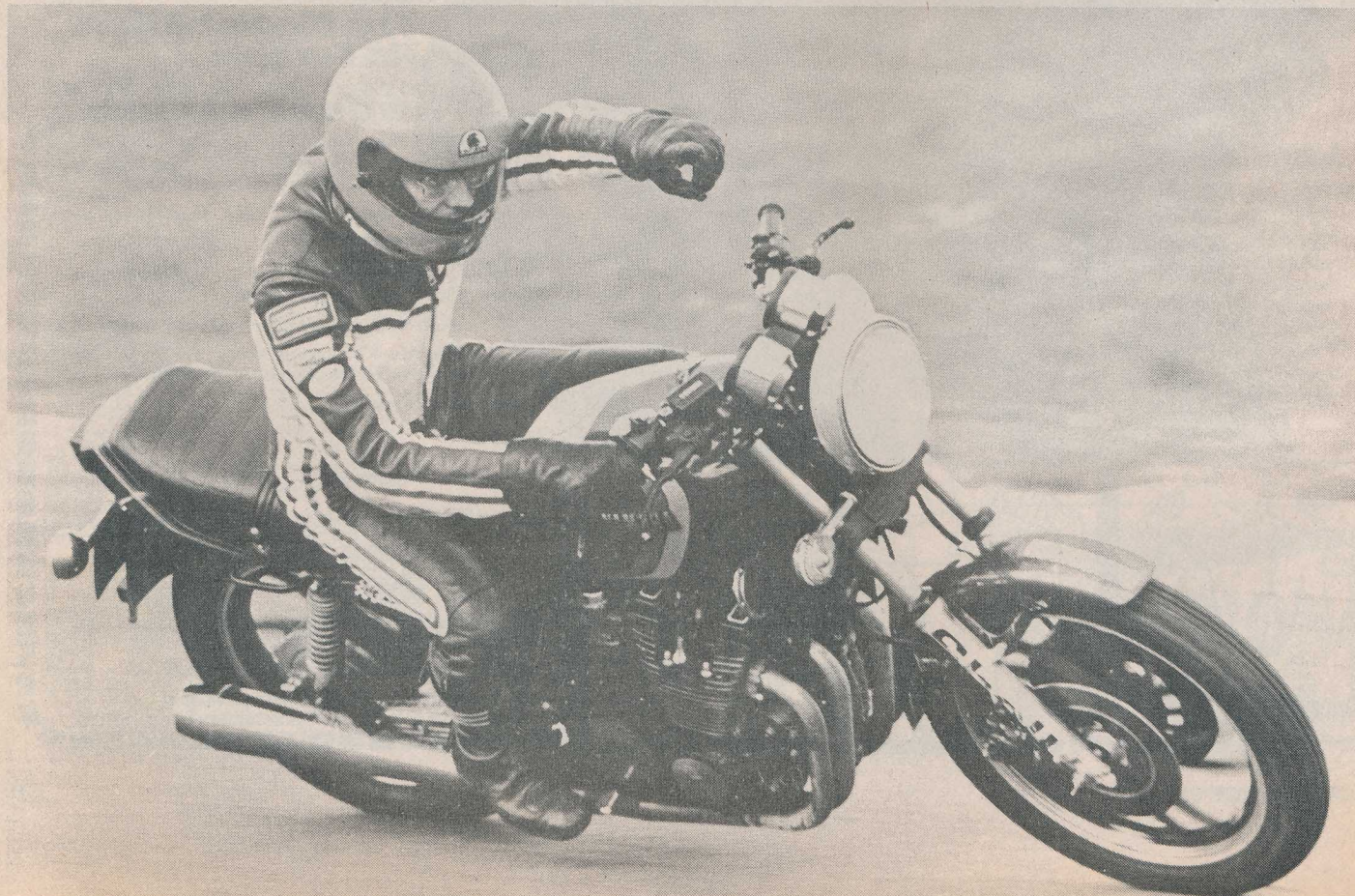
Rodeo star Dave Walker seems to be having some trouble with the handlebar height on the 650 Yamaha.



show of urgency by squealing the tyres under braking. Right according to plan the pit crew, Kevin Giles and Peter O'Connor, pounced on the 650 and did their stuff in less than one minute. All we were missing was the fresh pilot. I had no choice but to go out again while the missing body was located.

John Peters, Dunlop's test rider, was the second man out and he quickly got into the groove. This time the tank was brim full and the bike went one hour exactly before pitting again. By now it was starting to get dark and as Richard Hopkins prepared to take over, someone passed comment that a spot light would be nice.

Making like our fairy Godmother, Les Smith of Cibie appeared — spotlight in hand. This was clamped to the handlebar and wired direct to the battery. This was Richard's first ride on a race track and it





Pit stop for the best distance runner, the Yamaha XJ650. Kevin Giles refuels. Peter O'Connor checks the engine.

was explained to him that the only "blaze of glory" we wanted to see was from the Cibie lighting!

You get a fair idea of how good the Yamaha is to ride by looking at Richard's lap times. After a cautious start he came down to within four seconds of John Peters' times. Coming into the pits an hour later Richard was more than happy with the bike's power and handling but he did report that the engine was "not revving properly".

I thought that this was probably due to the fuel head dropping off as the tank emptied. I had found a slight throttle "lag" as the bike neared reserve and simply compensated by opening the throttle a little sooner in the curve. I was wrong! Going out with four gallons of petrol aboard I found the engine holding back at 7,500rpm and not wanting to run up to the red line at 9,500.

This was my fifth 24-hour test and the first time I had struck trouble. I've a fair bit of mechanical sympathy in what passes for my soul, and I don't often run engines past the red-line, or slam them down the box without losing road speed first. I liked to think that my fair, albeit hard, treatment would be rewarded yet again with another trouble-free run.

I decided to play a hunch and rip the spotlight wire off. Unfortunately it was wired up better than it looked and all my snatch at the wire achieved was to pull the handlebar violently to the left! Having recovered from a nasty weave I took a more cautious approach and eventually broke the connection.

Straight away I had to slow down. Without the extra lighting I couldn't see the near-side of the track going into the corners. The big Yamaha headlight was fine on the straight — where you didn't really need it. I could see well into the field either side of the Tarmac. However, going into a corner the wide beam tipped over leaving the inside of the track in total darkness. A rounder beam with less spread would have been much better.

To add to our troubles the engine was still reluctant to rev. I felt that the extra lighting just might have been too much for the generator — letting the battery voltage drop.

Half an hour later the road ahead became distinctly brighter — another bike had caught me up. After a couple of laps it still hadn't come past so I knew it wasn't the Honda. Up to then I had been changing up at 7,500 rather than wait for the motor to struggle further up the rev range.

With another bike catching up I tried hanging on to the gears — the misfire cleared and the motor pulled hard to the red line. My would-be overtaker was left for dead and the engine gave no more trouble for the rest of the test.

But more trouble was to follow. At around half past two in the morning I was getting ready to go out when I failed to

On test

notice our Yamaha go past the pits. I checked with our spanner men who told me to stop worrying and just get ready for the change-over. I was clutching the armco and peering up the road when a hand tapped me on the shoulder. "Demon Hopkins" was standing behind me when he should have been guiding the Yamaha around the Norfolk countryside. He had just stuffed the bike into the straw bales at Russell's!

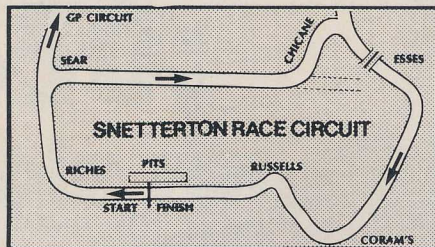
While Richard was busy apologising for the damage, the Yamaha technicians were busy ripping bits of broken headlamp from the machine. Twelve minutes later the bike was back on the track with a full tank of petrol, one new spark plug and a new headlamp.

When daylight came the bike started to lap pretty quickly. During the night the Yamaha had been getting into top gear on the back straight at around the 300-yard marker board. However, it hadn't actually been peaking in fourth and when we started to try a little harder there was no point in changing into top at all. Over a complete lap we were only using three gears most of the time, having no use for first or top.

With a shaft drive you can't alter the gearing without a lot of effort which is a pity because lower gearing would have brought an extra gear into use and given yet more power out of the corners. On the road top gear is about right for maximum speed under favourable conditions — but not so at the track.

At the end of the day we had covered 1,644 miles and only lost 1hr 16mins out of the twenty-four. Fuel consumption was difficult to keep an accurate check on but varied from 40mpg down to 25! In a lot of ways this was the easiest 24-hour test I have done. The bike is very comfortable to ride, and quite easy to go quickly on but still holding something in reserve for emergencies.

The handling is first class and gives good feed back to the rider. It proved a good choice for tyre evaluation and we learnt a lot about the different tyres we tried — you can read about that in another issue.



Yamaha's coolest 250

By Brian Crichton

IN OUR August issue we gave Yamaha's new water-cooled 250 twin something of a cool reception if you'll pardon the expression. We said the handling was great and, though the engine was very good, it was not quite up to the standard expected.

We didn't realise just how good the handling was until we had one for our recent annual 24-hour tests at Snetterton race track in Norfolk.

It was on the programme against the new shaft drive Yamaha XJ650, Kawasaki's new 440, 650 and 750E models and our own over-bored and tuned 750 Honda company bike.

Apart from the specially set-up Honda on endurance racing tyres, the RD250 out-handled everything on the track. It could dive into corners deeper and later and ride round the outside of the bigger stuff.

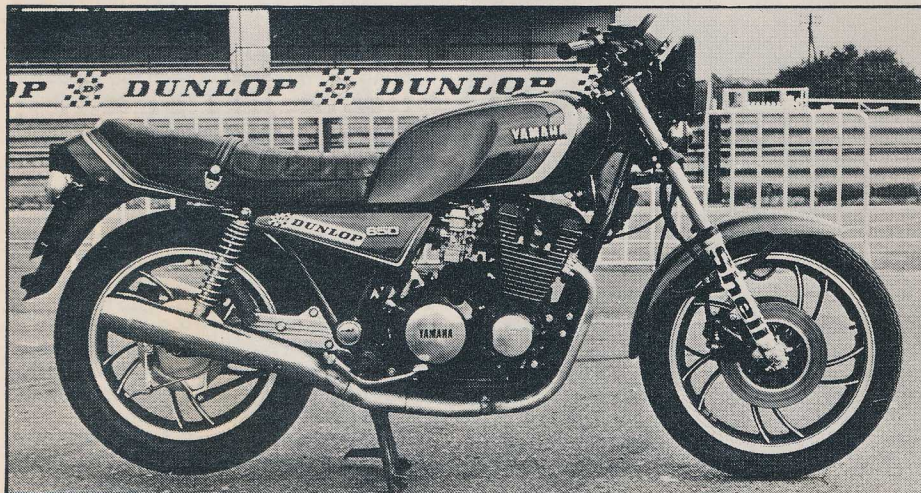
Surprisingly, the water temperature needle hardly lifted off its rest position even though the machine was ridden hard for so long. Unlike the TZ racers which have thermostats the RD misses out on grounds of cost. Maybe Yamaha will include one as an improvement next year.

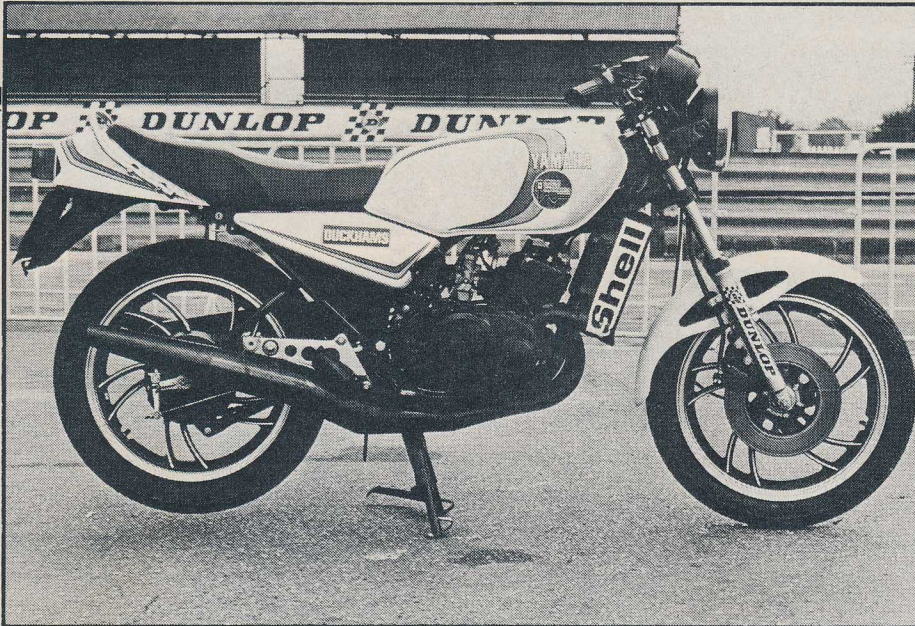
Originally we were due to have the RD350LC for this test. But, as potential owners will know, the much-awaited 350 is still awaited (at the time of writing anyway).

The alternative was the 250. The rest of

Below, left: A rocketship with a shaft the XJ650 Yamaha could have reached almost 130mph on a longer straight.

Below: A delay for the 650 Yamaha. A spotlight fitting caused the fuss but was soon sorted.





Mechanics 24-hour tests it was the first two-stroke to be included and the smallest by 150cc. So its well-publicised credentials were very much on the line. It responded to the challenge and amazed us all in nearly every respect.

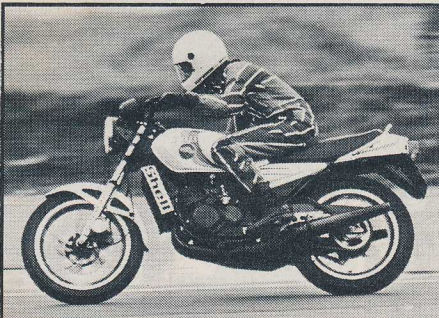
Before the 7pm evening commencement of the 24-hour period the transmission oil was changed and the tank filled with Shell petrol — one of the sponsors helping the marathon to run smoothly.

Last month's issue of *Mechanics* carried the story of the Kawasakis and listed the many helpers to which this magazine owes its thanks. In this issue the XJ650 Yamaha and company Honda stories are also included.

Looking after the Yamahas in the pits were Mitsui workshop foreman Kevin Giles and field engineer Peter O'Connor. Overseeing the whole episode was service manager Brian Hamilton aided by Patrick Wills from Yamaha's sales promotion department.

Apart from removing the mirrors the Yamaha went out for practice in standard trim including the tyres.

The three main riders to share the bike were myself, our London advert representative Ian Burgess who has done a spot of sidecar passengering at



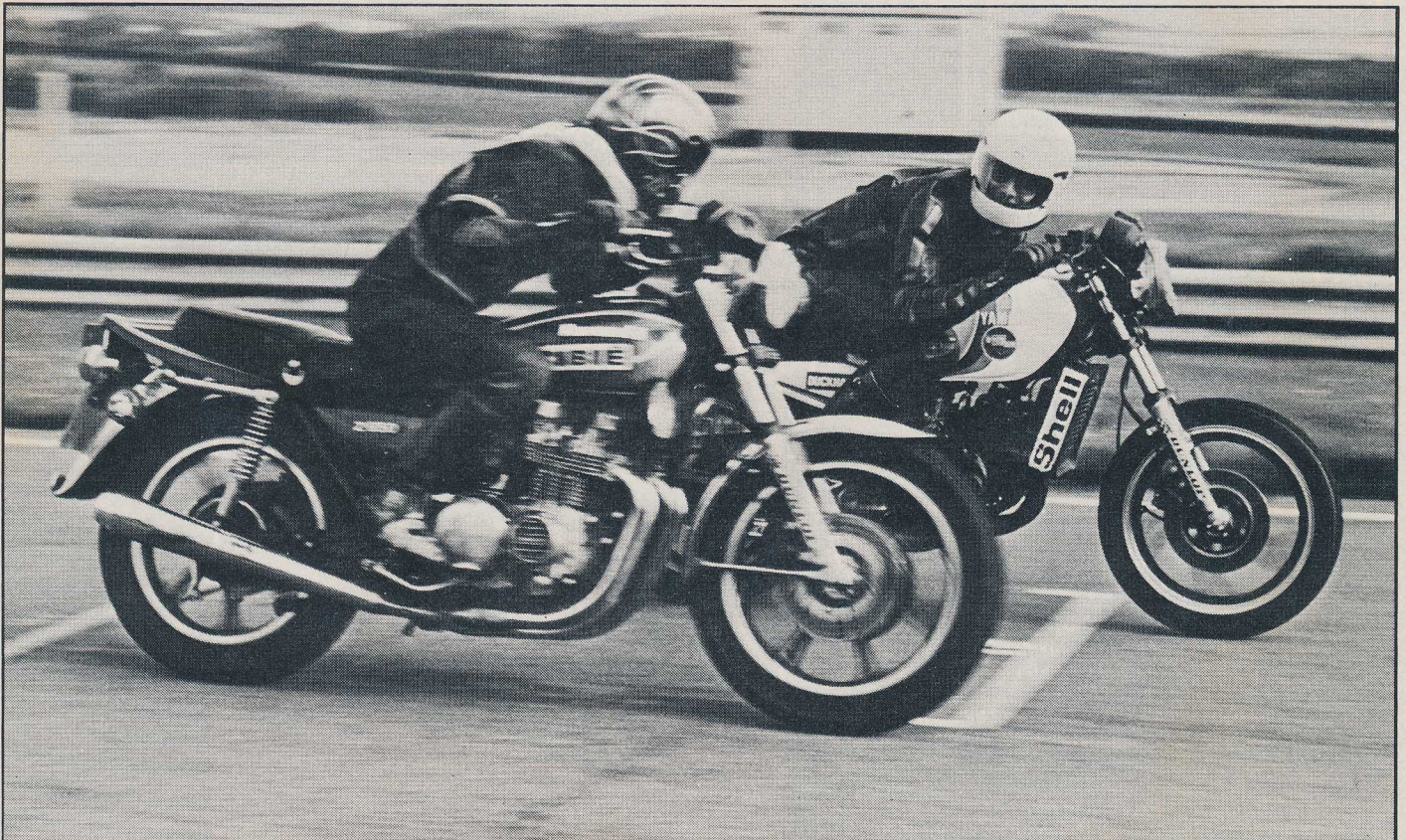
The only volume production road bike with monoshock rear suspension the RD Yamaha sets new standards in the class.

the *Mechanics* staff were surprised when I said I was happy to take charge of it. They had visions of it being overstretched to the point of boredom for such a long track session. The reliability factor was also questioned.

In the five year history of *Motorcycle*

Left: Ian Burgess gets down to some monoshock manhandling. He would have preferred a double disc at the front.

Below: Road racer Kim Hull on the 650 Kawasaki just manages to get past Phil Lelliott on the Yamaha. They almost have time to discuss it!



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Right: Have you ever seen an expression like it? Colin "Screwloose" Taylor must have guessed the Honda's impending doom.

Top middle: Night time attention from Kawasaki's Dave Hill on bended knee for the Z750E which gave the XJ Yamaha a run for its money.

Above: Wheel changing for the Kawasaki 440. Kawasaki technician Alex Dell is geared up ready for the next stint.

Main pic: Streaks of light past the pits as the midnight runners keep the wheels turning to catch the dawn.

On test



international level, and my brother Victor who works in the building trade.

Suddenly it seemed that the Yamaha teams may not get to start. For several heart-stopping seconds during practice the 250 and 650 were locked together as they exited Russells after colliding.

It seemed to take an eternity for them to separate. Both bikes pulled into the pits. Richard Hopkins, husband of our secretary Gill was shaken and drained of colour. He was also hopping mad.

Victor, who was on the 250, presented the bike with the right bar and lever bent down from the impact. It had been a narrow escape.

At first both riders kept their distance. But as they wandered closer together the inevitable but well restrained argument sparked. Neither rider admitted liability. It was an incident best forgotten. The Yamahas bars and lever were bent straight. The 650 had been undamaged and thankfully the riders were unhurt.

On hand to record mileage figures and events like this were Ian Burgess's girlfriend Gail Collins, secretary for the London dispatch rider firm of Pony Express, *Motorcycle Mechanics* advertisement secretary Jane Bullock and her boyfriend Rob Winfield, a marine engineer.

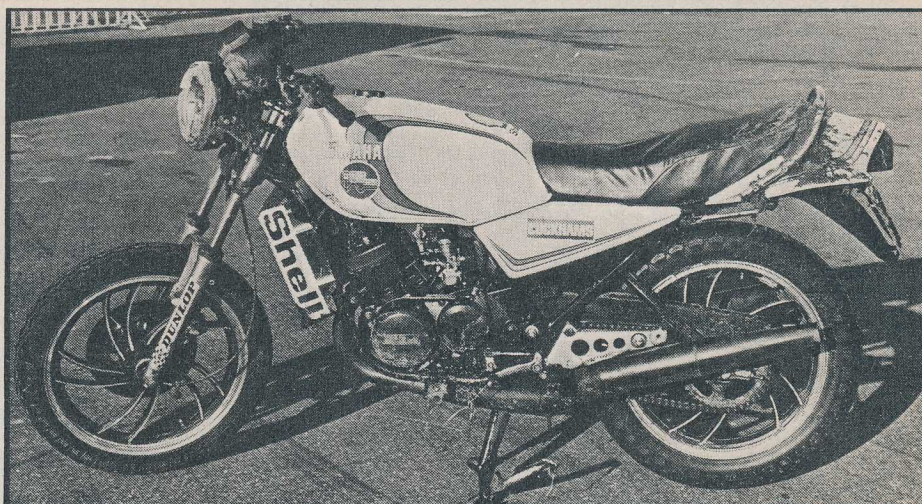
I was the first out on the 250 as we lined up for the start. Although I precipitated the start by letting the clutch out, everyone followed suit leaving me almost for dead. The Yamaha is very mild until it reaches 6,000rpm and I had allowed it to bog down on the initial take-off.

During that first session I was on the bike for 1hr 6min. Most of the time I was changing up at 9,000rpm through the six speed box and it came as a revelation to find out how the LC could sweep through corners in such a stable manner.

Through the speed trap set up on the Revetts straight (see map) it was reaching 97mph true speed with 100mph showing on the clock.

The bigger bikes were able to pass it here, but through the chicane before the Esses braking could be left to the last instant to repass. The engine responded crisply to throttle blipping for the down changes and the bike banked smoothly left and right.

Coming out of the chicane was a little



A great handler with a big bike feel for a 250 the Yamaha gives Brian Crichton a scintillating ride.

more tricky. I tried to use third every time. But if I didn't get the chicane right the gear was too high leaving the alternative of having to wait for the engine to get back on the power band, or bang down to second gear to use the top edge of the power spread in that gear.

The gearchange was very positive. Almost too positive in that the selection smacked as the engagement went home. It was best to use the clutch to help smooth it out rather than make clutchless changes.

When the tank ran on reserve the plan was to complete two more laps and come into the pits to refuel and change riders. Fuel consumption varied from 28.5 to 33mpg. When we road tested the model last month the best figure obtained for general riding was 41.2mpg.

Ian Burgess was the next out. When he came in he too had fallen in love with the handling but declared the bike to be underbraked at the front.

I sympathised to a point but had found that heavy pressure for the single front disc (the 350 has two) brought the results.

During my second stint I found I was using the brakes less. Handling was so good and the ground clearance so generous that it was daring me to crank harder.

Each time I went out on it I discovered there was more in hand and my lap times steadily improved to a best of 1m 27s. Going by memory my previous best on a 250 road bike had been about 1m 35s. The

After the crash the RD250LC Yamaha looks the worse for wear. Fortunately damage was superficial.

extra speed of the LC accounted for some of the improvement. But most of it can be attributed to the handling.

In the early hours of the morning after six hours of running time, the tyres were changed to Dunlop's latest TT100 K181 covers.

The suspension on the monoshock was working so well that it was difficult to feel a dramatic improvement over the standard Yokohamas, though they were definitely better. More details on the tyres and their wear during this test will be covered in a future issue.

While the wheels were being changed, Les Smith of Cibié lights fitted one of their units for a direct comparison over the standard provisional unit.

Victor Crichton was the only one to try both lamps. He didn't know there had been a switch to the Cibié. When I asked him about it he said the second time he was out during the night the lights were so much better he thought he must have been on dip during the first stint. Quite a tribute to the Cibié.

As you may have read in the last issue, after weeks of rain we were blessed with a rain-free 24-hour period except for a few very light spots which mercifully lasted a couple of laps only.

As it began to get light towards 4am I readied myself for the next session after trying to snatch a nap in the riders' changing room.

An hour later a cloud of dust was thrown into the air at Corams. Victor who was within two laps of pulling into the pits had crashed and slid on to the grass.

I ran over to the bike. By the time I arrived I was puffing so much I'm sure I felt worse than he did.

Shocked at first he was able to walk back to the pits. A banged knee was his worst injury.

He said the back wheel had slid out on the right-hander with 75mph on the clock. He straightened up and the wheel came back to the right. It went into a tank slapper



and came down on its left side going backwards.

Kevin Giles and Peter O'Connor recovered the bike, looked at it, decided the frame might be twisted and decided to call it a day.

A couple of hours later they had some time on their hands to examine it more closely. The smashed headlight glass was knocked out and the unit taped up. The bars were straightened and a new lever fitted. New bolts were screwed into the cylinder head where the exhaust had been pulled loose and it was ready to run again.

After the crash the bike had been dormant for 2hr 52min. Now it was running again as good as ever and in all ten different people got to ride it. All were amazed by it.

Apart from chain adjustment and refilling with petrol and oil the machine ran with no problems. Even the spark plugs didn't have to be changed. It was winner that day, in terms of human hearts.

DATA: Yamaha RD250LC

Distance covered: 1,403 miles (723 laps — circuit length 1.917 miles).

Total running time: 20hr 36min.

Average running speed: 68.79mph.

Average speed for 24-hour period including pit time: 58.47mph.

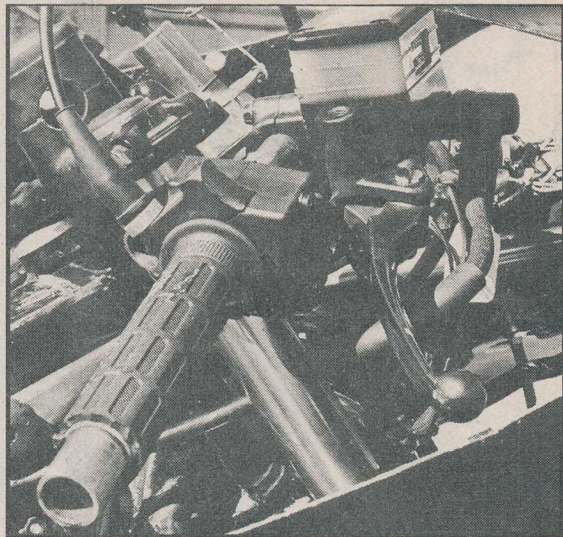
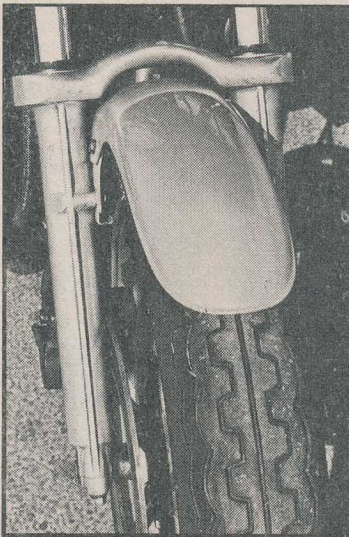
Poised for action

By John Robinson

MCM'S OWN 750 Honda has so far led a very varied life. After careful running-in, it was used to evaluate tyres, fairings, suspension units, luggage carriers, lights and other accessories.

Then it was used as a guinea pig for experimental exhaust systems. Finally the engine was tuned, as reported last month, and eventually gave us an increase from 70bhp to 80bhp.

The final increase in power was good but not immense, although the bare figure doesn't reveal the full benefit. The engine hadn't become "peaky", in fact it had very



Twin Cibies in the Harris fairing gave the Honda the endurance race look as well as improved night penetration.

impressive torque back-up, enough to convince us that it could pull a much higher gear.

It was also running more efficiently because at high speeds — above 7,000rpm — it was taking less fuel than the stock motor. But it wasn't all good news. We feared that we had made it very sensitive to carburation changes and we weren't convinced that the standard con-rods were strong enough to stand any extra stresses.

Because of this we made every effort to keep the usable power well below the 9,500rpm red line.

Having got the engine roughly where we wanted it, the next step was to get as much as possible out of the frame and cycle parts.

We chose the 750 because we thought it had a lot more potential than its four-pipe, touring guise suggested. During our tests with fairings, tyres and suspension we had found the Honda's strong points — and its weaknesses. Now we would discover whether we could make use of the former and eliminate the latter.

The changes were aimed at making the Honda a long-range, all-weather, high performance bike. And as an ultimate test for such a machine, we planned to run it in our 24-hour test. Here it would be running alongside sporty machines like the new

Above left: alloy fork brace and plastic mudguard. Above: the clip-on bars carried the brake cylinder inboard of fork leg.

Z750E Kawasaki and XJ650 Yamaha and we knew the Honda would have to be good to outpace bikes like these.

The Honda's riding position is already very good but unfortunately it isn't compatible with other changes which we wanted to make, mainly a big fuel tank and a slim fairing.

As far as the standard 750 is concerned, the limiting factors are weight and ground clearance. Our new 4-2-1 exhaust improved both of these quite considerably but at the expense of losing the centre stand. We also put a bend and a set into the brake pedal to prevent it from grounding.

We left the stock (folding) footrests to act as an inhibitor on the riders because the next thing to touch down is the engine. To improve this we cut a substantial piece from the alternator cover and welded a flat plate in — this is possible without running into the generator coils and gives quite a bit more clearance.

At the start we planned to get even more clearance by lifting the whole bike, using long suspension struts such as the S & W units and an air-boost kit at the front. But while we were working on the bike we had the gas shocks deflated and removed the front springs altogether and in this state — with front and rear suspension completely bottomed out — the bike could still be banked through 45 degrees or more before the engine grounded. We couldn't imagine compressing the suspension that much while cornering, so it looked as if the ground clearance problem had been solved.

We went back to CBX shocks which gave us the best compromise between comfort and good handling. Both bump and rebound damping is adjustable and the shocks still give slightly more ride height than the stock units.

In the front forks we used the standard springs but increased the damping by changing the original ATF for SAE20 fork

On test



oil. The oil seals had gone and had to be replaced.

To eliminate any chance of the front forks flexing, we fitted a large alloy fork brace of a kind being made by Colin Taylor, who did most of the preparation on the bike. The standard steel mudguard was changed for the lighter plastic version used on the CB900. The steel section of the rear mudguard was also discarded, the large hump of a Harris racing seat taking its place.

This seat was also considerably lighter and fitted much lower than the original item.

A low riding position was the next item on the list. We considered making up handlebars which bolted to the fork legs but which were carried on stalks to bring them a few inches in front of the forks. The plan was to make the bars narrow and angled quite steeply but this caused problems with fairing clearance and it also meant that the master cylinder would have to be remotely mounted — at such a steep angle, air can get into the hydraulic line.

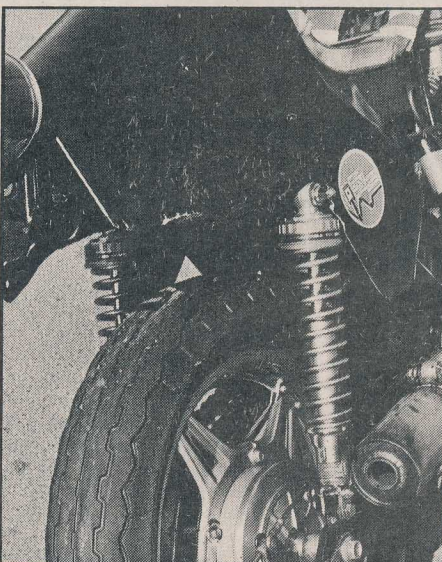
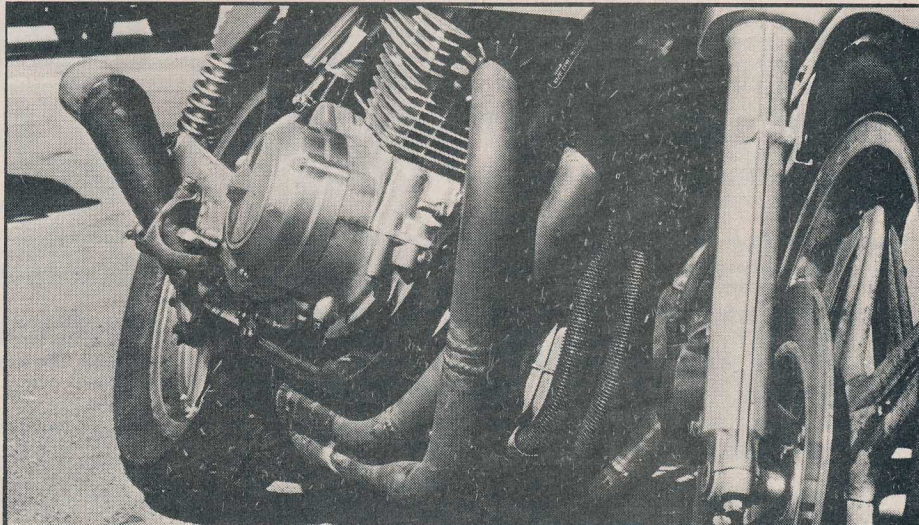
In the end we compromised by fitting the bars at a shallow angle, with the master cylinder carried inboard of the fork leg to keep the bars nice and narrow. It didn't work out too badly as it seemed to be fairly comfortable and gave reasonable access to all the switches.

The engine didn't quite have enough power to let us reach 135mph along the straight but the choice of gearing was limited. With the big 630 chain we couldn't fit a larger gearbox sprocket. The choice was either to use CBX wheel sprockets or to fit sprockets from the 900 which uses a 530 chain. These would fit the gearbox splines and would allow a much wider choice of gearing but it entailed a lot of other work.

CBX sprockets would take us from the standard 15/38 to either 15/35 or 15/34. At our 9,500rpm redline this worked out at 135 or 139mph — with a good fairing we reckoned the 750 could pull 135mph and so we opted for the 35 tooth wheel sprocket.

Even this wasn't as simple as it looked because the CBX has different mounting holes in its sprocket with "strengthening" holes drilled between them. Colin had to weld up part of the strengthening holes and re-drill the sprocket to fit the 750.

The problems weren't over because,



Shocks from a six cylinder CBX and a Harris seat were used on the 750.

Top: Specially made alloy tank holds much more than the standard item (see text) and yet it looks no bigger.

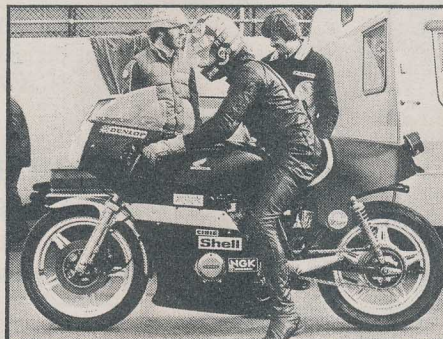
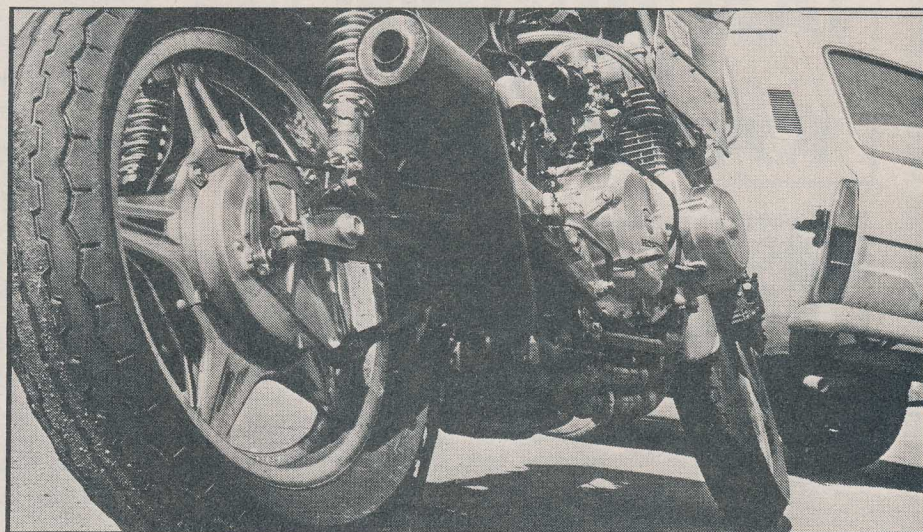
Above: The feed pipes to the 900 oil cooler could just be squeezed between the exhaust headers.

with the smaller sprocket, the 750's chain was too long and had run out of adjustment. One solution might be to fit a longer swing arm — Dresda will supply such a device for the Honda — but Ken Gillett at Honda UK came up with another answer.

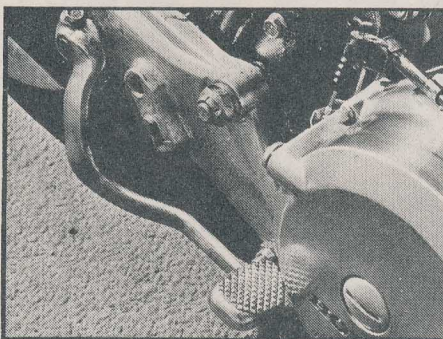
He'd already been very helpful — and patient — with all our enquiries about how many teeth were on this and will such-and-such fit the 750. Now he called to say that 84 and 86 link chains were listed for the CBX, compared to the 90 link chain on the 750.

All we needed at this point was a good fairing and we didn't have any hard facts about performance fairings — we'd only tested the touring types. The Harris endurance fairing looked like one of the sleekest around, although Harris have a

On test



Colin Taylor about to blast off from the pits. The Harris racing fairing had to be modified to fit the Honda.



Rear brake pedal was bent to tuck in behind the clutch, giving more cornering clearance.

we wanted.

Don's vague brief was to keep to the original lines of the tank, use the same base pan, leave enough room for our arms and legs and get as much capacity as he could. Without being able to go too high or too wide, we thought he'd be lucky to get 5½ gallons. A week later he produced a beautifully finished tank which barely looked larger than the stock item. It was certainly a lot lighter, and it held an incredible 6.7 gallons.

Even at 20mpg it would give us a very useful range and we were hoping to do

◀ slightly larger one which will go straight on to the 750.

We decided to try to fit the race fairing. It certainly upset one of our acquaintances when we found that it easily fitted *inside* the fairing he uses on his 900 Honda. In fact it was a bit too short for the 750 but the fairing splits horizontally and it seemed easy enough to make up a spacer strip between the two halves.

The fairing is set up to take two small Cibé lights and Les Smith of Cibé was extremely helpful, supplying a ready-made wiring loom and relays so that the full 110 watts doesn't have to go through the stock switches. These looms, incidentally, are available through Crossbow Equipe, Wallington, Surrey.

Having accumulated all the bits and pieces, the next job was to fit it all together to get maximum performance and handling.

We thought that the ground clearance and suspension were at their optimum. We knew from earlier fairing tests that a frame-mounted fairing improved the Honda's stability and made the steering a lot lighter. This was desirable because in standard trim the 750 could be sluggish in the steering department and narrow handlebars would emphasise this. Consequently we moved everything we could away from the forks and into the fairing. It made the fairing mounts a bit unwieldy but it took a lot of weight off the steering.

The 750's fuel tank is only just big enough. For our purposes a bigger tank would be very useful and an alloy tank would save weight.

Dredsa make a large capacity alloy tank for the 750 but we decided to have a one-off made in order to get the biggest capacity and blend in with our fairly tight riding position.

For this we went to a recognised maestro in the world of sheet alloy. If you've ever admired the tanks of the Rod North-framed Tridents, or on the prototype Hesketh, or the body shells on Lotus racing cars, you'll understand why we paid a visit to Don Woodward.

In his small workshop at Morton, near Bourne in Lincolnshire, the Honda was squeezed between the shining alloy of a Lister Jaguar and the frames from a French endurance racer while we explained what

Specially constructed 4-2-1 exhaust system is small and neat for ground clearance on the 750 Honda.

considerably better than that.

The bits and pieces were slowly coming together. So far we had several things which were known to improve the Honda and had eliminated several things which handicapped it.

We'd shed a lot of weight and improved the cornering clearance. We'd raised the ride height at the back and removed the mass of the headlamp and instruments from the steering, both of which were known to improve the Honda's high-speed handling. We'd got a really slim fairing that should let us reach 135mph because, at this stage, we intended to test the bike on Snetterton's GP circuit with its very long straights.

All we needed now were tyres. Normally we would have considered K91 Red Arrows or possibly Pirelli Phantoms but we knew from experience that the fast circuit was particularly cruel on tyres. A CB900 wore out K91s twice as fast there as the tyres on the works Hondas as the Bol d'Or last year.

We called Stephen Thrush at Dunlop and asked his advice. No problem at the rear — there was a new endurance tyre which would fit; the KR91A is, as its name suggests, basically a big Red Arrow. The problem is at the front because racing bikes don't have 19 inch wheels. The only tyre which Dunlop thought would match the KR91A was a KR83.

Things had gone relatively smoothly but there had been plenty of setbacks which had taken time to overcome. Such are the perils of publishing schedules that these minor delays used up all our time and when the day of the 24-hour test arrived, the Honda still hadn't been given a shakedown run.

NEXT MONTH: What happened when the MCM Honda was let loose on the race track? It was an experience you'll want to read about — we're sure of that!