Problems of lubrication of the connecting rod bearings 2/6

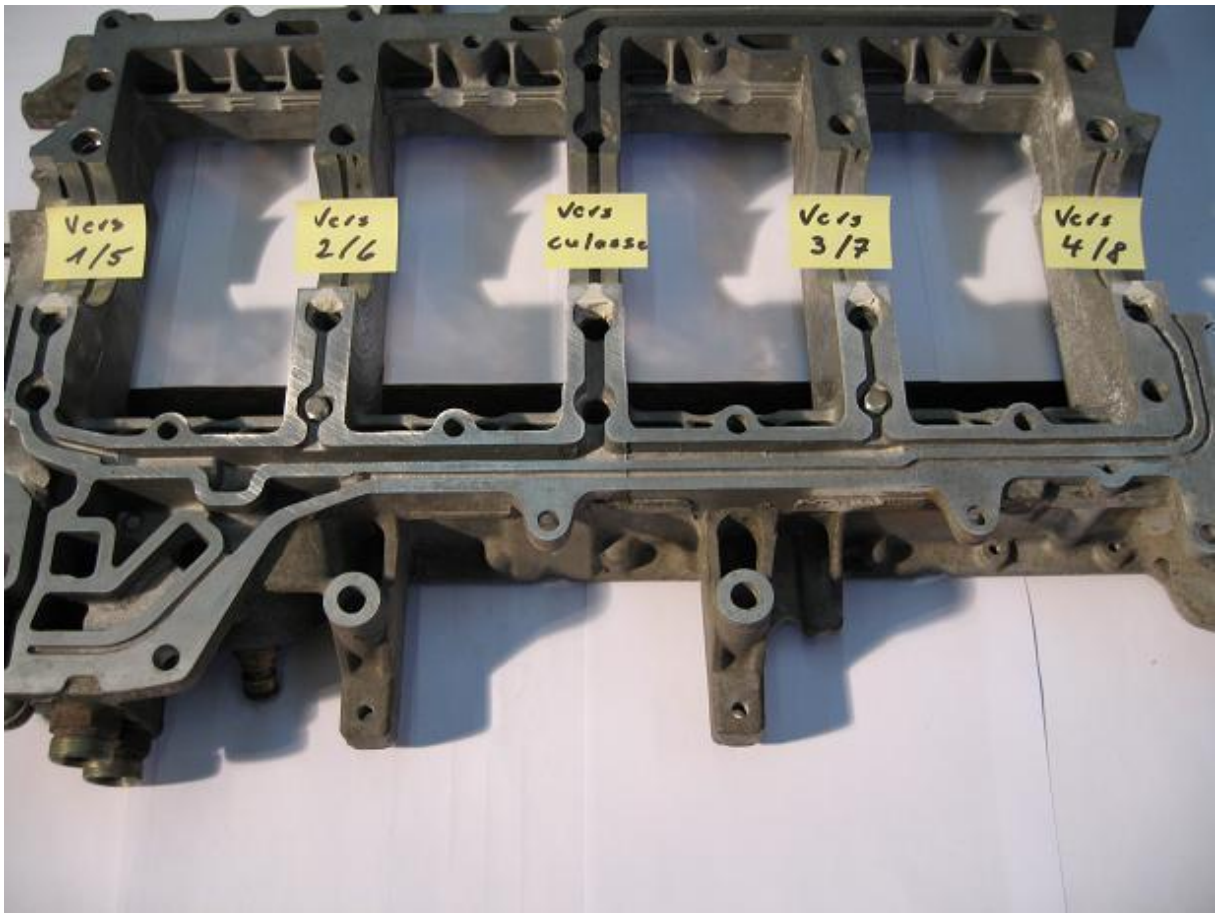
http://www.amicale928.org/forums/viewtopic.php?f=13&t=7951&start=0

Hi all

Our engines sometimes have problems of lubrication in extreme situations (mainly in circuit), the connecting rod bearings 2/6 in general are the first to suffer.
This subject is dealt with for years on foreign forums and as already described (especially on Rennlist 928), and multiple causes are suggested:
-too much air bubbles or foam in the oil
-faulty design of the crankshaft oil ducts
-accumulation of oil in the cylinder head
-poor design of the crankcase of oil
-cavitation of the pump oil
-etc...

And different solutions are proposed:
-re-drilling of the crankshaft
-the crankshaft scraper
-sheet metal anti-lift-off
-spacer of the crankcase of oil
-limiting oil pressure 3 bar for each cylinder head (944 107 139 00) 328 euros the 05.03.2009
-accusump
-dry carter
-etc....

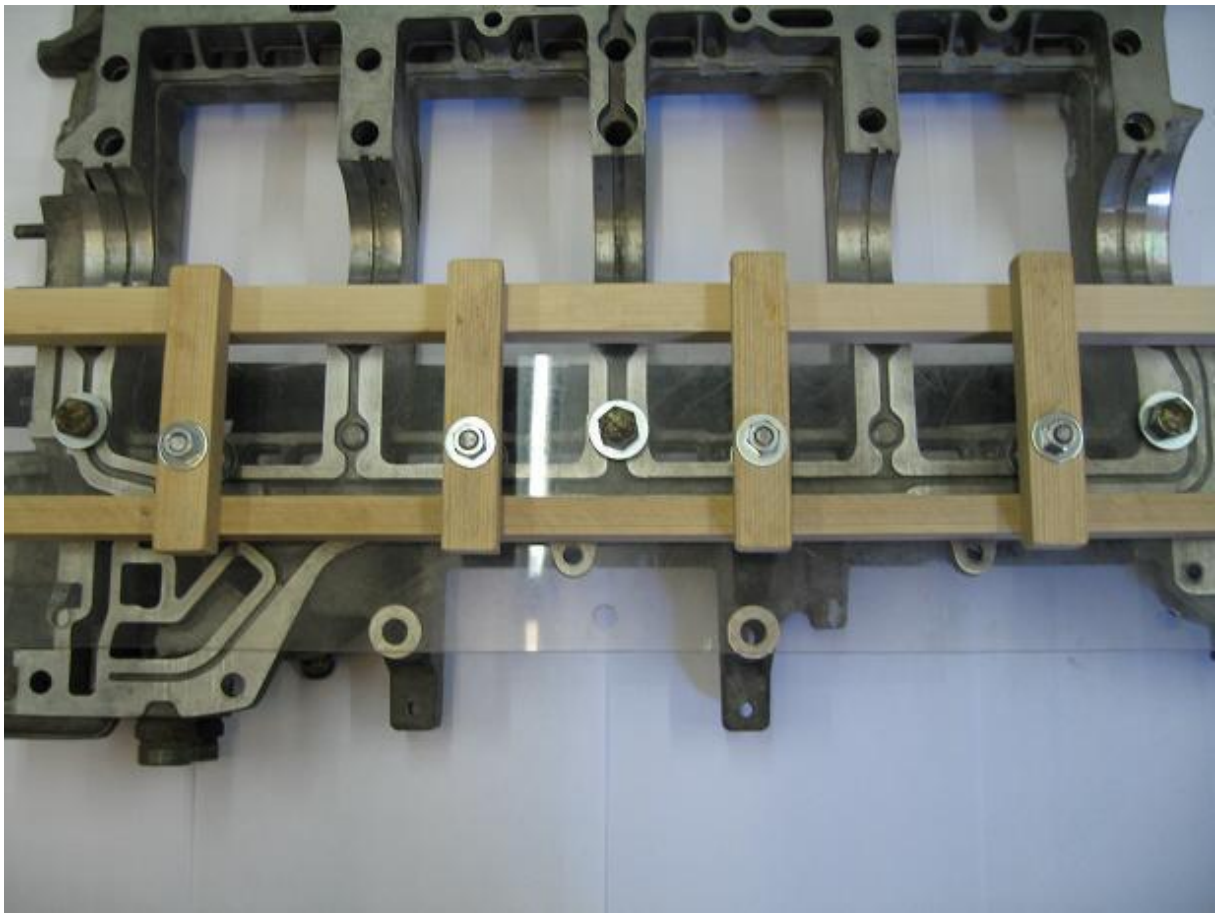
There may also be in the lower part of the engine block design of ducts of lubrication not able to cope with the extreme situations (air bubbles in the oil (or lift-off ??)).
They feed (through the levels of the crankshaft) levels of the rods or the cylinder passenger side.



Through various tests on one of these low parts of a spare and redundant engine block we may find answers or answers elements.
The community offered farts for this test.

Finally it has come to a pro, "Olivier MALAISE", thanks Olivier.
Paradoxically almost at the same time, another pro, "Didier MEYER" also proposed me.
Despite their maturities they apparently still have the ambition and also want to identify the weaknesses of this block.

An (old) piece of plexiglas mounted on top of the oil ducts will perhaps show or identify why levels of rods 2/6 fail often and almost exclusively in extreme situations.



This mixer adds (compressed) air in the liquid to try to reproduce what happens when the oil passages are fed with air-inhaled oil (or foamy oil feeds).

Numbered cans of 5 liters allow to collect and quantify the fluid arriving at the bearing seats of the crankshaft through a hole from 3.5 mm to 6 mm and rods to the cylinder head (to try to reproduce the constraints of the missing channels):

-n ° 1 to the connecting rod bearings 1/5
-n ° 2 to the connecting rod bearings 2/6
-n ° 3 to the cylinder head
-n ° 4 to the levels of connecting rod 3/7
-n ° 5 to the connecting rod bearings 4/8

As in is flexing the viscosity oil approximates more and more water, the use for these tests of water from the tap pressure should be acceptable.

Here are the results (after about 30 seconds), when water not aerated password in these ducts.
4 Cans (No. 1, no. 2, no. 4 and no. 5) receiving the liquid towards the levels of connecting rod, are almost all the same volume.
The No. 3 receiving significantly more liquid, feeds the passenger side cylinder head.
These results appear consistent and correspond to the sizes of ducts. Several successive trials gave similar results.

Blue guides will help later, a direct comparison.

By adding air to aerate the liquid, the distribution is clearly different. First with a bit of corresponding to the black markers and then air with more than air corresponding to the Red markers.

As could be in doubt, it is actually the exit No. 2 (towards levels of connecting rod 2/6) which is the most penalized, receiving much air or aerated liquid.

Exit No. 3 which has more flow, also receives many air or aerated liquid. This output feeds the elements in the cylinder head which appear much less sensitive.

The exit No. 4 also receives lots of air but is almost two times less penalized than the exit No. 2.

Exit No. 1 receives significantly less air than the exits No. 2, no. 3 or no. 4.

Exit No. 5 is the only one which gets very little or not at all air (is only when other outputs are saturated air as it receives and more), therefore, this output taken as benchmark to quantify the missing liquid in other outputs.


1/5
1
2/6
2
3
3/7
4
4/8
5


1/5
1
2/6
2
3
3/7
4
4/8
5

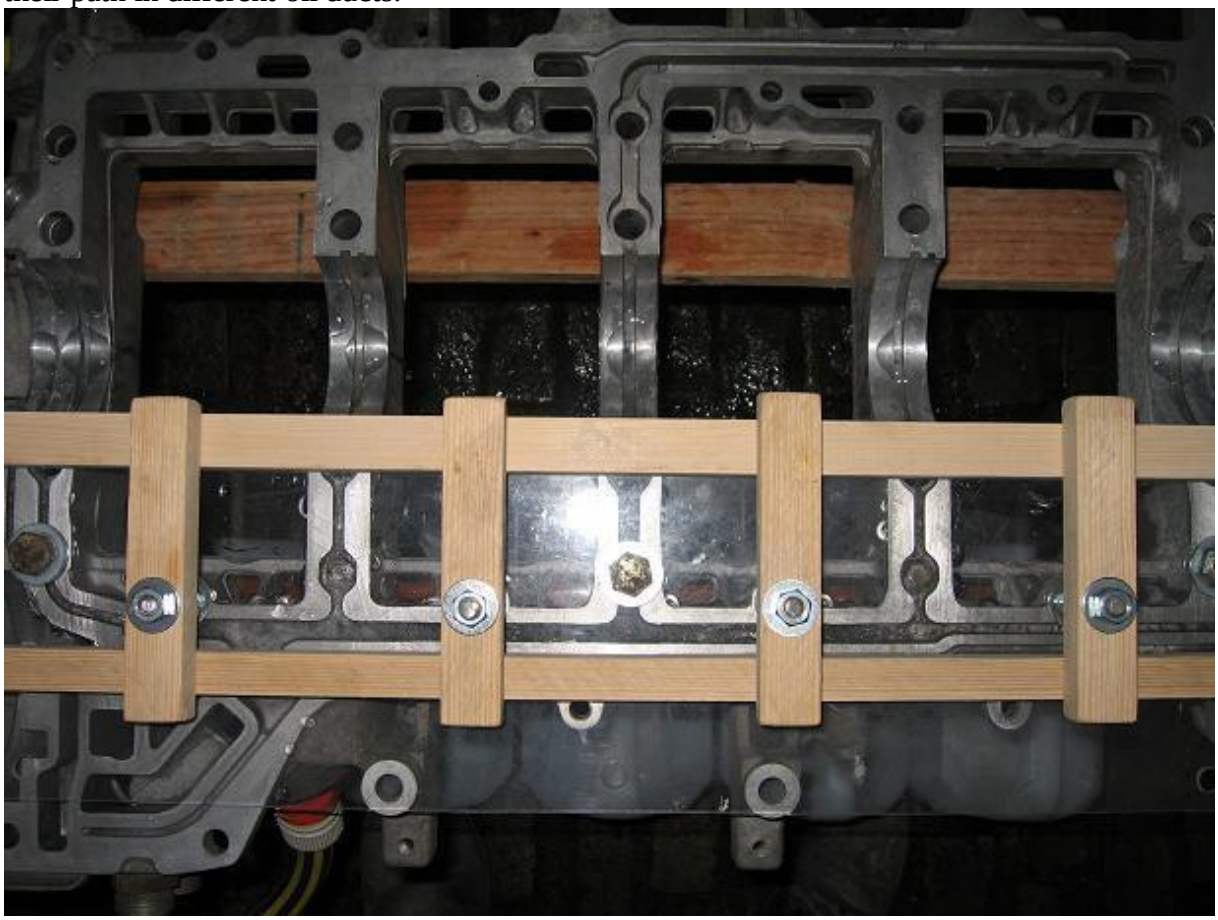
Multiple successive trials with aeration showed the same type of result, more or less marked by the proportion of air added in the liquid each time.

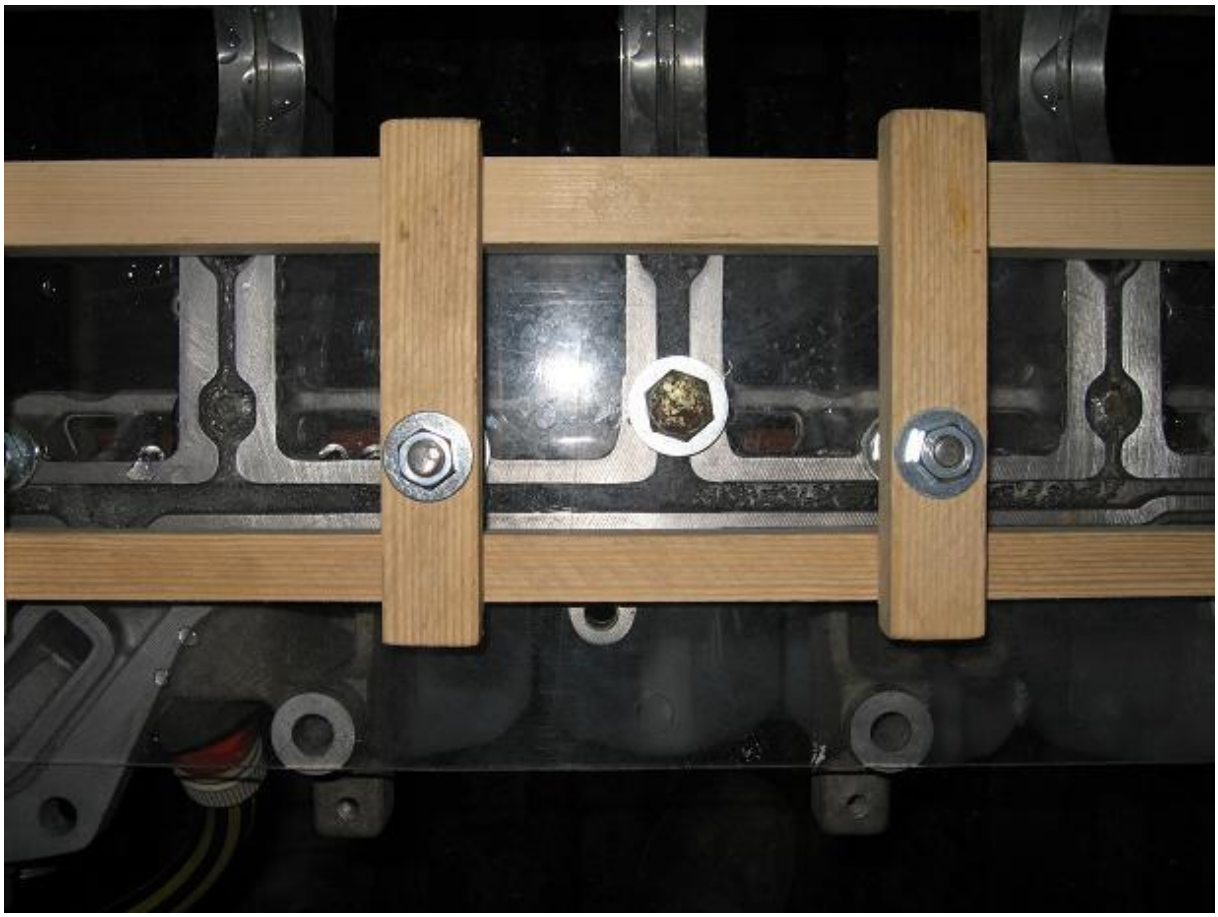
Here is a part representative and encrypted test corresponding to the pictures:

benchmark... - blue.... -Black-Red
... . (without air)... (little air)... (more air)
n° 5 -.... 2.0 liter.... 2.0 liter.... 2.0 liter
n° 4 -.... 2.1 liter.... 1.7 liter.... 1.3 liter
n° 3 -.... 4.7 liter.... 3.2 liter.... 1.8 liter
n° 2 -.... 2.1 liter.... 1.4 liter.... 0.7 liter
n° 1 -.... 2.0 liter.... 1.9 liter.... 1.8 liter

By observing through the Plexiglas plate oil ducts are distinguished nothing, everything uniform when it circulated a non-aerated homogeneous liquid, it is transparent or not.

However when on aerated fluid, you see little circulating air bubbles, but they move extremely quickly, much too quickly to well analyze what is happening.
Is that with a certain type of photos that you arrive well distinguish these air bubbles to study their path in different oil ducts.





To better see what is happening, here are 5 large vertically aligned plans.

Passage 1/5

Passage 2/6:

Passage to Cylinder head:

Passage 3/7:

Passage 4/8:

A second version with a little more air.

Passage 1/5:

Passage 2/6:

Passage to Cylinder head:

Passage 3/7:

Passage 4/8:

For the moment let pass a small period of reflection before you make changes to the lower part of the engine block and quantify the results.

All the advice on what should be amended or that Porsche would of improve or rectify concretely this coin will be interesting and welcome.

Be especially do you shy not to give your opinion.

Best regards

Bernard