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7th July, 1947.

Mr. H. H. Knight,  
Commonwealth Aircraft Corporation  
Liaison Office,  
Rolls-Royce Limited,  
DERBY. ENGLAND.

Dear Sir,

General Report on Engine Division.

The following report outlines the current position in Engine Division.

1. Industrial Position.

The current trend is towards a definite labour shortage throughout the industry generally. Engine Division Machine Shop has lost approximately fifty men since the beginning of the year. This leaves about a hundred effective men to cope with firm orders from all sources of not less than 62,000 man hours.

At present, about thirty-seven (37) of the hundred (100) men are required in overhaul work and this will rise to forty-nine (49) when the R.A.F. programme begins, if the men can be obtained. The matter is being examined in all phases, by the Personnel Department, and has been drawn to the attention of the Manager.

Arising out of the position in the industry, a large amount of attractive commercial work is offering, but we have had to discourage this and set an arbitrary figure of no more than five hundred (500) man hours per week for this work. This is dictated both by shortage of shop labour and planning personnel.

2. Factory Layout and Equipment.

This has not altered, basically, since our last report. The supply position on fans for exhaust systems and electric motors is very bad.

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Work has commenced on an electro polishing set-up for stainless steel sinks, in the Plating Department. This involves the conversion of one of the ex dragout tanks in the hard chrome room, and the transfer of the generator from the decorative chrome, to this tank. A 2000 amp. rectifier has been obtained in its place, for the decorative chrome supply.

The application for installation of the two hydraulic hoists ex Lidcombe, in the test house, has been rejected by D.A.P., on the grounds of "our already elaborate facilities" and insufficient saving in man hours per engine. We have since asked for reconsideration of their decision.

The D.A.P. have also requested and been supplied with an estimate for installation of the Jacobsen Test Stand. This was given to them on the basis of using one stand only. One set of the duplex equipment in the control cabin will be used for operating on running fuel and oil; the other set for inhibiting. As the Jacobsen equipment is completely disassembled and boxed, the sum for installation is greater than that at first visualised. In view of the difficulty of obtaining finance, it would not be surprising if the application were rejected.

### 3. Projects.

#### (a) Delivery Van.

The engine and gearbox has been assembled and test running is in progress. So far, the following features have been noted.

The engine runs sweetly, but the aluminium ducting tends to amplify the normal mechanical engine noises. Preliminary power checks have not given the power estimated, a maximum of 18.2 H.P., at 4290 r.p.m. having been obtained. This has been achieved on a Prony Brake rig, using two brakes coupled to the differential shafts of the gearbox. While these are only preliminary checks, it appears that the torque curve peaks at fairly low revs., say about 3000 r.p.m. and drops off quite rapidly after that, resulting in little gain in H.P. for the additional revs. However, we have yet to complete these tests, particularly as regards carburettor jets and settings, and further work may show improved performances.

The ring arrangement is not satisfactory at present, as an abnormal amount of oil smoke is obtained in the exhaust. This has been improved considerably, by providing a chamfer on the pistons below the oil ring. However, more work is necessary to improve this condition. Proposals include dual narrow compression rings and a narrow oil ring with scraper ring in the same groove. The piston ring suppliers have suggested a plain scraper in lieu of the oil ring. Cooling of the engine seems to be satisfactory. The gearbox in general is behaving well.

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However, the small thrust washer locating the second gear cluster on the top shaft is not satisfactory and seized up after low gear running, due to the high thrust on it. Temporarily, we are fitting a hardened washer of increased diameter and as a longer range correction, are making a new pair of last stage low gears with the helix cut opposite hand, to balance out the load. It is intended to carry out trial installation and a road test about July 20th.

Estimating work has been stopped, as the Manager has ruled that such work is to be discontinued until the prototype unit is completed. The van has been given towing and steering tests, pending fitting of the engine unit.

(b) R.A.F. Overhaul Project.

We have received the first twenty-five (25) R.A.F. engines and are in the process of receiving our spares for the first two months' operations. It appears that the initial range of spares will be reasonable, shortages being covered by local procurement from R.A.A.F. or D.A.P. sources.

The engines received are, in many cases, in very poor condition, showing extensive corrosion, with packing cases attacked by mould and rot. The engines had been packed very carelessly, cheesecloth having been used to wrap propeller shafts, resulting in corrosion. Accessories were lashed in place with cheesecloth strips, or in a number of cases, merely rolling around loose in the bottom of the box. This applies to carburettors, vacuum pumps etc. Magnetos, in general, are bad, being corroded and mouldy internally.

The first five (5) engines have been stripped for a preliminary inspection and are not in very good condition internally. Three of them have cracked crankcases and some of the reduction gears are badly corroded.

It is intended to commence the programme on July 15th. This will give sufficient time for the necessary spares to have been passed to store. The spares in a number of cases, need reoperation. A typical example is master rod bearings, all those supplied having the old type slots.

(c) Nene.

This has been covered in a separate letter.

(d) Production of Spares for R.A.A.F. and Civil Airlines.

Progressing normally. Approval has been obtained for an increase of bank stocks, to include all items required for 100% replacement at each overhaul, to assist in meeting civil requirements.

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(e) R-1830 Overhauls for R.A.A.F.

Proceeding normally. We had one period of acute shortage of work, due to non-supply of engines to Department 51, but this has been overcome and we are now receiving engines for overhaul again. A large number of engines was held, waiting accessories, but this appears to be clearing slowly. R.A.A.F. intend to scrap a large number of R-1830 engines, so the accessory position should improve in time.

(f) Overhaul and Conversion of Wasp Junior Engines for Associated Airlines.

The modification and manufacture of the conversion parts is proceeding satisfactorily, though some hold up was caused by the thread on the valve bodies supplied with the propellers being .090" greater in diameter than we had provided for. We checked with Pratt & Whitney, who confirmed that it was satisfactory to remove this extra material from the I.D. of the propeller shaft end. This necessitated a revised form of locking the end plug.

(g) Merlin Inlet and Exhaust Valves.

The inlet valves are proceeding satisfactorily. The exhaust valves are also, approximately four hundred (400) having been filled and extruded since our last report. The attempts to salvage those filled prior to this, have so far not been successful.

(h) Automobile Valves.

The remainder of the complete order has been forged and machined and is in inspection. The forging was not completed without considerable difficulties.

(j) R-1830 Valves.

Work has begun on current orders for R-1830 inlet valves for civil airlines. Material has been obtained for firm orders for both inlet and exhaust valves. In addition, approval has been obtained for purchase from D.A.P. of sufficient of the special materials to manufacture four thousand (4000) inlet and two thousand (2000) exhaust valves. The amount required for firm orders previously referred to is included in these quantities. This was considered to be warranted, as the particular materials concerned were being offered by D.A.P. for disposal; replacement for future orders would then have been a long range matter. As it is, considerable time elapsed in obtaining the amounts from D.A.P. to cover firm orders, due to the disposal action being in progress.

(k) General Commercial Work.

In general, is proceeding satisfactorily.

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(m) G.M.H. Tooling.

A total of four thousand (4000) hours has now been spent on G.M.H. tooling. No recent orders have been received.

4. General.(a) Staff.

The transfer of the Material Control and Overhaul Parts Control Departments from Engine Division to Administration Department, has been completed. This action was taken after due consideration and discussion. It was thought to be necessary in view of the R.A.F. overhaul programme, which uses common storage with R.A.A.F., but separate accounting, also places the onus on C.A.C. for any discrepancies in stock keeping. It has also enabled some saving in staff. The two departments are still located in their old positions and are giving the same co-operation as the factory received previously. The new system is working quite satisfactorily.

(b) "Nene" Engine.

Mr. Birch of Rolls-Royce has made available the "Nene" Engine which was originally shown at the Paris Aero Show. It is on view in the Machine Shop and has attracted considerable interest.

Yours faithfully,

Secretary.

CB/SL