

IIH Task Force Conference Call January 23, 2015

Attendees:

Chrysler: Haiying Tang, Jeff Betz

Intertek: Adison Schweitzer, Charlie Leverett, Bill Buscher

Lubrizol: George Szappanos, Michael Conrad, Kevin OMalley

Afton: Ed Altman, Bob Campbell

SwRI: Karin Haumann, Sid Clark, Pat Lang

Ashland: Amol Savant

Infineum: Mike McMillan, Andy Ritchie, Gordon Farnsworth

Shell: Jeff Shu

Oronite: Kaustav Sinha

IMTS: Dave Passmore

OHT: Matt Bowden, Jason Bowden

TMC: Rich Grundza

Karin opened the meeting with discussion and information about the oil filter spacer plate IMTS fabricated and Karin forwarded to Afton for use on their next test. Comments from Ed Altman and Karin disclosed modifications required for clearance and that the plate was needing an additional surface fly cut for the O-ring sealing and spacing requirements to position the plate.

Comments continued about Amol's suggestion and George's concerns about O-ring placement on the fitting for the thermocouple in the main oil gallery instead of using tapered 1/16th pipe.

Karin asked to focus on discussion about the block modification and Dave Passmore explained the proposed design on the tooling to install the thermocouple using tooling from the rear of the engine. See Attachment 1

The plan would be to have tooling to make the pilot hole through the rear of the block and adaptor fixtures to attach to the master plate for drilling and tapping the 1/16th pipe female thread for the thermocouple.

The group discussed earlier thoughts about using an O-ring with a straight thread deciding too much material would be removed from the main oil gallery housing. The group continued discussion talking about the drilling and tapping process focused on how to incorporate a stop in the tapping process. George expressed concern about using a shoulder to stop the tap so the operators would not go excessively deep. The group reviewed the drawings provided for the discussion agreeing this would become part of the procedure.

The group reviewed the Assembly Manual Section 4 Sheet 1a.

George suggested having a ring groove to indicate the tap was at the proper depth vs a positive stop as additional torque on the tap would then possibly pull and weaken the threads. The group seemed to agree a ring with an identifying color would be the better process.

The group next discussed the suggestion from Amol to place a special thermocouple entering from the rear plug of the main oil gallery at the rear of the engine between the rear gallery and the flywheel. See Attachment 2

Amol reviewed his drawing explaining the fabrication and installation of the assembly. The group discussed this method with questions:

- 1) Fabrication of the thermocouple with a tapered thread plug in the rear of the engine.
- 2) Possible flow interference in the oil gallery and the area of the pipe plug, and fittings around the rear oil gallery feed for the rear main bearing feed.
- 3) Clearance for thermocouple wires from the plug up through the rear engine mount.
- 4) Jeff commented about Chrysler having a special application where they actually use a straight thread internal hex plug with a Copper washer to seal at the rear of the block.
- 5) Quick turnaround for calibration which would require the thermocouple kept for each test stand. The group also agreed this would be the same situation for the fixture drilling rig as the engine still would need to be built for each test stand and calibrated thermocouple.
- 6) George commented about problems he realized with a lengthy thermocouple installation in the front main gallery that actually bent the 1/8th thermocouple until it made contact with the gallery wall and chafed the tip of the thermocouple. The group discussed this issue and possibly using a much larger thermocouple diameter. Gordon Farnsworth commented on the oil flow around the tip and the group discussed the unsupported length of the thermocouple with the flow concentrated at the tip. Sid commented as a caution about this sitting and possibly getting bent between tests and or installation.
- 7) Karin commented about lab technicians changing and installing these thermocouples, the group continued discussion expressing concerns about how the thermocouple would be positioned and the flow around the thermocouple with Rich commenting labs concerned about all thermocouples in the test stands.

The group discussed all alternatives, adaptor block, rear block tapping fixture, and rear oil gallery plug thermocouple. Everyone expressed concerns with Karin commenting her biggest concern was making such a change as putting it deep into the rear of the oil gallery at this point in the test development. Chrysler commented expressing concern about making such a change indicating they have agreed to positioning it either in the adaptor plate or just below the production assembly in the main gallery.

Conversation switched to Afton using the adaptor plate and what oil they would run. Karin commented after conversation with Chrysler they would like to see REO2 used for this test. Ed Altman suggested if Afton realized any problems with the adaptor plate they would remove the plate and tap the main oil gallery and proceed with the test.

Karin reminded everyone the group agreed to supply a solution to this topic by February 5th and Chrysler is committed to their timeline to start the Precision Matrix in February. Haiying asked Amol when Ashland would be ready for Matrix Testing. Amol commented his understanding was Ashland could finish their Prove-out runs and make their Matrix Runs later during the matrix. Amol indicated they would be starting their Stand Shakedown the last week of January.

Karin commented the Matrix Design was set for a 5, 6, or 7 Stand Matrix and the basic Matrix could be started any time and changed as necessary depending on the final number of stands available.

Rich indicated he needed to get the Matrix Oils ready for shipping to the labs.

Jason indicated OHT was talking with the supplier and waiting on a quote for the Piston Ring Matrix materials. The group discussed requirements for matrix and the first reference period.

Action Items:

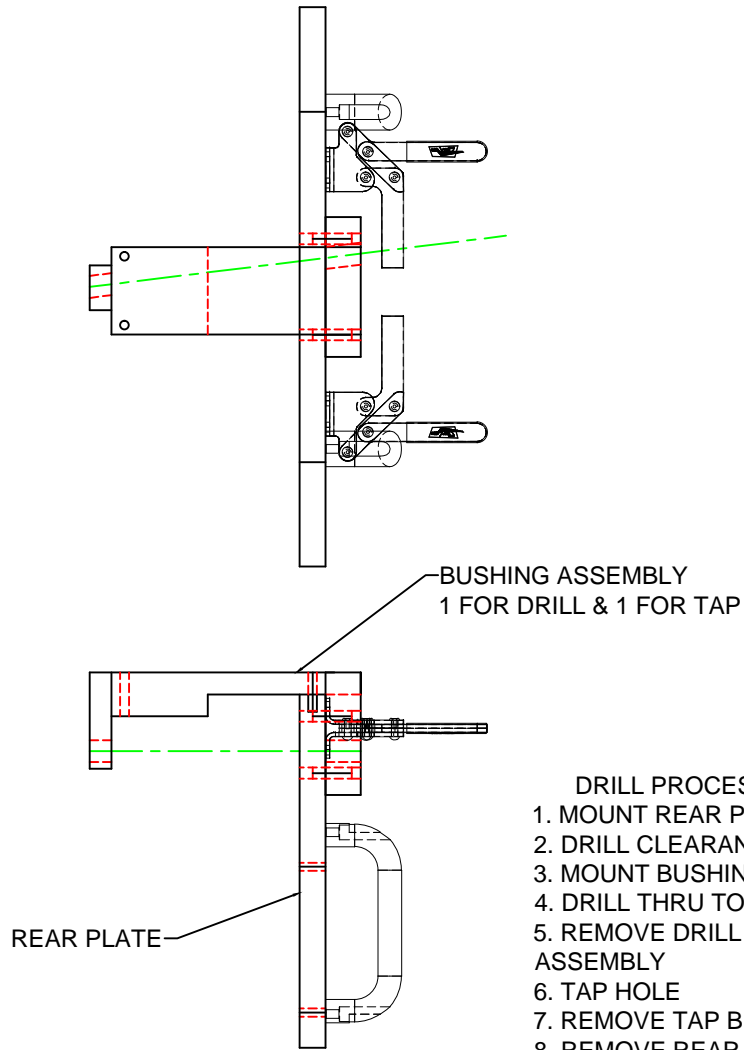
- 1) Ashland will continue setup to run shakedown testing using a tapped rear oil gallery.
- 2) Amol will provide swage lock part number for the 1/16th thermocouple fitting
- 3) Amol will continue looking into his proposal for using a thermocouple in the rear oil gallery.

Adjourn

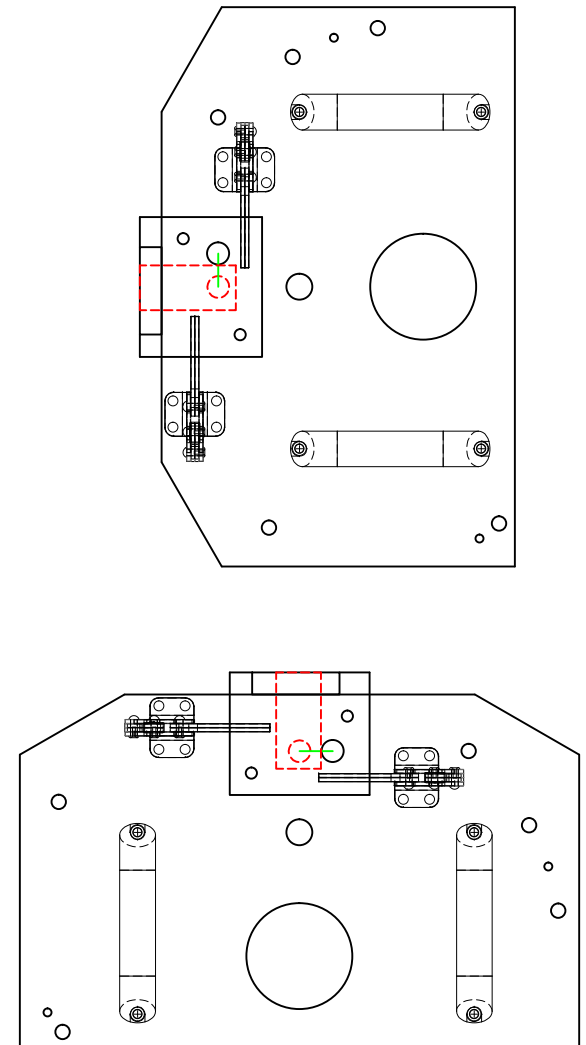
Next meeting scheduled for Wednesday January 28, 2015 at 11:00 Eastern.

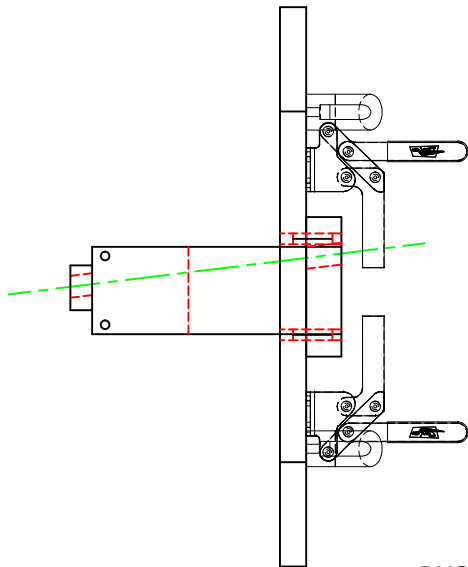
This is a compilation from notes recorded during the call, with comments from member participants during the Draft Review. Certain subjects may not necessarily be in exact order; however, they are believed to represent an accurate account of the call. If anyone feels changes or additional content may be necessary, please contact Sid Clark @ 586-873-1255 or Sidney.Clark@swri.org

Thanks, Sid

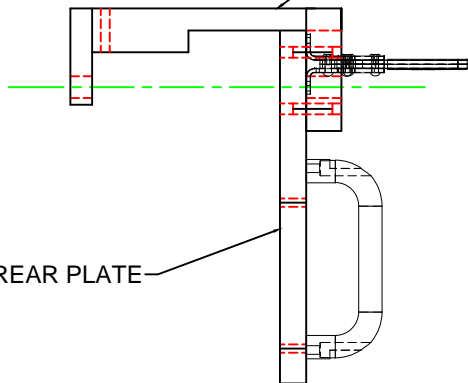


- DRILL PROCESS
1. MOUNT REAR PLATE TO BLOCK
 2. DRILL CLEARANCE HOLE THRU REAR OF BLOCK
 3. MOUNT BUSHING ASSEMBLY FOR DRILL
 4. DRILL THRU TO CENTER
 5. REMOVE DRILL BUSHING AND MOUNT TAP BUSHING ASSEMBLY
 6. TAP HOLE
 7. REMOVE TAP BUSHING ASSEMBLY
 8. REMOVE REAR PLATE





BUSHING ASSEMBLY
1 FOR DRILL & 1 FOR TAP



REAR PLATE

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