Mack T13 Task Force Meeting, April 16, 2014

Volvo; Hagerstown, MD

Operational Data

Additional reference data to be reviewed; LZ data and SwRI 5 was shown.

Jim Rutherford showed operational data, including a focus on the exhaust temp until time to break. The photo for the presentation was of an old Italian sports bike that hit a deer and landed on Jim. It was totaled. There was quite a bit of swing in average temp, high of 448C, low of around 411. The "break" criteria Jim used was hours to a 12cSt increase (KV 40C). There appeared to be a relationship between the two.

The IAR run with a boost leak and sever LZ run both had higher exhaust temps and the operational break fell into a similar profile. The LZ run following the TMC821 data shown resulted in an exhaust temperature of 430C based on the plumbing changes previously discussed. Manifold pressure has been controlled for both runs. Along with the lowered exhaust temp, the exhaust CO2 was also lower. Jim felt that the turbo communication had a great deal to do with it, there were some issues throughout the test. Allison's feedback on the turbo communication problem is that the majority of the time the fault code is related to a bad connection or missing ground issue. The chart for exhaust temp and Pb was very similar to the chart for viscosity increase. Exhaust temperature vs oil consumption did not show as strong of a relationship as it had with Pb and viscosity. The within laboratory connection was not very strong.

It was restated that the Intake Manifold Boost should be targeted to 232 kPa, and that we should aim for the middle.

Oil consumption was discussed again and its impact on the break for TMC821 oil. Greg anticipates that the hardware engineers will tell us that the range we're seeing is typical for build to build variation. Bob Campbell pointed out that we need to keep in mind the acquisition of large batch power cylinder parts.

Mike is planning to gather data on ExxonMobil's internal runs for liner IDs, block hours, and oil consumption.

The PTC test on "new liners" has completed break-in and is on test. Mark Sutherland learned from the supplier of the kits that we have been running the "new liners" 21334768 for 2014 applications since December. The supplier made a kit part number change that was supposed to be just a small tweak, but included a new liner. We need to identify the correct liners for each test that was run.

ACTION ITEM FOR LABS: Check liner IDs for all TMC821 runs

The matrix proposals were shown, and questions were allowable. Jim discussed some background on the feasibility of their designs. From the statistician perspective, the good options for precision would be some of the designs that allow for II-II BOI, any of the 12 does precision about the same.

Bob Campbell wanted to discuss the inclusion of additional data that will likely come from other stands at labs, and also the reference requirements for each stand; does a cell need 1 or 2 references?

The majority of tests today require two references from the first stand, and only one for subsequent.

Bob is in favor of two runs per stand to help the robustness of the matrix.

Jim Moritz asked about bringing in additional stands during the matrix, but not knowing which oil to run since we don't have a predicted reference oil.

Jim Rutherford wanted to bring up the fact that usually we need to make some sort of adjustment throughout the matrix, such as parts changes, or other conditions that arise due to the early matrix runs. Or the possibility of invalid tests showing up after the fact.

Steve Kennedy mentioned the option of the reduced-K procedure for eliminating a second run requirement. This may be a way to help with increasing the data set.

Further discussion occurred on the feasibility of using a reduced-K technique when the data set is still under development. Going back to the LTMS requirements for reduced K in the 1R test, a requirement of three calibration runs was in place before the reduced K was available.

Proposal: Bob Campbell motions, Mike Alessi seconds

The first two stands in a laboratory must be brought into reference with two valid calibration tests. The third stand, and subsequent stands, will be eligible for reduced-K targets for calibration. In the event that reduced-K targets are not met, a second valid calibration test will be required.

Final wording will be similar to the T-11 requirements in the LTMS

Vote in Favor: LZ, Afton, Volvo, IAR, SwRI, Infineum, Oronite

Waive: TMC, TEI

ACC Checklist

Jim Rutherford went through Addendum K1 Checklist for tracking test development progress. Many of the items within the checklist were either "Planned" or "In Progress". An active CPD and test fuel supply were listed as complete items. Ratings procedures were listed as "No Action".

CPD Report

Bearings have been ordered. 300 sets are being sent through a long route of intermediaries via air freight. 1950 are on the way via boat, all from the same batch. They are all the new design with the reduced chamfer and the staked tang.

Liners are 2014 in the kits. CPD getting about 6 kits a week in.

Production has moved to Mexico for the liners, Chris was unsure how the production capacity will impact our ability to get a batched set. Current liners are coming from Poland, we will be likely getting them from Mexico in the future. They are getting up to speed right now and not at full capacity.

Chris thinks that Poland could do a 3000 liner batch in a week's delivery.

Chris wasn't sure if we were getting German pistons or from another source, but thought it unlikely that Germany would ever have machined the US10 piston. On a piston, if the numbers are etched on the bottom of the pin boss it is a US made item, a German piston is etched on the top face.

Critical parts to get as batches: Rings, Pistons, and Liners

Mark Cooper proposed the idea of setting aside part

Euro6 is the new cylinder head style that will be implemented into US10 cylinder heads. Some of the original engines Volvo supplied to the labs had the thicker valve seats, the ones moving forward will be the thinner seats.

Changes: Rinse holes modified from the cleaning process. Relocation of some coolant passages closer to the combustion chamber.

Euro 6 Cylinder head Kit #: 22251160 (gaskets, brackets, valves, springs, etc.) Has an "E6" on the P/N

Actual Cylinder head P/N: 21995786 (should be cast onto the top of the cylinder head)

Previous Cylinder Head P/N 21458124, (Kit 21460896, thicker seats)

Injectors are only available in a reman version at this point. New part 22027808, Reman number: 85013612. In reman, the injector gets a new spill valve, needle cup, needle. The majority of the other components are graded for reuse or not. The improvement that was made should help with the full load misfire that some labs were experiencing with injectors in the past.

Allison reported that one additional T13 engine went out from Reman this Monday. Another will be going out next Monday.

VISION and Impact

Allison had update drives with the new version of Vision available. Will be good until April 2015

Test Procedure Updates

Wording was cleaned up for oil adder system requirements. There was a mis-statement as to the line that was adjusted to a -12 line. It was the line pulling oil from the pan to the weigh tank, not the line sending oil back to the engine.

Various part numbers were updated based on items discussed during the hardware topics.

It was asked what background data had been shown on the oils selected for the Matrix.

Greg commented that EMA had ranked three technologies, that way if only two technologies were to be used, we have the choices already made. The base stocks were defined as a preference of group two by EMA. Steve Kennedy brought up the fact that the OME might need to get with the sponsor for what will become the feature oil to get a larger blend made.

T13 Report Form

Jim Moritz had some comments and corrections for the form that he sent to Sean. Sean will distribute to the panel.