Paul Wilson

Joined: 30 May 2004
Posts: 64
Location: Gloucestershire, UK
Posted: Mon Oct 09, 2006 11:10 pm Post subject: Unusual noises

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I've just done the first road test of my latest Scott project (3-speed, longstroke engine) and the bike is making an irregular clattering/clicking sort of noise when it's going along. The noise disappears when I pull the clutch in and coast along only to restart when I let the clutch lever out.

I've examined the workings and can't see anything obvious like a chain link hitting the flywheel or frame. I've also pushed the machine along in all gears with the plugs removed and can't get it to make the noise.

Could it be the engine pinking (the compression is 11:1 and i'm using 95RON unleaded fuel !?) or worse still a gearbox problem ? Does anyone have any ideas what I can check before resorting to removing the gearbox and swapping some cogs around ?

Best Regards,

Paul

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Paul Wilson

Joined: 30 May 2004
Posts: 64
Location: Gloucestershire, UK
Posted: Tue Oct 10, 2006 4:30 pm Post subject: update:

Updated 10/10/06 - i've road tested it again and the noise starts once the engine has warmed up. The sound reduces when I close the air lever to make the fuel/air mixture rich. Altering the timing lever makes no appreciable difference to the sound which appears to be happening when the engine is under a slight load.

i've never heard a Scott engine 'pink' before but i'm thinking that's what the problem is !

Regards,

Paul

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Roger Moss

Joined: 31 May 2004
Posts: 242
Location: Leicester UK
Posted: Wed Oct 11, 2006 7:27 pm Post subject: Klicking / Knocking

Hi Paul
First comment. I am interested at how you arrive at a CR of 11:1
It certainly beats anything I have ever achieved.
If I fill the head volume with thick oil with piston at TDC, I have 23cc
On counter bored plug pocket type i.e. Mk1 head patts as used on racer up to 2004
Volume at TDC 23cc
If calc approx from half stroke i.e. 320/2 160cc into 23cc then theoretical CR is 6.9:1
This assumes 100% filling which is not reasonable to expect, given the nature and direction of the inlet tract.
I put reed valves on the doors of a Scott in 1967 and the cylinder filling was then much more complete and you had to jump on the kick starter to get it to turn over.
Next. If the noise was from pre ignition, then I would expect it to vary with the ignition advance. I would also expect that the plugs would show signs of distress unless they were far too soft.
I would be looking for a mechanical source.
Not likely, but worth checking, given the damage that it can cause, is to be sure that the crank tapers are snugly home.
Get hold of the flywheel rim and try and wag it.
When the engine runs, does the visual appearance of the flywheel stay reasonably crisp, or does it go into a foggy blur?
Check the nut that holds the clutch on to the gearbox high gear. I have known these to strip threads and the whole clutch be clattering loose.
In this case it would be stabilised when the clutch was pulled in and the clutch backplate loaded against the head of the big bronze bush that the high gear runs in.
We do assume that the rivets that hold the 20T primary drive sprocket on the flywheel have not become loose. They are only 1/4" mild steel pins in clearance holes and we often see quite spectacular wear here.
Just a point that can catch us all out if we are not careful. If you make a new key for the flywheel to crank location, care should be taken to be sure that the key is not too tall, or too long. If it is too tall, you can assemble an engine where instead of the cranks sitting snugly in the flywheel tapers, they are sitting on top of the key and in line contact only on the opposite side of the taper. If too long, the cranks can bottom on the key and not in the tapers. Its worth a check!
Otherwise if you have big oversize pistons fitted, is there clearance for the skirts in the case. The smallest obstruction will make quite a big noise. A great opportunity to prove your dogged nature?
Please excuse if some of the above is a little simplistic, but after so many years trouble shooting special machine tools, I came to the conclusion that you have to start at the bottom and hope folks will not imagine that you are trying to insult their intelligence.
Kindest Regards
Roger

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Paul Wilson

Joined: 30 May 2004
Posts: 64
Location: Gloucestershire, UK
Posted: Wed Oct 11, 2006 10:35 pm Post subject:

Hi Roger,

Many thanks for the list of items to check - really useful stuff.

For the record the compression ratio I quoted was calculated from the swept volume plus measured volume at tdc (approx 30cc per cylinder) divided by the measured volume at tdc. I now realise that this is quite misleading as the port timings (and the other factors you refer to) prevent a complete fill of the cylinders. Even so, by applying the same calculation to my other Scott engine this new one still has a relatively higher compression ratio.

I'm fairly confident that the flywheel and flywheel sprocket are sound. I will double check the clutch as i've had it apart several times trying to adjust for an even lift. One simple thing I will then try is to swap the NGK B6ES plugs for some cooler ones as the noise reduces when I richen the mixture. I'll let you know how I get on but with these darker evenings approaching it's getting more difficult to take the machine up and down the road during the week (no lights on the bike !!).

Cheers,

Paul

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Roger Moss

Joined: 31 May 2004
Posts: 242
Location: Leicester UK
Posted: Sat Oct 14, 2006 10:24 am Post subject: Ignition Timing

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Hi Paul
Back in 1967 when I had my Replica in 500cc guise, I had some problems with whiskering plugs etc. I was using the timing method of lining up by eye, the crank centre, the centre of the crankpin screw and a point that was the middle of the hexagon head of the rear cylinder holding down bolt. The solution was to use a harder plug and to retard the ignition a little. The normal ignition timing often quoted for Scotts is 35 degrees before TDC at full advance, but my belief is that this is a bit too far advanced. I would prefer 32 / 33 degrees on a road engine.
If we open up the inlet and make it breath better, we set them to about 28 / 29
If we put on a high compession head, then this speeds up the burn and we set at about 26 / 27. On a competition engine with better inlet, a big carb and a mild extractor exhaust, I use 21 degrees.
Make a setting tool by fitting a bolt into the outer of a two piece spark plug body. use this to find TDC accurately. For a datum, the short edge of crankcase RH top near the carb base can be used as a sighting line.
Mark position when piston hits bolt ACW and mark this, then repeat CW, take mid point of both marks on periphery of flywheel, this then is TDC.
Make mark with chisel for future use.
A 9" flywheel gives 2mm for every 1 degree on the periphery, so for 32 degrees, use a flexible rule and measure and mark a point 64mm round the periphery of the flywheel. Now line up this point with your zero datum feature and you will have timing you can reasonably trust.
For those who want real accuracy, we have the periphery of the flywheel engraved every degree, but this is not essential for a road engine.
Again I hope that I have not rambled on needlessly and send my kindest regards.
I think we should take some pics and make an illustrated explanation on our website.
Roger

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enhanced replica Scott engines. Special manufacture Scott technical info at our website www.mossengineering.co.uk

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efr215

Joined: 06 Nov 2004
Posts: 80

Posted: Sat Oct 14, 2006 12:47 pm Post subject:

Yer carnarf go orf some people!

I could really get to hate Roger Moss ‘coz he can type faster than me and wrote in his first posting on this topic almost exactly what I was about to submit… Grrr!

Steel rulers can & will squirm about like a worm that has seen the hook and unless the engine is on the bench the flywheel is not that easy to get at when in the bike.

So rather than measuring around the diameter might I suggest using a pair of dividers and a bit of trigonometry? To get the chordal distance for any desired advance angle we need to briefly go back to school.

Find the Sine of half the desired angle and multiply it by the radius of the flywheel (4½in.) and then double it. Carefully set the dividers to this figure. Place one point on your TDC mark and scribe a mark on the periphery with the other.

My inclination would be to use an accurately located centre punch mark for TDC as the dimple will provide a positive location for the divider point to pivot in. Once the advance position is found another ‘pop’ mark there will provide a more lasting advance mark. For the really technical that have access to a strobe light a drop of paint on the rim with the line scribed through it will assist checks with the engine running.

Worried about trig functions? Microsoft Windows provides a calculator, that will do them and most hand held calculators do too or if you never throw anything away there are always those tables you had at school.

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Colin Hough

Joined: 10 Sep 2004
Posts: 35
Location: Amersham, Bucks
Posted: Fri Oct 20, 2006 12:08 pm Post subject:

Paul,

This is moving on from your original 'challenge' to identify what's happening to Roger's excellent comments re timing (and efr's memory test of high school tri functions - I passed, but it took about 10 min to work out why it was right).

Re timing of the more modern machines (mine is a '59 Brum).

I have a copy of the Book of the Scott noted as 'latest edition' but without a date and an address of 2 St Mary's Row Birmingham which includes recommendations for the 1949 model and onwards. This notes that the distributor includes automatic advance and gives '17 - 20 deg at 2,900 rpm' and the setting instruction is to have the right hand piston at TDC and rotate the distributor 'until contact breaker points are just fully open' and, obviously, the rotor connected to the right hand HT lead. This ensures 'the spark occurs slightly before TDC when fully retarded in order to give the correct advance at at higher engine speeds'. It also notes that the auto advance commenses at 300 - 350 rpm.

I also have the Miller wiring diagram and instructions for a 1959 model (they are actually written for a Douglas Dragonfly, but this has been hand crossed out and Scott written in). This came directly from Miller when I got a new distributor cap in 1967. This states that the 'the unit is fitted with an advance and retard mechanism giving 25 deg of advance at 2,500 rpm'.

So, the message to me is that when setting up the timing of the more modern machines, it is necessary to include the correct allowance for the auto advance.

Regards,

Colin

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Colin Hough
1959 Brum
SOC Membership No. 473

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dave bushell

Joined: 09 Jun 2004
Posts: 112
Location: Caterham, Surrey
Posted: Sat Oct 21, 2006 11:26 am Post subject: unusual noises

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When timing my Brum (1957), I set the timing as Colin mentions, which is a good basic setting to get the engine running. I leave the distributor clamp ring just loose enough so that I can turn the distributor by hand and without it being able to move by itself through engine vibration.
I then take the bike bike out for a run, and when it is up to temperature, rotate the distributor as I'm riding to the position that gives the best running and response on the level and on slight inclines. Then I clamp up the distributor.
Dave

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Paul Wilson

Joined: 30 May 2004
Posts: 64
Location: Gloucestershire, UK
Posted: Thu Nov 02, 2006 10:28 pm Post subject:

All, thanks for the replies so far.

I have now rechecked the timing and noticed the advance lever works the other way round to what i'm used to (it's fully advanced with a slack cable) so my timing was actually 1/4 btdc on the full retard setting (well I was in a hurry to get the engine running after 8 years of restoration work !)

I have now reset the timing to 1/4 btdc on fully advanced (using a scribed dowel in the plug hole and a bit of micro solder taped onto the block as a pointer to reduce the parallex error).

Last Sunday morning was nice and sunny and dry so I took the bike for another spin.....

Well some progress of sorts has been made in that I can reduce the pinking sound by retarding slightly but then engine spits back until i close the air lever. Things are now pointing to the mixture being too weak (i'm running a 6/4 slide with the needle in the middle position - amal 151/276 carburettor). The next thing to try is a 6/3 slide and raise the needle slightly to see what effect this has..... the paets are now fitted but unfortunately the weather has turned very cold and they're gritting roads with all that nasty salt (and I don't want to get the bike rusty just yet) so watch this space.....

Cheers,

Paul