

February 2, 2018

Caterpillar Surveillance Panel Teleconference Minutes

Conference Attendees:

Mark Jarrett, Hind Abi-Akar – Caterpillar

Robert Stockwell – Chevron-Oronite

Ray Burns - Exxon-Mobil

Jim Gutzwiller (Chairman) Elisa Santos, Bob Salgueiro – Infineum

Garrett White, Josh Ward, Jim Moritz, Tim Griffin – Intertek

Doug Jayne, Andrew Stevens - Lubrizol

Jim Carroll (Secretary), Gary Hammer, Jim McCord - SwRI

Dan Lanctot – TEI

Sean Moyer – TMC

Abaigeal Ritzenthaler - Afton

AGENDA

1. C13 Liner cleaning – (Lubrizol surface analysis of liner specimens using different cleaning solutions/techniques)
 - Can we agree on a cleaning procedure and start Reference testing on “NEW” liners
2. Update on COAT Aeration System build and prove-out runs
3. CAT 1Y540 Engine Part# 1Y5788 Bracket Assy. (page 25 – 1Y540 parts book)
4. Update on 1P parts availability (since we’re out)
5. COAT Oil Pressure study ideas:
 - a) Run COAT tests with CAT ET to monitor engine oil pressure from engine sensor, status of VVA oil control solenoid and make sure there are no fault codes
 - b) Inspect and replace VVA oil solenoid valve to make sure it is not a leak path for oil
 - c) Consider adding an oil pressure measurement at the end of the VVA oil gallery.

Gutzwiller put on the Skype screen Lubrizol’s X-ray Photoelectron Spectroscopy analysis of the surface of the liners from different cleaning procedures. Doug Jayne gave his presentation. (Attached) The old rust preventative (RP) was Castrol Rustilo DW30X which had Barium, the new RP Rustilo DW300 has calcium which was used as a marker to assess the level of cleaning.

Doug noted that he analyzed small and large areas and got similar element concentrations (%) on the as-received parts regardless of the size of the area he analyzed.

Doug: It is hard to tell where the carbon and hydrogen are coming from. Methane tends to leave residual C and H on all surfaces.

Moritz: How would pentane differ from using hexan?

Doug: Not much, both are low molecular weight HCs.

Hind: Should we still rinse WD40 with hexane?

Doug: Not necessarily, I did it just to be consistent with other rinsing I did.

Moritz: Did you run solvent wash first and then tide?

Andrew: Yes, we did this with tide because Ensolv is so volatile and needs special procedures.

Hind: Would you dip the whole liner?

Moritz: Not sure.

Andrew: Should we still rinse with pentane or hexane?

Mark: Should we still do the tide wash?

Andrew: Do we need to put this in the test procedure?

Carrol: Did you heat the parts after cleaning to see if they still colored?

Andrew: No.

Sean: Do we know what the old liner do?

Gutzwiller: Jim McCord ran old liners in the oven and they did not discolor.

Confirmed by Gary and Carroll.

Andrew: Should we hold up the testing for this?

Mark: It should not affect results we don't grade the liners.

Moritz: If heat transfer is different deposits may be different.

Andrew: If something is different, are we going to wait months and months for new liners.

Moritz: I think we've done our due diligence.

Andrew: I hate to hold things up any more for that.

Hind: In real life this is how the engines operate.

Moritz: The test procedure says to use Ensolv.

Sean: The procedure says it is shown to be effective, not required.

Moritz: I am not finding it they are rolled into the archive.

Mark: Have we done enough due diligence to proceed?

Gutzwiller: Yes, clean with wd40, wipe with rag, rinse with pentane or hexane, coat with buildup oil.

Sean: Rregarding ring cleaning. We had removed the previous wording, and added the ENSOLV cleaning procedure in 2014.It is not required.

Jim Gutzwiller made a motion:

All C13 cylinder liners shall be cleaned with WD40 and wiped with a rag, rinsed with pentane or heptane, and coated with build-up oil.

Seconded

Non-opposed

Non-waived

Motion carried

Jim Gutzwiller made another motion:

C13 second rings shall be cleaned with WD40 and wiped with a rag, rinsed with pentane or heptane, and coated with build-up oil

Seconded

Non-opposed

Non-waived

Motion carried

Update on COAT test apparatus from Intertek

Tim's first run will complete around noon today. It has the oil filter bypass passage plugged. The second box will be put on the stand over the weekend and the second test should be started next week.

Hind: Did he get to 90C?

Gutzwiller: I believe he did.

Carroll: Not quite he got to 86C.

Carroll to Moritz: Please verify that the period from MM is being used by Tim to calculate density.

CAT 1Y540 Engine Part# 1Y5788 Bracket Assy

Hind: The 1Y5786 bushing is serviceable. She asked if CAT can keep the bushing and studs available does CAT need the whole system available. Part #23 (outer housing) on the form is the part in question. Last time the part was shipped was in 1996. What is the need for this part?

Andrew: What is the geometry?

Hind: We can share the prints

Andrew: Why don't we do that?

Hind: There is a time limit since we are sending them out to be rebuilt now. We can scan them now, then send it out for the build. I will send the current prints today.

The smaller shaft 1Y77C. We have 4 on order and expect to have them available by mid-April.

1P status of parts.

???: Bottom rings and liners are still not available

Mark: Liners are manufactured and being shipped. They should show up mid-February.
???: We got a few rings but did not get any oil rings.

Mark: I can check on the status of the rings.

Moritz: We kind of need to know.

Mark I understand. We had 30 pistons shipped, more are coming. 30 top rings. Feb 21 11 top rings. 1 oil ring was available and taken. 6 are about to become available. If you put in orders this triggers the system. If you have future demand this is helpful.

Moritz: We can't do that.

Hind: We also have difficulty to project need.

Mark: Typical lead time is a month.

Gutzwiller: Is there a way to trigger a quicker re-order?

Mark: We've been trying to do that.

COAT oil pressure study

Moritz sent out notes on the IVA (attached). He is concerned that the solenoid controlled warmup valve could be leaking oil without operations knowledge. His suggestions are listed in the agenda items at top.

Andrew: We've run Electronic Technician (ET) on every test.

(Electronic technician is Caterpillar's access software to the engine control module with fault codes access and fault diagnoses capability)

Carroll: We have the check engine light at the stand. The IVA system has a pressure sensor and if pressure is low it sets a code and lights the check engine light. We then use ET to find the cause. We can and setup a separate pressure transducer to monitor pressure with our data acquisition system.

McCord: We don't know what a normal pressure is at this point.

Hind: Will this add any delays to test runs?

Moritz: Should take hours not days.to set up.

McCord to CAT: Do you have the PGM number. I believe the low pressure limit is 150 kPa.

Moritz: It's more than that. But, if all three labs have the same pressures the difference is not there.

Gutzwiller: All three labs are starting with new filter holders so we may find we are all the same.

Moritz to Carroll: Good news about the service light. But run one test with ET and log data to check against the other labs.

McCord: Recommend putting the transducer placement on the pressure sensor side of the gallery.

Mark: Are all the transducers measurement taken at the same place at each lab.

McCord: All the placements are set in the procedure.

Gutzwiller described the routing of the oil flow and location of the transducer connections.

Mark: I suggest we add a tap to get just filter DP since we don't have that right now.

Gutzwiller showed the left side of a C13 on Skype and decided to have lab engineers discuss where to add oil pressure transducers.

C13 New Liner Reference Tests

Moritz: Have we agreed to start C13 references?

Gutzwiller: Who is ready?

Afton is ready

Lubrizol is ready

SwRI has a client that wants to start a candidate

Gutzwiller to SwRI: Can you talk to your client and explain the urgency?

McCord: Yes.

Sean: Typically we have coordinated to start before or end before a set date. Once hardware is approved, that is the start of calibration for all of industry.

Moritz: Then we will not use old hardware.

McCord: No we never dump old hardware.

Sean: We use CFs for whatever hardware is used.

McCord: ...if there is a change.

Moritz: Are 3 data points enough?

Sean: We will get 4 data points.

Moritz: is Lubrizol going to run?

Alex went to ask Andrew.

Moritz: How do we want to put a date on starting? It is not our place to tell other labs how to run.

Afton: Let SwRI run the candidate test.

McCord: I will have the next engine built. I will check with client and get back with Jim Gutzwiller.

Sean: Can we say the references shall start by March 1?

It was agreed that the C13 references with new liners should start by March 1.

McCord to Mark: When did you notice the liner discoloration?

Mark: During endurance testing it was found that the liners were of a difference color. This triggered the thought that we should investigate. No differences found in anything else.

McCord: We now get the new liners from Holt, but there are 4107 liners still available.

Mark: There are 80 available.

Hind: They are still usable for production. We'll check into this.

McCord: Are we going to have a meeting to discuss more COAT data collection?

Gutzwiller: Next Wednesday 1-3 OK?

He will check with Tim and get back to us.