Moss Engineering

www.mossengineering.co.uk

Date:
Job #:
Engine #:
Customer:

Dear Customer ,

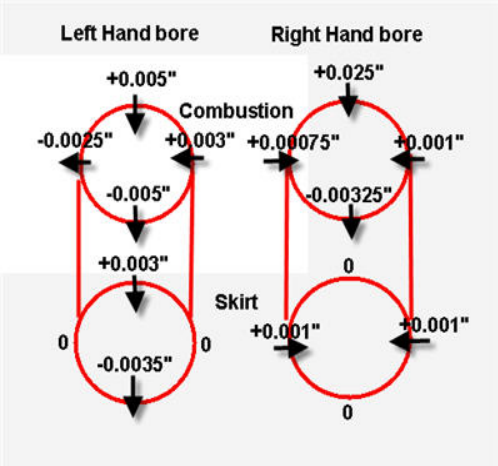
We completed the inspection of your engine on the 13th and 14th of this month.
These conclusions are arrived at after study of a considerable number of individual measurements.

Barrels

Both the Cylinders appeared to have unusual wear patterning but upon inspection were found to be within a maximum 0.002" of the desired size.

Seeing that it was not necessary to rebore the barrels meant that i had to confirm their squareness as when we rebore a block we automatically re qualify any angular misalignments in previous rebores. Scott Barrels are not the Easiest things to hold if you cant get the head off and many people will not have the special fixture we have for this.
Without measuring this we couldn't rebuild an engine and feel sure about the truth of the alignment.

The Results of this test were as follows:



The 'fore and aft' deviations are unimportant, they being in the axis of the big end assembly. The sideways deviation on the Left hand cylinder is more significant as there will be the tendency for the rod to slide sideways under load on a pin that is not completely square to it.

Pistons

The Pistons are usable but are far from perfect examples. The clearances we advise for a road engine are 0.010" just beneath the Ring land and 0.004" at the Skirt.

Your left hand piston has between 0.007" and 0.016" clearance at the skirt and 0.012" at the ring land.
Your right hand piston has 0.010" at the Skirt and 0.010" at the ring land.

Both Pistons measurements suggest the practice of squeezing the skirts to take up excess clearance in the thrust direction. This increases the clearance in the pin axis, which reduces the control upon the pistons movement normally exerted by the bore.

The Piston pin bores are between 0.0017" and 0.002" oversize and the pins are 0.0007" and 0.0008" down respectively.

The Pins also show signs of long wear patterns, from the movement of the little end along them in use.
The Right Pin also shows greater signs of heat in use.

The Pins are also very heavy in Section and weigh 90g each as compared to the ones we use which are 70g.
This extra weight will increase loadings under higher rev conditions.

Rods

The Left Hand Rod deviated 0.004" from parallel and 0.006" in twist. The little end bush wear was between 0.0015 and 0.002". The Big End track did not look damaged but was unusual in its finish and also there was no sign of a bearing track which makes me wonder how many miles this engine had done..
The track itself was 0.0006" oval. This can be honed out. The Little end needs to be reworked.

The Right Hand Rod deviated 0.0065" from parallel and 0.0065" twist. The Big end does not look so good!

Click on the pictures to see what was happening:

The bluing is a sign of the intensity of the heat that was created in the failure of the big end assembly.
This requires a complete big end overhaul, and little end work.

Cranks

Both Cranks have good Tapers, and there are no signs that there have been problems with loose assembly as is often the case.

The Left hand crankpin bush is up on size by between 0.0015" to 0.002" depending on axis.

The Right Hand crankpin bush was loose on the pin, and no useful measurements can be taken from it.

The right hand crankpin is up to 0.0012" down on size and is no longer usable without re machining.

Main Bearings

The left hand main bearing cup deviates +0.0001" / -0.0005" which is acceptable.
The left main ring is size (+0.0001") but the -0.0005" figure on the cup leaves insufficient clearance.
It was noticeably tight on disassembly.

The right hand main bearing cup deviates +0.001" / -0.001" which is unacceptable.
The track of the main bearing ring appears mottled, compacted, and its has been done by the lack of clearances necessary for operation.

The Cups are of different types and both have evidence of removal and refitting.
The Left hand cup appears to be of a later type possibly made by a re builder. The right hand looks more 'original'.
The way people have ground cups since the factory closed is to do them separately on a machine and then fit them.
The way Scott's did them was to fit them and then grind them in situ.

Mixing Cups prepared in different ways can invite inaccuracy and after measurement there was a positional difference relative to the block face of 0.003".

As the Right Hand Cup is already damaged at the Gland face, It is our suggestion that this be replaced with a pre ground cup, which will ,as on the left side, rely on the position of the crankcase main bearing cup bores for positional accuracy.

Left Cup

Right Cup

The Left hand gland is ok. The right hand gland as is expected is damaged on the face and will need regrinding.

Flywheel

Left and Right hand tapers are good. No wear Pattern from gland tangs. Drive Sprocket worn but usable.

Crankcase

The Crankcase is of Generally sound appearance and has no sign of damage to the main bearing housings as is often the case with long stroke engines.
The right hand lower rear mounting lug is definitely cracked and there is also the slightest of evidence that the left hand side one is too. This will need to be welded.

Overall Assessment

The failure of your engine was due to a combination of factors.

Simply put: The Connecting rods provide a linear force to the crank which converts it to a rotational one.

If the axes of Gudgeon pin and crankpin and main bearing are not parallel, Loadings occur for which the design has no answer.

Your Rods are not capable of transmitting the forces how they should and thus point to point loadings on the rollers have caused heat build up and eventually failure. Also significant is the lack of clearance in the big end assembly. I can only speculate that the right side was similar but the left was without sufficient clearance and thus any tendency for inaccuracy in the rods were translated more directly into friction and the breakdown of oil film protection.

Standard Rebuild

To rebuild this engine to a good standard* with the minimum of work, we would suggest the following:

inspect extent/Weld Crankcase Cracks
remove right hand cup / ring
check/ Assess concentricity of Left Cup/ right bore
fit newly ground right hand cup/ ring
grind gland
Fit new pistons / pins/ rings
Recondition right rod total
Hone left rod Big end
Recondition Right Piston little end.
supply new roller plates
Lap out left hand cup ovality to left hand main bearing fit.
Supply and grind new right hand main bearing ring.
Fit replacement right hand crank.
Supply and fit new right hand crankpin bush

**** Reusing existing pistons possible but not in our opinion good standard.. please advise***

Apart from the purchase of a rh crank and the costs of welding the price of the above is £772.00
This does not include remedial work should the main bearing/ crankcase bore alignment inspection necessitate further action.

We are happy to sell a used Right hand crank without bearings for £35. This will be donated to a charity. There is no warranty with this item and in fact we cannot guarantee an engine rebuilt with used long stroke Cranks anyway as there is no easy way of assessing their life expectancy.

The Strip/Inspection/Report/Rebuild fee (S.I.R.R.) : £250
Sub Total (without welding)for the basic Rebuild : £807

Options

There are a number of improvements possible to make on your engine that address different areas:

- ***Performance***
- ***Longevity***
- ***Smoothness***
- ***Appearance***

I attach a 'tick list' with the relevant information for you to fill in and return, with a copy for your own records. These options can transform the feeling of a Standard Engine and many have been developed over 35 years of Scott racing experience.

I hope that this report is clear to you and any feedback that you have is appreciated.

Please let us know your wishes at your earliest convenience

Best Wishes

Richard Moss

33 Kings Lane, South Croxton, Leicestershire. LE7 3RE. UK. Tel/Fax 01664 840215
email:info@mossengineering.co.uk Web: http://www.mossengineering.co.uk