



Telegrams
CYCLES, PHONE, REDDITCH

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Manufacturers
of
Royal
Enfield
BICYCLES and
MOTOR CYCLES

THE ENFIELD CYCLE COMPANY LIMITED

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RAW-J/MB

HEAD OFFICE AND WORKS
REDDITCH
WORCS. ENGLAND

2nd January, 1963.

Mr. L.H. Davenport
Major V.T. Mountford
Mr. V.L. Young
Mr. J.J. Booker
Mr. G.H. Baker
✓ Mr. R.E. Thomas

REPORT OF DEVELOPMENT WORK IN PROGRESS DECEMBER, 1962.

This report covers the period 6th October - 31st December, 1962.
Sub-section Nos. refer to the Minutes of the Meeting held on 22nd November.

1. 750 cc ENGINE

Oversize pistons - An engine fitted with cylinders bored .020" oversize has been run in on the test bench and run for a total of 40 hours at speeds ranging from 3,000 to 6,000 r.p.m. (55 - 110 m.p.h.) at loads equivalent to level road conditions.

At the end of this test there is no indication of trouble with the cylinder barrels. In view of this, Mr. Spencer has been asked to order a reasonable number of pistons + .020" oversize to meet his requirements.

Five-Speed Gear Box - This has not been run owing to the 750 cc engine being on the test bench.

Automatic Advance - Messrs. Lucas have no automatic advance coupling which will bring the sprocket into line with the one on our inlet cam shaft - even if the magneto could be bolted direct on to the back of the chain case. They are not prepared to make a special centre for for coupling which would bring the sprocket into line. It has, however, now been arranged with Mr. Phil Wood that we will make a special centre which they will assemble into their standard coupling. A prototype

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CUSTOMERS MOTOR CYCLES, CYCLES OR PARTS THEREOF ARE RECEIVED AND HELD BY US ENTIRELY AT OWNER'S RISK AND WE ACCEPT NO RESPONSIBILITY FOR LOSS OR DAMAGE TO THEM ARISING FROM FIRE, THEFT, BURGLARY OR ANY OTHER CAUSE.

Automatic Advance (Cont)

of this should be tested to make sure that the additional overhang does not interfere with the operation of the automatic advance mechanism.

Clutch - Messrs. Albions have now quoted us 12/10 additional cost for supplying new clutches to the modified design with Glacier 'DU' bearings and J.17 facings on all surfaces except the back of the sprocket. They have also quoted an additional sum of 6/3, i.e. 19/1 altogether for converting existing clutches. They have agreed to absorb the tooling charges themselves.

2. SILENCING

Tests on a silencer made to Mr. J.J. Booker's suggestion, containing four baffles with alternate right and left-hand louvres and a tail piece consisting of six $\frac{1}{2}$ " diameter tubes, have given very promising results. The power output in the middle of the speed range is substantially above that given by our current production type silencer and the noise level is so low that mechanical and air-intake noises undoubtedly predominate.

Owing to unsuitable weather conditions, no noise measurement tests have been made but these will be run as soon as conditions improve.

3. NEW 350 cc BULLET

There seems to be some evidence that the tightening of the crankshaft in the bronze steady bush is due to distortion of the crankcase after machining. An engine has been fitted with a compo bush instead of phosphor bronze and is now in test.

After 17,469 miles the gearbox layshaft in the prototype machine broke. This has been sent to Messrs. Albions who report that the material and heat treatment are correct. In effect, their opinion is that the failure is due to the extra load imposed by the 350 cc engine. They recommend that a nickel case hardening such as EN.36 or KE.660 should be used in preference to the direct hardening EN.24, which is their standard material for these shafts. KE.660 is used for the layshaft in the 5-speed gear sets in order to obtain a harder surface finish to the four pegs which drive the intermediate gear pinions without at the same time making the whole shaft too brittle. KE.660 is, however, not easily forged and these 5-speed layshafts are being made from bar which involves extra machining costs as compared with the use of a forging. EN.36 can be forged and the extra cost of this material compared with EN.24 is likely to be only a few pence compared with two or three shillings extra for KE.660. Messrs. Albions have been asked to quote us for these layshafts made from KE.660 bar and alternatively from EN.36 stampings as compared with the present shafts made from EN.24 stampings.

4. 175 cc MODEL

Snap readings taken on the test bench showed the engine to be developing approximately 11 B.H.P. at 8,000 r.p.m. This seems satisfactory for the first attempt and will no doubt be capable of improvement with further development. The amount of oil from the breather is more than could be desired but the main trouble is considerable wear on the cam followers after 20 hours running. Some outer valve springs half gauge lighter were tried which are capable of taking the engine up to 9,000 r.p.m. without valve bounce but do not appear to seriously reduce the amount of wear since the cam followers were showing signs of scuffing after only 10 minutes running with these springs. Tests are now proceeding with Stellite faced rockers and at the same time the valve operating gear has been redesigned with smaller diameter cams.

The prototype frame is complete and the second engine has been fitted into it. This machine is at present awaiting a fork head and Mr. G. Neale is working on the rear panelling, toolbox, etc.

5. BATCH TESTS

Batch tests were run on a Super-5 and a Continental on October 9th at the M.I.R.A. Proving Ground when the following results were obtained :-

<u>Continental</u>			<u>Super-Five</u>		
	<u>West</u>	<u>East</u> <u>Mean</u>		<u>West</u>	<u>East</u> <u>Mean</u>
Standard Rests	69.82	68.42	69.12	Standard Rests	77.43 65.4 71.41
Pillion Rests	73.27	74.80	74.07	Pillion Rests	74.88 75.54 75.21
M.p.g. at 45 m.p.h. 87.2			M.p.g. at 45 m.p.h. 88		

These were considered to be not entirely satisfactory, and the west run on the Super-5 with standard rests seems to be obviously incorrect. Accordingly the speed tests were re-run on the 24th October when the following results were obtained :-

<u>Continental</u>			<u>Super-Five</u>		
	<u>West</u>	<u>East</u> <u>Mean</u>		<u>West</u>	<u>East</u> <u>Mean</u>
Standard Rests	62.29	82.89	72.59	Standard Rests	62.06 80.17 71.125
Pillion Rests	66.55	86.04	76.41	Pillion Rests	68.85 81.57 75.28
Wind 10 m.p.h. SW			Wind 10 m.p.h. SW		

6. OVER-OILING ON 250 cc MACHINES

Tests with twin disc pumps show very satisfactory results on the bench but when fitted to a machine and run for 12½ miles at 60 - 65 m.p.h.

*Can leak bleed from
Cam housing?*

6. OVER-OILING ON 250 cc MACHINES (Cont)

on the M5, an excessive amount of oil was passed by the breather.

The gear pumps showed excessive oil from the breather when run on the bench; also the priming of the feed pump was uncertain unless the oil tank was full.

The twin disc pumps, therefore, seem to be the more promising line of development.

7. 250 cc PISTONS

The machine on which a modified Constellation piston, with valve pockets machined at an incorrect angle, was being tested unfortunately broke a big end bolt during a final high speed test at the M.I.R.A. Proving Ground. This in turn broke the connecting rod and the skirt of the piston thus bringing the test to a premature conclusion. It was felt nevertheless that sufficient running had been done to recommend that these pistons could safely be used in 250 Clipper machines provided a compression plate was fitted.

8. SIBA SELF-STARTER

Shortly after the return of the machine fitted with the Siba Self-Starter which had been on loan to Mr. Curry of the Motor Cycle, the crankshaft extension fractured for the second time. The tapers at both ends of this extension showed considerable signs of fretting, from which it seems obvious that larger tapers must be used to deal with the inertia imposed by the dynastarter rotor when fitted to a 250 cc o.h.v. engine.

In view of the interest shown by Messrs. Sharps Commercial in this type of engine fitted with electric starting, it has been decided that the layout with a steel crankshaft extension and an outrigger bearing is unsatisfactory and a quotation is being prepared on the basis of Mr. Thomas' alternative design in which the rotor is carried directly on to a cast on extension of the crankshaft using a larger diameter taper and no outrigger bearing. This requires some modifications to the generator side of the crankcase as well as to the crankshaft, but fortunately there are two sets of crankcase dies in existence so that alterations could be made to one set without interfering with the production of the standard crankcases.

An alternative scheme using an inverted dynastarter with the stator carried outside the rotor was turned down on the grounds that location of the stator coils concentric with the crankshaft would be made more difficult.

9. LUCAS SELF-STARTER

There is nothing to report on this except that further tests are awaiting the production of components in the tool room.

10. MILLER LIGHTING SET

This has recently developed apparently very high charge rate. This, however, may be due to either a faulty ammeter or to the battery condition. This is being checked.

11. LIGHT ALLOY CYLINDER BARRELS

Nothing to report.

12. SHORTER BRAKE LININGS

The second pair of shorter brake linings has been fitted to the front wheel of a super-5 and has covered 868 miles. There is no marked difference in the performance between this brake and a standard one. It is probable, however, that the shorter linings will reduce any tendency to grabbing though of course at the cost of reduced life.

13. 75 cc MACHINE

Mr. Thomas has completed a layout of a machine incorporating the 75 cc Villiers engine and is proceeding with some more detailed arrangement drawings of this.

.....*R.A. Wilson-Jones*.....
R.A. Wilson-Jones

VTM/10McG

2nd November, 1962

Mr. R.A. Wilson-Jones.

Copies to : Mr. V.L. Young,
Mr. G.H. Baker,
Mr. J.J. Docker,
✓ Mr. R.E. Thomas.

I thank you for your Report dated 30th October, on the tests of cylinder bores and it now remains to be seen what will be the effect of running a 750 c.c. engine with an overbore & I am very doubtful whether the spigotted part of the barrel will stand up.

I understand that the oversize pistons are due any day - as soon as they arrive, will you please arrange for them to be assembled in an engine and a rigorous test to be run. This matter is particularly urgent as we have supplied machines to American and they have already ordered oversize pistons.



V. T. Mountford.