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To Directors. Conservators
and Deputy Surveyors

Mechanical Development Report No. 42
Cromard Cylinder Liners

This report shows the great increase in cylinder bore life obtainable by fitting Cromard liners. These liners should where possible be fitted as routine practice to all engines requiring re-boring when under overhaul, unless they are within two years of being scrapped. If re-boring is necessary and the vehicle is likely to have a further life of at least two years the expense of the liners is fully justified.

Mr M.C. Richards 13/12

Mr Warfield 13/12/55.

Mr Stoddart 19/12.

Mr Bryner 19/12

H.B.P.

Deputy Director General
7.12.55

P.A.

Cromard Cylinder Liners

Origin

Investigation into means of reducing vehicle maintenance and repair costs led to the initiation of experiments with Cromard cylinder liners in the engines of a number of vehicles in the Forestry Commission's fleet. Most of these vehicles are used for a large number of short journeys in a day so many engine stops and starts are incurred. It is known that bore wear is greatest during the first few minutes after starting a cold engine so the conditions in forestry work are probably as unfavourable to engine cylinder bore life as are likely to be found.

Experiments of this nature take a long time before results can be said to be conclusive but four years have now elapsed on this trial and a number of the vehicles have done big mileages.

Description

There are many reasons why the modern cylinder block must be a compromise between iron which provides a good casting and iron which provides a cylinder bore of maximum wear resistance. Cylinder bores, therefore, provide scope for improvement in wear resistance and the most popular method of doing so is by the use of liners. The particular feature of the Cromard liner is that it is made of mild steel tube with the inner surface chromium plated. The method of fitting is to bore out the cylinder and press in the liner which is available in all the popular engine bore sizes.

Observations

1. The following vehicles have completed considerable mileages on Cromard liners:-

F. C. No.	Make and Type	Mileage	Present oil consumption
F.C. 534	Bedford tipper	51,078	1,184 M.P.G.
F.C. 590	" 5 ton	31,938	1,200 "
F.C. 832	Vauxhall 10 H.P.	42,903	2,704 "
F.C. 868	Austin 10 H.P.	75,171	3,040 "
F.C. 3571	Bedford tipper	63,945	528 "
F.C. 9017	Ford 10 H.P.	28,144	4,920 "
F.C. 1478	Bedford 10 ton transporter	72,272	2,704 "

A further 22 vehicles are running with Cromard liners and they have covered mileages between 4,000 and 22,000.

2. In no case has a liner failed in any way and there is no sign that any engine so fitted will need early replacement. F.C. 868 an Austin 10 H.P. car at 75,171 has covered the greatest mileage and the oil consumption is now 30.40 M.P.C.

3. The mileage at which unlined engines are requiring replacement due to bore wear is usually around 30,000 miles so it is already clear that the engines fitted with Cromard liners are giving a far higher life mileage. Over 100% increase is certainly indicated.

4. The reduction in the rate of bore wear also reduces contamination of sump oil by gas leakage past the piston rings. A consequent improvement in the life of the crankshaft and bearings can reasonably be expected.

5. An important point in favour of the use of any liner, not only the Cromard type, is that the cylinder bore diameter remains standard and no question of oversize pistons arises.

6. The cost of fitting Cromard liners to a Bedford engine (for example) is:-

Cost of the liner = £3 per bore

" " boring cylinder and
pressing in liner = £1: 12: 0d. per bore

These are retail prices subject to discount. The cost of boring without fitting liners is £1 per bore so the extra cost of fitting Cromard liners during an overhaul is £3: 12: 0d. per bore (retail) less the price of oversize pistons.

The nett extra cost of fitting Cromard liners during the overhaul of a Bedford engine is therefore under £22, less the cost of oversize pistons.

conclusions . . . The results of this trial carried out on a large number of vehicles under widely differing conditions give a very definite indication of the improved engine life that can be obtained by using Cromard cylinder liners.

R. G. SHAW
Machinery Research Officer
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