MOTOR CYCLE MECHANICS

AUGUST 1978
50p

WIN A YAMAHA DT175 MX

Fairing wobbles? We've been investigating

24 hours at Spa

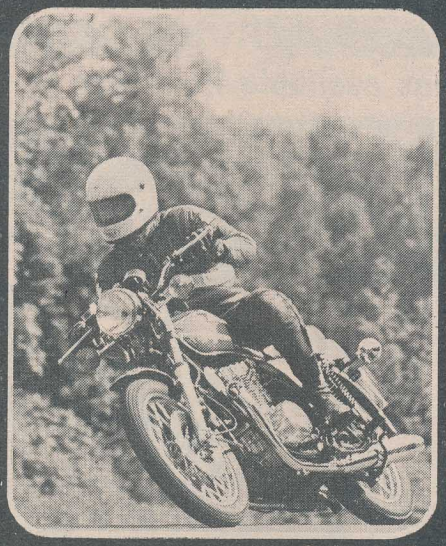
Turbochargers- blowing in the wind?

MOTOR CYCLE MECHANICS

Contents

AUGUST

Vol 22 No 11



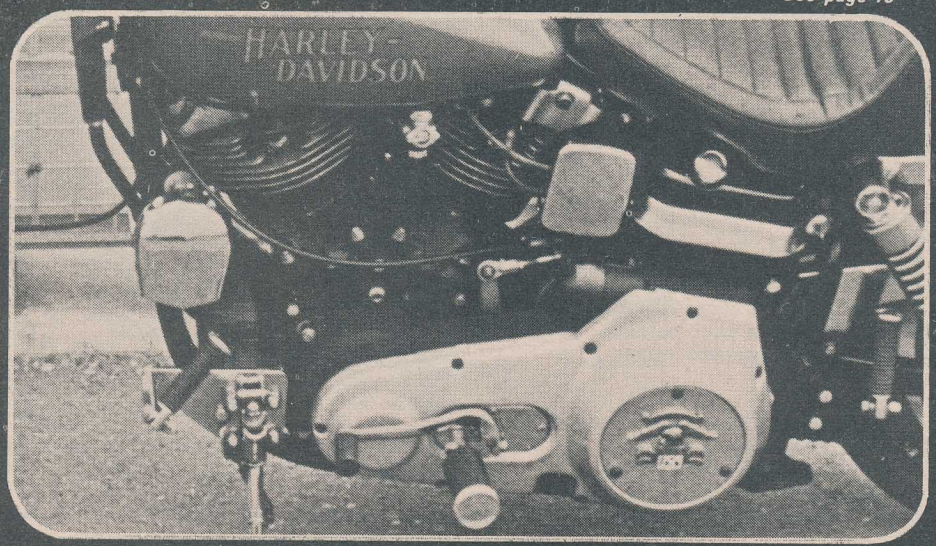
See page 69

EDITOR: Colin Mayo
DEPUTY EDITOR: John Robinson
FEATURES EDITOR: Brian Crichton
TECHNICAL EDITOR: Dave Walker
ART EDITOR: Dave Stirling
DESIGNER: Mike Burton
PHOTOGRAPHER: Rod Sloane
ADVERTISEMENT MANAGER: Peter Crew

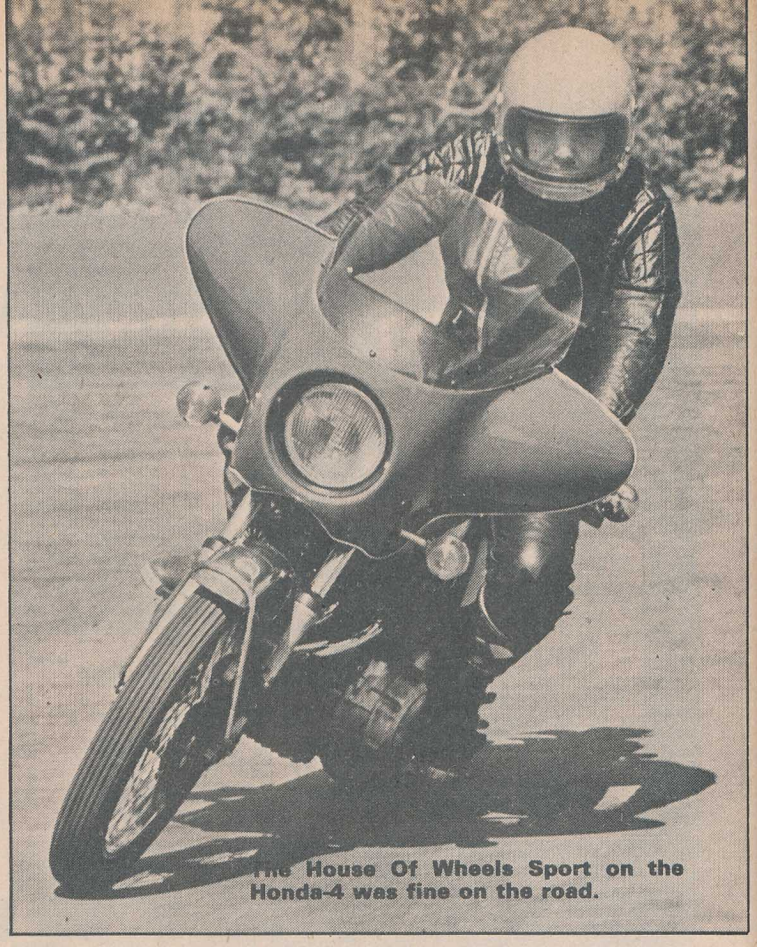
REGULAR CONTRIBUTORS:
Frank Melling
John Hartley
Brian Lecomber

EMAP National Publication Ltd., Editorial and Advertising office, Bretton Court, Bretton, Peterborough, PE3 8DZ. Tel. 0733-264666. Telex 32157. Northern Advertising office: 29 Station Road, Cheadle Hulme, Cheshire. Telephone: 061-486 0541. Circulation: Park House, Park Road, Peterborough PE1 2TS. Telephone: 0733 63100. Promotions: 21 Church Walk, Peterborough PE1 2TS. Telephone: 0733-63100. Annual Subscription rate: £7.90 (or the equivalent in local currency in the case of overseas subscriptions). Remittances should be made payable to Motor Cycle Mechanics and should be sent to MCM Subscription Department, Park House, 117 Park Road, Peterborough PE1 2TS.

See page 73



The GP Sports fairing on the Yamaha upset high speed handling considerably.



The House Of Wheels Sport on the Honda-4 was fine on the road.

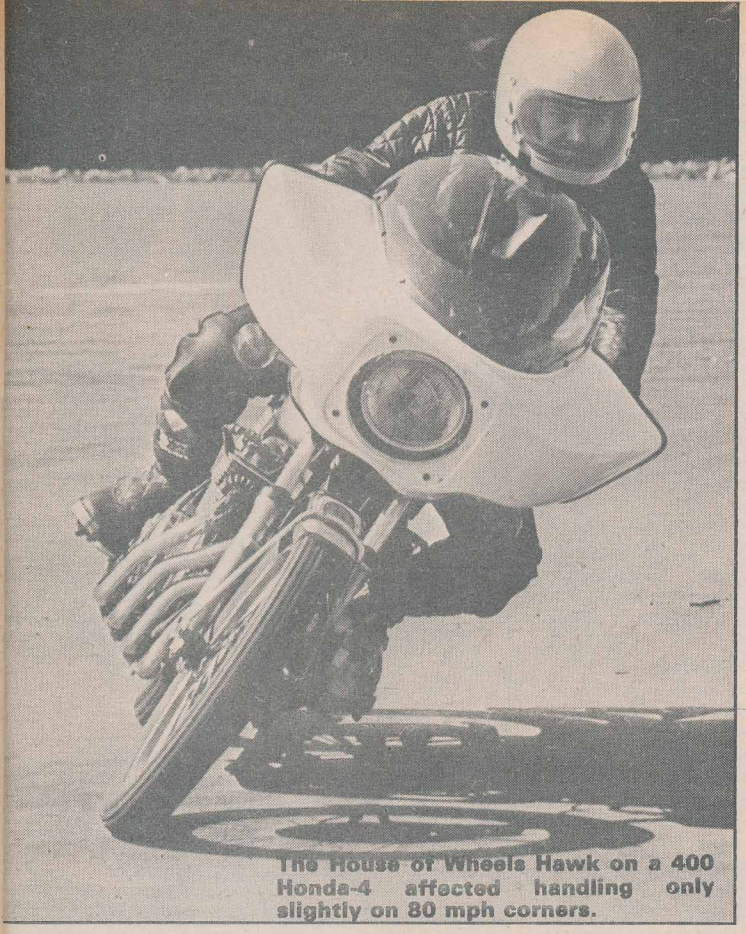
MCM INVESTIGATION

FAIRING EFFECT ON STABILITY

WARNING

I AM writing to you in the hope that my experience may help by warning others. In mid-September I bought a top half sports fairing with pouches to extend over the handlebars from R.B. Equipe. With fairing fitted properly I set off to work as usual but noticed a little instability about the handlebars and front wheel at around 65mph, but this disappeared when I leaned forward. Coming home at 75mph, the wobble returned. It was as if the front wheel was being lifted and the handlebars being shaken from side to side. I shut the throttle and the 'bars went onto full lock and threw me up the road, breaking bones in my wrists and hands and resulting in stitches in knee and hand. I was lucky I wasn't run over.

Although my bike, a CB250G5 also has a top box fitted, it has never before shown the slightest handling problem, and the police could find nothing wrong with it when they examined it after the accident. While I appreciate that the accident could have been caused by some unknown factor, I believe the fairing was to blame. — M. D. Buller, Cambridge.



The House of Wheels Hawk on a 400 Honda-4 affected handling only slightly on 80 mph corners.

The Oxford Fairings touring model, fitted here on the 250 Yamaha caused no problems on a windy 70-mile road route.

THE MOST burning topic filling our letters page so far this year has been that of handlebar fairings making the bikes to which they were fitted unstable.

A letter printed in our February issue from M. D. Buller of Cambridge who said he believed fitting a handlebar fairing caused him to be thrown off his 250 Honda sparked off massive response. Most of it was on the same theme, but a few readers who had fitted fairings with no ensuing problems also took the trouble to write in.

We decided to carry out our own investigation in two parts. The first dealt with stability after fitting topboxes and panniers. This appeared in the June issue. This second part covers stability with handlebar fairings fitted.

Three firms who market handlebar fairings co-operated in the tests: GP Accessories of 19 Whitehouse Road, Woodcote, Reading, Berks, who market Churchgate Mouldings products; Oxford Fairings of North Hinksey Lane, Botley, Oxford; and House of Wheels of 98, 100 and 118 Leyton High Road, London E15 2BX. The latter two manufacture their own fairings.

No other firms were contacted because it was thought that a sufficient cross section of fairings would be provided by the above three.

The bikes used were our own RD250 Yamaha which was also used in the pannier and topbox stability tests, a 400 Kawasaki twin loaned by Kawasaki UK, and a 400 Honda-4 provided by R B Equipe of 814 High Road, Leyton, London, on behalf of the House of Wheels.

Our thanks to all people mentioned and to Hondastyle chief Malcolm White who loaned us his 400 Honda Dream which could not be used because it was fitted with a Hondastyle touring fairing and did not have the original headlight necessary for fitment of handlebar fairings.

Two days were devoted to the tests which were carried out at a test track and on ordinary roads.

As a brief summary of conclusions we discovered:

1. In general all the fairings were safe.
2. None of the fairings improved handling.
3. None of the fairings improved top speed.

We thought that the most important factor to be considered when carrying out the tests was stability up to the maximum legal speed limit of 70mph. In all cases the fairings caused no major hazards at speeds up to and including 70mph.

Before tests began the heads of the companies concerned stressed the importance of correct fitting.

A rigid fit is the key factor. It is difficult to fit a handelbar fairing out of line because it goes over the headlight. At least that is what I thought until Graham Pouard who owns GP Accessories told me of a customer who returned to his shop after buying a fairing and was so proud of it that he dragged Mr Pouard outside to look at it. Mr Pouard couldn't believe his eyes. The customer had fitted the fairing *above* the headlight!

All fairings used in the test were fitted by personnel from the companies mentioned. Riders on the first day were myself, MCM technical editor Dave Walker and road racer John Hammond, brother of Oxford Fairings director Alec Hammond. John could not be present for the second because of TT racing arrangements.

Representatives of the companies were also invited to ride the bikes which were tried with and without fairings.

While riding the bikes we rode one-handed, sometimes with no hands, and deliberately tried to make the bikes wobble by pushing on the bars and shutting off in fast corners.

Not all the fairings were fitted to all the bikes, nor were all the bikes ridden on the road. But after testing we felt we had a good enough overall picture.

The weather was good for both days of testing and for the high speed trials laps of average speeds well over 70mph apart from the GP Tourer fitted to the 250 Yamaha were recorded. Top speeds were also recorded and are shown in the panel accompanying this article.

Fairings used were: GP Accessories Sports and Tourer; Oxford Fairings Sports and Touring; House of Wheels Monza, Stingray, Hawk and Tourer.

Rather than outline all the tests, many of which would be repetitive we have condensed the important findings to the following.

The House of Wheels Stingray on the Honda 400-4, the Oxford Fairings Sports and Touring both tried on the 400 Kawasaki were all fine on the road giving no problems at all. The Oxford Fairings Tourer was used on a 100-mile run including a 40-mile stretch on the M1 in windy conditions. Even strong buffets of wind hitting the bike after overtaking large lorries at 70mph failed to cause problems. Aside from the stability factor what was noticeable was the increase in engine noise the fairing threw back at the rider and the amount of performance it cut.

The same was true of the GP Tourer fitted to the 250 Yamaha. The GP fairings were fitted to the Yamaha only because the

FAIRING EFFECT ON STABILITY

fittings taken to the test track could not be used for the Honda or Kawasaki.

It was surpising to find that the smallest fairing fitted to the slowest bike caused the most dramatic worsening of stability. The GP Sports on the Yamaha sent the bike into a wobble if the throttle was shut off in a corner.

It caused Dave Walker to comment that it made the bike feel as if it were "hinged in the middle." John Hammond who put in the fastest lap times, rode through corners under power and this way avoided anything more than a slight weave. Keeping the speeds to a maximum of 70 mph eased the problem considerably and even Dave Walker said he would not be unhappy with the fairing on the road.

The fastest speeds came from the HoW Stingray and Hawk fairings on the 400 Honda-4, which had felt very taut and sure when unfaired. Both fairings were able to upset handling only slightly on fast corners. They never felt as though they were going to cause the machine to get out of control and neither wanted to know about a wobble as they went through the speed trap at over 100 mph.

As mentioned in the brief summary of conclusion, none of the fairings improved handling. But they all passed the "70 mph test" with only the GP Sports as a borderline case.

To further outline cases of slight front wheel oscillation would seem to be bordering on the hyper-critical.

While we would not deny the authenticity of the readers' letters about being thrown off their machines after fitting handlebar fairings we did not encounter problems of such magnitude.

Our tests cannot be regarded as conclusive for all handlebar fairings. As Graham Pouard says: "It can vary so much from bike to bike." What the test results did tell us is that the handlebar fairings we tried can be fitted and used safely, and from our results we think it is reasonable to assume that these findings should apply generally to handlebar fairings.

By strange co-incidence, the week before the tests were due to take place, I came across a rider who had just picked himself up after falling off his 400 Yamaha twin on a brand new stretch of dual carriageway.

I quizzed him about the accident which he directly blamed on a screen he had fitted only the day before. He said the wobble started at about 60 mph and his automatic reaction was to shut off which made the wobble worse.

As with most of the accidents reported in letters, the road surface could not be blamed. A topbox was fitted to this particular machine but the owner said it had been on for several months and had never given any trouble.

The accident was, therefore, directly attributable to the screen or to the combination of screen and topbox. The latter sounds more feasable since the wake behind the screen becomes very turbulent and may well have acted on the topbox.

Further, screens have been used for many years apparently with no problems. And for every letter sent to us about adverse handling effects after fitting handlebar fairings there are probably hundreds of users who have not had problems.

We can only suggest that if you wish to fit a handlebar fairing you make sure it s not loose and once fitted proceed with caution until you feel happy and confident with the handling of your bike.

If the fairing does upset the handling take it back to the place you bought it from and tell the dealer, who hopefully may be able to pinpoint the trouble, or, if not, refund your money or suggest an alternative fairing.

The causes of handling and steering pecularities is a complicated subject. From an aerodynamic point of views every machine is a separate case, because every rider is different and, therefore, presents a different frontal area and profile.

When fitting a handlebar fairing its actual weight is not important until the weight moves. In other words a heavy fairing, so long as it does not protrude outside the machine's wheelbase, will not affect handling until there is a "movement" of weight caused either by leaning the machine or turning the bars.

If the machine is prone to wobbling anyway, the fairing will generally accentuate it because it increases the moment of inertia about the steering axis.

Wind conditions can play a large part in setting a machine fitted with a handlebar fairing into a wobble because of the surface area and, therefore, wind resistance it represents.

Many factors can contribute to a wobble. Before a handlebar is fitted it would be worth an owner's time to check the overall condition of his machine to eliminate some of them. Tyres compatible to the machine and tyre pressures are of the utmost importance. One MCM reader claimed he was able to cure a wobble tendency by experimenting with pressures until he hit upon a suitable combination. It seems that increasing tyre pressures slightly is the best way to go if adjustment is necessary.

An unfaired bike with loose spokes can go into a wobble. So check spokes, and condition of the suspension. Rear shockers which are too soft can allow a weave at the back of the machine which sets the bars oscillating. Weight distribution of acces-

John Hammond sorts out the fitting of an Oxford Fairings Sports Cockpit.

Fairings, bikes and most of the testers; L to R: Graham Pouard, Brian Crichton, Nick Warner, John Hammond, Alec Hammond and Dave Walker.

sories and luggage equipment will also contribute to undermining stability. Also check wheel bearings, steering head bearings and wheel alignment.

If you are in the hot seat and a wobble starts, opening the throttle is not necessarily the right answer . . . especially if you are about to negotiate a hairpin bend.

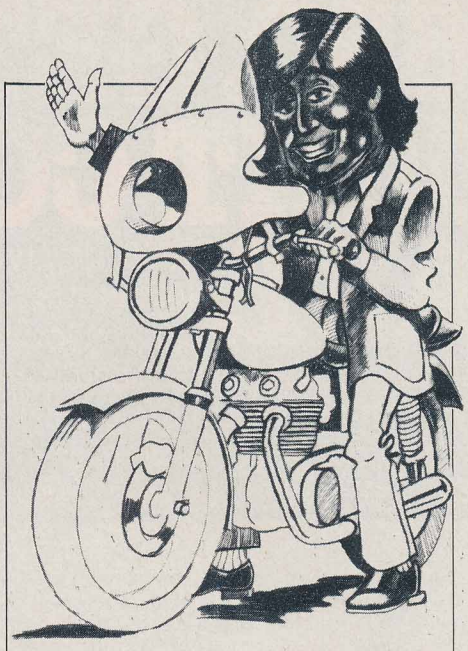
It is very difficult to give advice on controlling a wobble. Whatever practical theory is put forward it will always be shot down by someone who has proved it wrong.

The first thing we would advise apart from checking things already mentioned is *not* to ignore the start of a wobble. Owners of early 900 Kawasaki-4s will know about this.

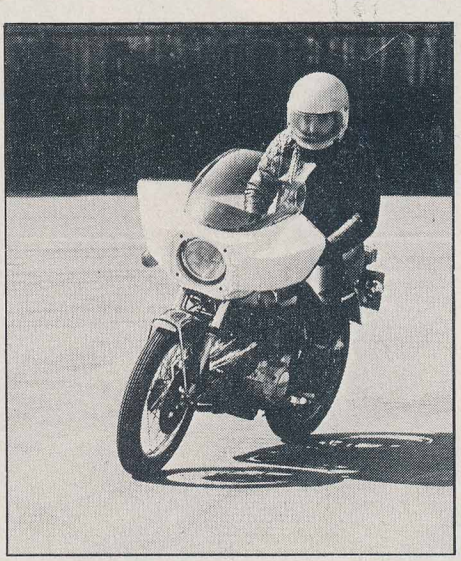
If the bike does break into a wobble try not to over-react by fighting the bars. Gently easing off the speed and use of the rear brake while holding the bars lightly may well be the best way to deal with a wobble. Changing down a gear could also help.

Research at Manchester University showed that any front wheel will wobble when it reaches a particular speed. This speed depends among other things upon the weight on the spindle and the mass carried by the handlebar assembly. It is also possible that a fairing can give lift, taking weight off the front wheel and lowering the wobble speed. Handlebar fairings also carry the mass of the headlamp further from the steering axis increasing its inertia about the axis.

An American survey concluded that wobbles which resulted in a crash were in the order of one crash per 2.5 million miles travelled. That survey included machines with and without fairings. So the odds of crashing with a handlebar fairing should be far less. A comforting thought for all handlebar fairing owners.



When it comes to fitting a fairing you could hardly fit it the wrong way round or upside down. One customer came up with the ingenious idea of fitting one above the bars and thought it was far better than everybody else's conventional ideas.



Trying it no hands with a House of Wheels Hawk fairing on the Honda-4.

MAXIMUM SPEEDS (MPH)

MACHINE	Unfaired	OF Sports	OF Touring	HoW Monza	HoW Tourer	HoW Stingray	HoW Hawk	GP Sports	GP Tourer
KAWASAKI 400	98	93.5	87.5	98					
HONDA 400-4	106				97	103	104		
YAMAHA 250	89.5		81	88.5				89.5	73.5