

Jeff Clark

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Sent: Friday, January 07, 2011 4:44 PM
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Cc: ronald.brock@us.mahle.com; jim.corty@us.mahle.com; clark.knop@us.mahle.com
Subject: Unconfirmed minutes of our January 7, 2011 teleconference.

Call participants –

Zack Bishop; Doyle Boese; Ron Brock; Bob Campbell; Chris Castanien; Jeff Clark; Mark Cooper; Jim Corty; Pat Fetterman; Jim Gutzwiller; Clark Knop; Jim Matasic; Jim Moritz; Scott Richards; Jim Rutherford; Greg Shank; Tom Wingfield (Jim and Clark, I guessed at your emails based on Ron's address)

Discussion –

T-11 / PC-9 HS fuel –

Tom Wingfield reported that ChevronPhillips have developed a relative severity measure for this fuel which can be reported on the C of A for each batch. It will take some time for their SAP-based C of A system to be modified, but in the interim, he can provide the data manually to labs.

Jim Matasic asked if there was an "acceptable" range for this parameter, and Tom agreed that one would be developed.

Bob Campbell asked if Tom could supply data on this parameter for the previous batches of PC-9 fuel, and he replied that he wasn't sure if the needed inspections were available.

Jim Rutherford noted that there are issues around being able to identify exactly which fuel has been used in each test, and Mark Cooper indicated that this was a broad issue that he would work off-line with Jim R and Tom W.

Tom W. asked about the status of the T-11 reference test at Afton, and Bob C replied that the test was complete, and the engine was calibrated. However, he noted that the oil barely made 15 cSt vis increase at EOT and noted that there will likely be issues around soot at 15 cSt for some runs. This kicked off a brief discussion of how to handle severity adjustments, and Mark C noted that this is an open action item which is being worked.

Action item – add the topic of how to handle runs not hitting 15 cSt viscosity increase to future meeting agenda.

T-12 rod bearings –

Jim Matasic reported that, in response to an action request from a previous meeting, he had checked the last six sets of T-12 bearings, and there was no indication of cracking. Tests used both new and reconditioned rods.

Scott Richards reported that SwRI is still checking, but they have already identified bearing cracking as far back as 2006.

Jim Matasic referenced the recent pictures sent out by Jim Moritz, and he noted that he thought some older batch bearings had exhibited backside marking like the new V batch bearings.

Ron Brock noted that Mahle do have a standard for maximum backside roughness, but this could be an area for further discussion. He then described Mahle's production processing and concluded that he believes the bearings he has seen represent "normal production variation".

Greg Shank asked if Mahle could control the process to match batch U backside smoothness, and Ron indicated that they could not control below the normal of 63 micro inches max.

This led to a lengthy discussion of whether or not variations in backside roughness could lead to bearing cracking, and the Mahle position remains that they believe insufficient rod support is leading to bearing flexing which causes the fails.

Bob Campbell asked if this flexing could be caused by differences in the rod bolts rather than the rods

themselves.

Jim Moritz reported on an extended length T-12 which he had run. The test was run as a standard T-12 for 300 hours, stopped and inspected. Jim wasn't sure, but he thought the result was a borderline passing T-12. The engine was reassembled for extended testing, but due to a general concern over the rod bearings, they were changed. The test was then run for an additional 300 hours of stage two loading conditions. At the end of test, several of the rod bearings had spalled off pieces of overlay material, but the backing material showed no signs of cracking. The bearings used were batch U, and the pin bushings were run for all 600 hours. The rods were reconditioned with one dimple.

One of the Mahle folks (I think it was Ron, but I'm not sure) stated that since the small end bushings ran all 600 hours, these rods are giving good support, and this is the kind of failure they normally expect to see....overlay failure, but no outside cracking.

Zack Bishop reported that TEI had checked their bearings on-hand, and all of the upper rods are dated 1/10, and they have "rough" backs. Bearings dated 12/9 have "smooth" backs, but they do not have any 12/9 upper bearings.

Jim Matasic asked if we should ignore cracking and concentrate on used oil lead, since cracking appears to go back several years, and we only "discovered" it when we started looking to understand the variability in lead with batch V bearings. This kicked off a discussion of whether increased lead was driven by the cracking and what path forward we should follow.

Mark C noted that, at some point, we need to better understand the rod design – including the impact of rod bolts – and exactly what loadings it was designed to handle. We know that we are running the bearings at loadings significantly greater than they were designed for, but what about the rod assemblies? A discussion covered that the rods were originally sourced from Mack, so presumably there should be data available regarding their designed load capability. Greg Shank agreed to discuss this with Ken Goshorn on Monday.

It was agreed that a face to face meeting is desirable to discuss all of the details regarding rods, bolts and bearings, and Volvo Powertrain has offered to sponsor a meeting in Hagerstown on Tuesday, January 25th.

Interested parties are asked to check their availability for that date and respond with concerns. (T-11 fuel issues will also be covered at this meeting.)

We will continue with weekly teleconferences until then, with the next call set for 10:30 am EST on Friday, January 14, 2011.

Respectfully submitted,

Pat