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Committee D02 on PETROLEUM PRODUCTS AND LUBRICANTS

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Staff Manager: DAVID R. BRADLEY, (610) 832-9681, Fax: (610) 832-9668, e-mail: dbradley@astm.org

February 14th, 2022

Reply to:
Matt Sangpeal
Afton Chemical Corporation
500 Spring St.
Richmond, VA 23219
(804) 788-5364
(804) 788-6239 [FAX]
matt.sangpeal@aftonchemical.com

ASTM D02.B0.03 L-42 Surveillance Panel
Members and Guests:

Attached for your review and comment are the unconfirmed minutes of the:

February 9, 2022 L-42 Surveillance Panel Meeting (PRI, Warrendale, PA and Virtual Meeting – Microsoft Teams)

Please direct any corrections or comments to my attention.

Very Respectfully,

Matt Sangpeal, Chairman
L-42 Surveillance Panel

L-42 Surveillance Panel Meeting Minutes

PRI, Warrendale, PA and Virtual Meeting – Microsoft Teams

February 9, 2022

Attendees: voting members in **bold**, * indicates virtual attendance

R. Banas (Exxon Mobil)*	B. Jordan (Shell)	M. Sangpeal (Afton/C)
S. Bealko (LZ)	T. Kostan (SwRI)*	R. Slocum (LZ)
D. Beck (TMC)	J. LaBond (Meritor)*	D. Uy (Shell)
D. Bell (Afton)	A. Lange (Intertek)	W. Venhoff (LZ)
J. Carter (Meritor)	C. Louis (SwRI)	R. Warden (SwRI)
A. Comfort (US Army)	D. Moser (BASF)	A. Zyski (Dana)
A. Goyal (BASF)	T. Muransky (AAM)	
D. Horvath (Afton)	S. Neil (Detroit Diesel)*	

Call to Order

Review of Agenda

The meeting agenda is attached.

Review of Membership

A motion was made to replace Rebecca Warden with Caroline Louis as the voting member from SwRI.

Motion: R. Warden

Second: W. Venhoff

Approval of Meeting Minutes

Meeting minutes for approval:

▲ “20211109_SP” → November 9, 2021 – Surveillance Panel Meeting – Ann Arbor, MI

A motion was made to approve these meeting minutes as presented.

Motion: M. Sangpeal

Second: A. Goyle

All in favor, no objections, no abstentions.

L-42 Hardware Print Review

Update from Dana to occur at the May SP meeting.

L-42-1 Development

C. Louis presented on SwRI's progress on electric L-42-1 test development. Details can be found in the attached presentation. One test was completed on a C1L446 / P8AD132 axle with TMC 117-1 reference oil to investigate scoring severity. Scoring was severe compared to historical levels. Next steps will be to reduce Shock I torque and run more testing.

There was a brief discussion around each lab's intentions to have a dedicated L-42-1 stand.

L-42-1 Hardware Donation

Lubrizol will donate 4 axles from batch **C1L446 / P8AD132** to SwRI to be used for L-42-1 test development.

New Hardware Order (2022)

One lab needs L-42 hardware. Another lab re-distributed some of their hardware to them. No other labs need hardware currently.

The next large industry-wide batch order will likely occur in 2023. Quantities will be determined later.

New/Open Issues

None.

Adjournment

A motion was made to adjourn.

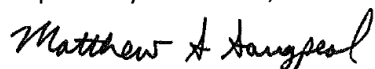
Motion: C. Louis

Second: A. Goyle

All in favor, no objections, no abstentions.

Meeting adjourned.

Respectfully submitted,



Matt Sangpeal

L-42 Surveillance Panel Chairman



L-42 Surveillance Panel Meeting

ASTM D7452

PRI and Microsoft Teams

Warrendale, PA

February 9, 2022

9:30 am – 10:00 am EST

Passion for Solutions™

Agenda

- ▲ **Call to Order**
- ▲ **Agenda**
- ▲ **Membership Review & Update**
- ▲ **Approval of Meeting Minutes**
 - ▲ 20211109 SP Meeting, SwRI, Ann Arbor, MI
- ▲ **L-42 Hardware Print Review**
- ▲ **L-42-1 Development Updates**
 - ▲ Update from SwRI
- ▲ **L-42-1 Development Hardware Donation**
- ▲ **New Hardware Order in 2022?**
- ▲ **New Issues**
- ▲ **Adjournment**

L-42 SP Voting Members

 Rob Banas:	ExxonMobil
 Dylan Beck:	TMC
 Mike Cabaj:	Linamar
 Allen Comfort:	US Army
 Arjun Goyal:	BASF
 Troy Muransky:	AAM
 Jason Carter:	Meritor
 Matt Sangpeal:	Afton Chemical (Chair)
 Robert Slocum:	Lubrizol
 Anthony Lange:	Intertek
 Rebecca Warden:	SwRI
 Amy Zyski:	Dana

Approval of Meeting Minutes

SP Meeting Minutes

- ▲ “20211109_SP” → November 9, 2021 – Surveillance Panel Meeting – SwRI, Ann Arbor, MI and Virtual Meeting via Microsoft Teams

L-42 Hardware Print Review

 Update from Dana

Electric L-42 Development Update

SOUTHWEST RESEARCH INSTITUTE®

Caroline Mueller
February 9th/10th, 2022



FUELS & LUBRICANTS RESEARCH

Action Items from Nov 2021

- Torque traces approved by group for severity run
- 8x donated axles (4 Lubrizol, 4 Afton) to be sent to SwRI
 - 4 received
- Use high ref oil (TMC 117-1), standard temperature conditions



Ratings

L-42-1 Severity Run

	Drive Side		Coast Side	
	Pinion	Ring	Pinion	Ring
Shock 1		0%		15%
Rated	0%	0%	44%	34%
Correction Factors			6%	4%
EOT	0%	0%	50%	38%

117-1 Targets on L-42

	Drive Side		Coast Side	
	Pinion	Ring	Pinion	Ring
Shock 1		0%		0
EOT	0%	0%	16-32%	No target

Notes: 15% coast side polishing on pinion at EOT.

Stats—Conditioning

Conditioning 1			
Input Torque [ft-lb]		Input Speed [rpm]	
<i>Target</i>	60 ± 5	<i>Target</i>	2363
<i>Avg</i>	60.0	<i>Avg</i>	2360
<i>Min</i>	59.2	<i>Min</i>	2357
<i>Max</i>	61.5	<i>Max</i>	2363

Conditioning 2							
Peak Input Torque Drive [ft-lb]		Peak Input Torque Coast [ft-lb]		Maximum Input Speed [rpm]		Minimum Input Speed [rpm]	
<i>Target</i>		<i>Target</i>		<i>Target</i>	2363	<i>Target</i>	1582
<i>Avg</i>	113.3	<i>Avg</i>	-57.8	<i>Avg</i>	2366	<i>Avg</i>	1581
<i>Min</i>	112.1	<i>Min</i>	-59.7	<i>Min</i>	2365	<i>Min</i>	1580
<i>Max</i>	113.8	<i>Max</i>	-55.6	<i>Max</i>	2367	<i>Max</i>	1582

Conditioning 3			
Input Torque [ft-lb]		Input Speed [rpm]	
<i>Target</i>	70 ± 5	<i>Target</i>	3350
<i>Avg</i>	69.9	<i>Avg</i>	3346
<i>Min</i>	48.9	<i>Min</i>	3343
<i>Max</i>	82.0	<i>Max</i>	3349

Conditioning 4							
Peak Input Torque Drive [ft-lb]		Peak Input Torque Coast [ft-lb]		Maximum Input Speed [rpm]		Minimum Input Speed [rpm]	
<i>Target</i>		<i>Target</i>		<i>Target</i>	3350	<i>Target</i>	2754
<i>Avg</i>	115.0	<i>Avg</i>	-66.8	<i>Avg</i>	3354	<i>Avg</i>	2753
<i>Min</i>	114.3	<i>Min</i>	-74.3	<i>Min</i>	3352	<i>Min</i>	2753
<i>Max</i>	115.5	<i>Max</i>	-63.6	<i>Max</i>	3355	<i>Max</i>	2754

Stats—Shocks

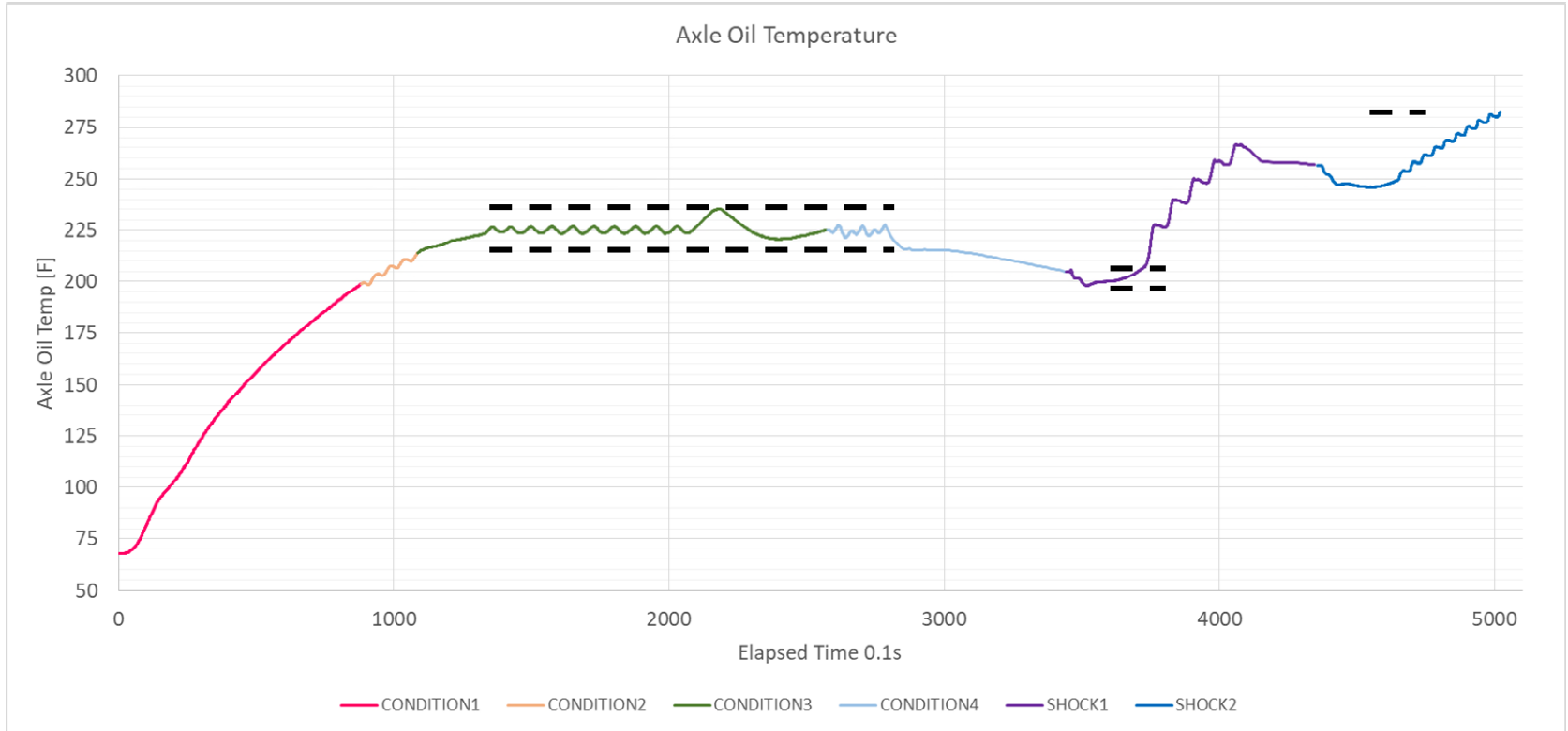
Shock 1							
Peak Input Torque Drive [ft-lb]		Peak Input Torque Coast [ft-lb]		Maximum Input Speed [rpm]		Minimum Input Speed [rpm]	
<i>Target</i>		<i>Target</i>		<i>Target</i>	4316	<i>Target</i>	2178
Avg	235.0	Avg	-126.8	Avg	4377	Avg	2177
Min	233.9	Min	-133.7	Min	4375	Min	2176
Max	236.7	Max	-118.2	Max	4380	Max	2178

Shock 2							
Peak Input Torque Drive [ft-lb]		Peak Input Torque Coast [ft-lb]		Maximum Input Speed [rpm]		Minimum Input Speed [rpm]	
<i>Target</i>		<i>Target</i>		<i>Target</i>	3083	<i>Target</i>	2178
Avg	225.3	Avg	-231.7	Avg	3077	Avg	2170
Min	224.3	Min	-232.9	Min	3075	Min	2167
Max	228.6	Max	-226.6	Max	3086	Max	2173

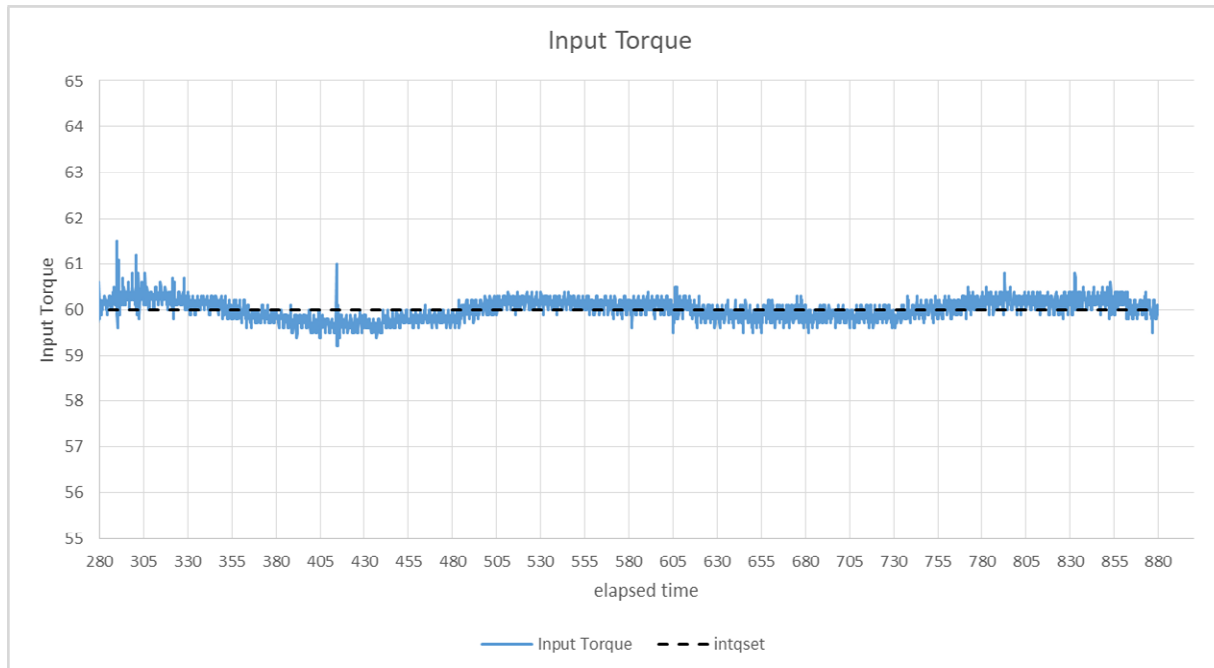
Speed and Torque Traces



Temperature

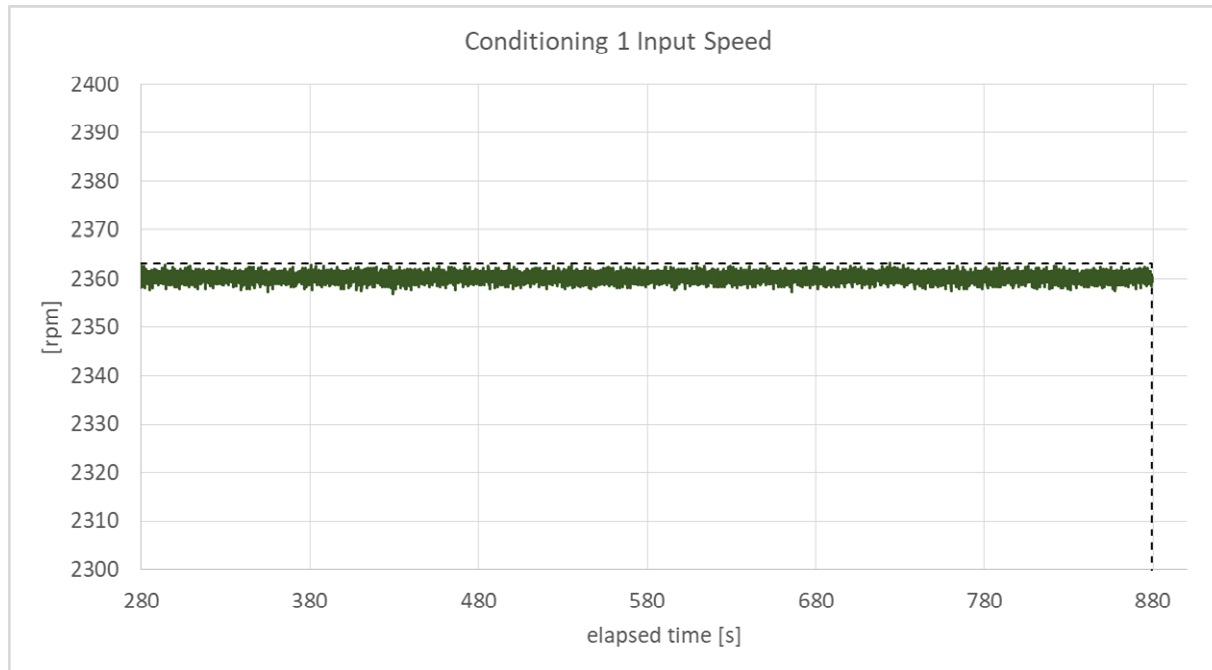


Conditioning I



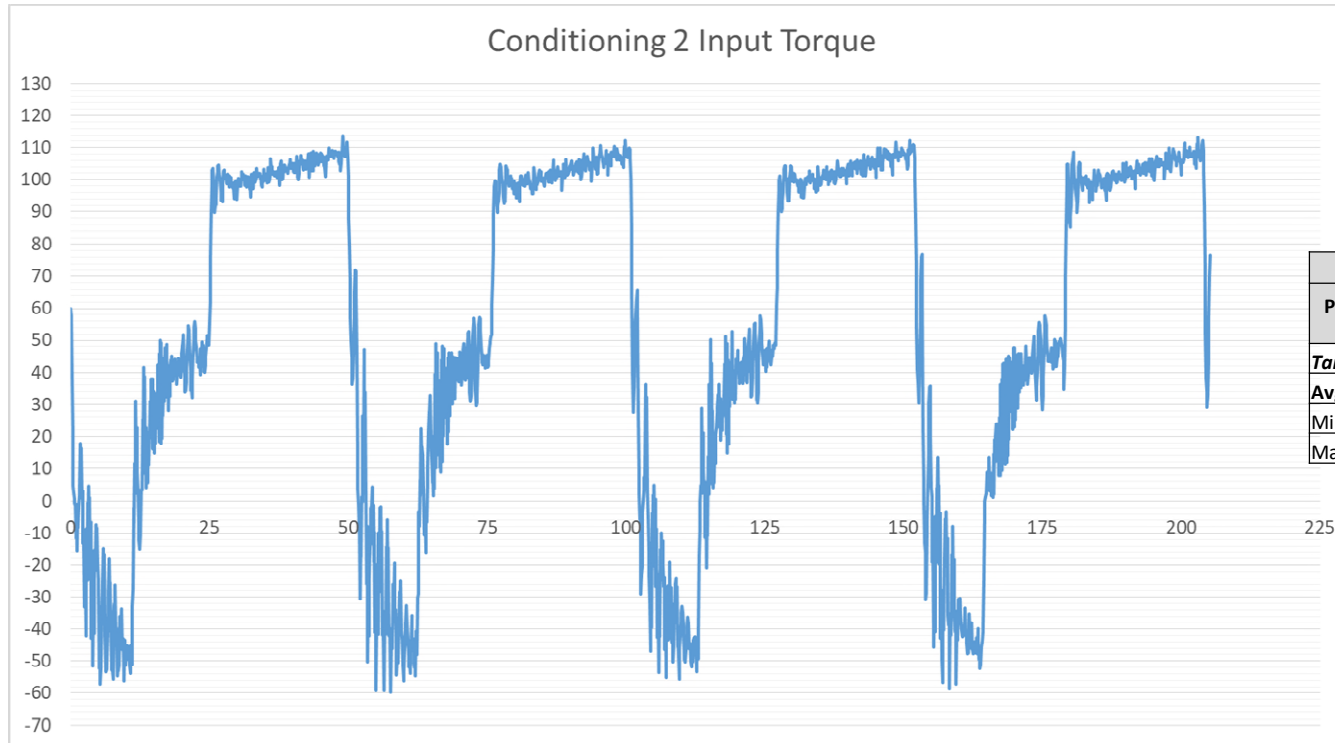
Conditioning 1			
	Input Torque [ft-lb]		Input Speed [rpm]
Target	60 ± 5	Target	2363
Avg	60.0	Avg	2360
Min	59.2	Min	2357
Max	61.5	Max	2363

Conditioning I



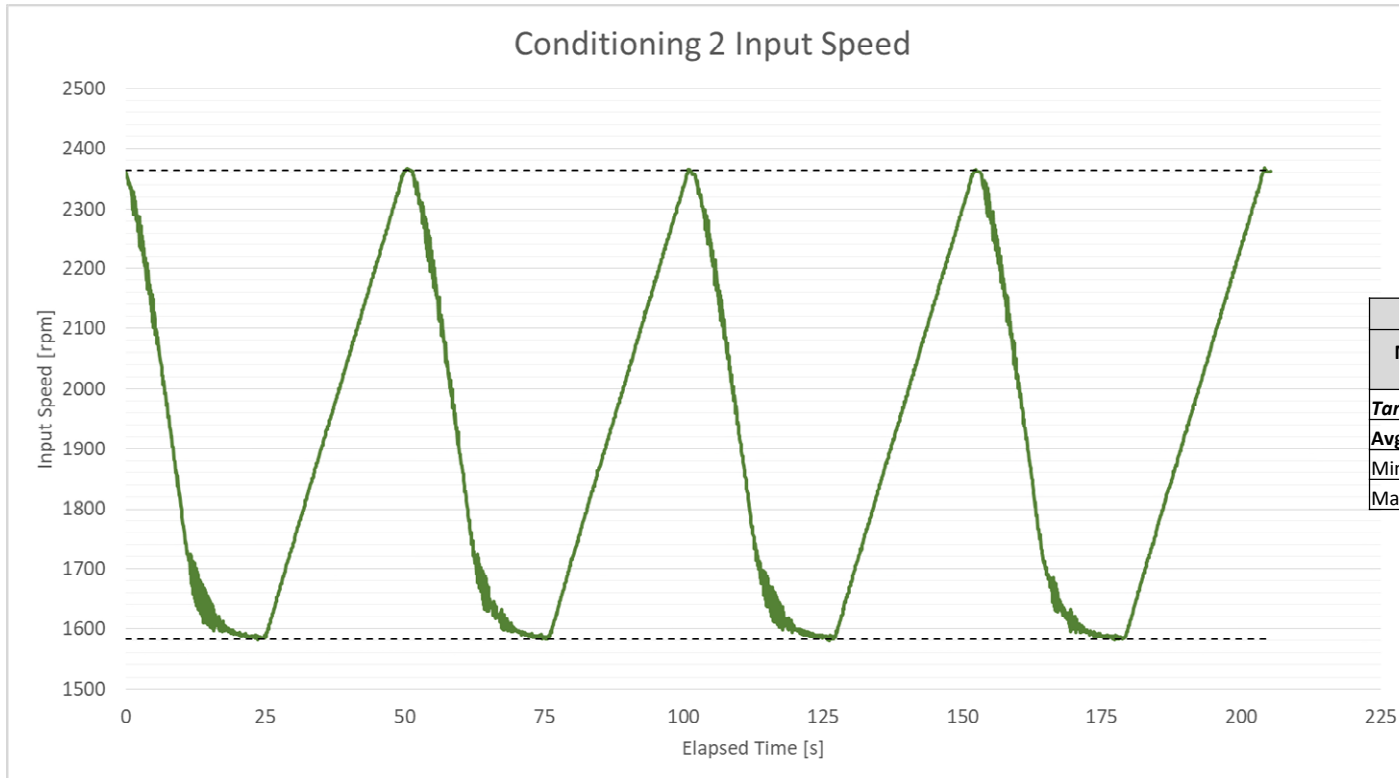
Conditioning 1			
	Input Torque [ft-lb]		Input Speed [rpm]
Target	60 ± 5	Target	2363
Avg	60.0	Avg	2360
Min	59.2	Min	2357
Max	61.5	Max	2363

Conditioning 2



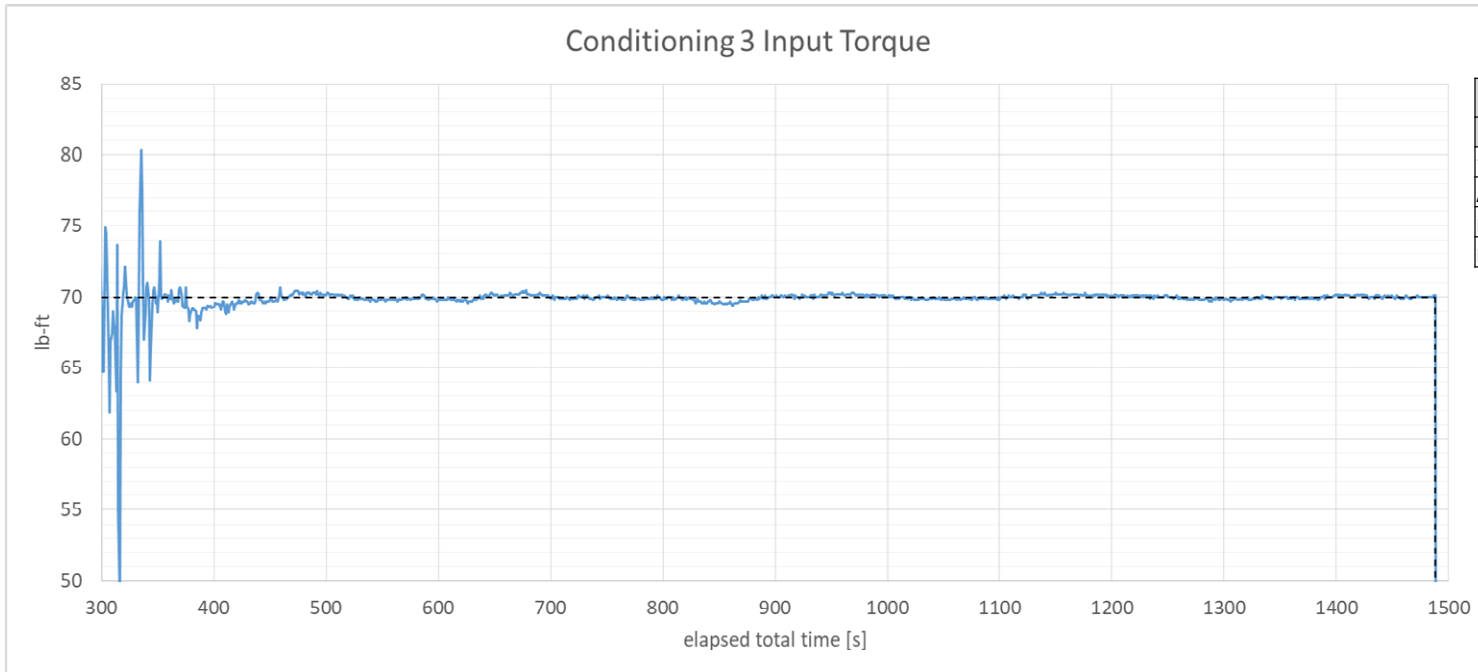
Conditioning 2			
Peak Input Torque Drive [ft-lb]		Peak Input Torque Coast [ft-lb]	
Target		Target	
Avg	113.3	Avg	-57.8
Min	112.1	Min	-59.7
Max	113.8	Max	-55.6

Conditioning 2



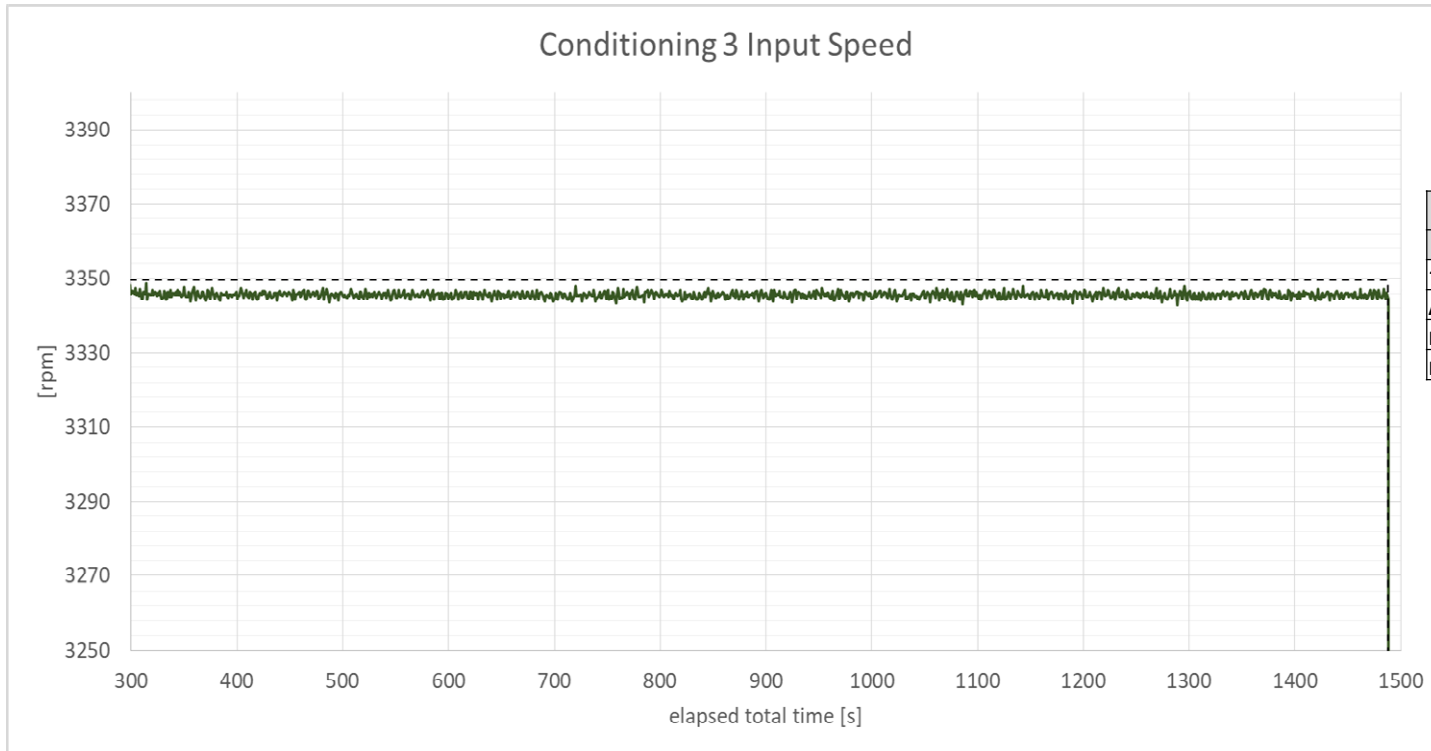
Conditioning 2			
Maximum Input Speed [rpm]		Minimum Input Speed [rpm]	
Target	2363	Target	1582
Avg	2366	Avg	1581
Min	2365	Min	1580
Max	2367	Max	1582

Conditioning 3



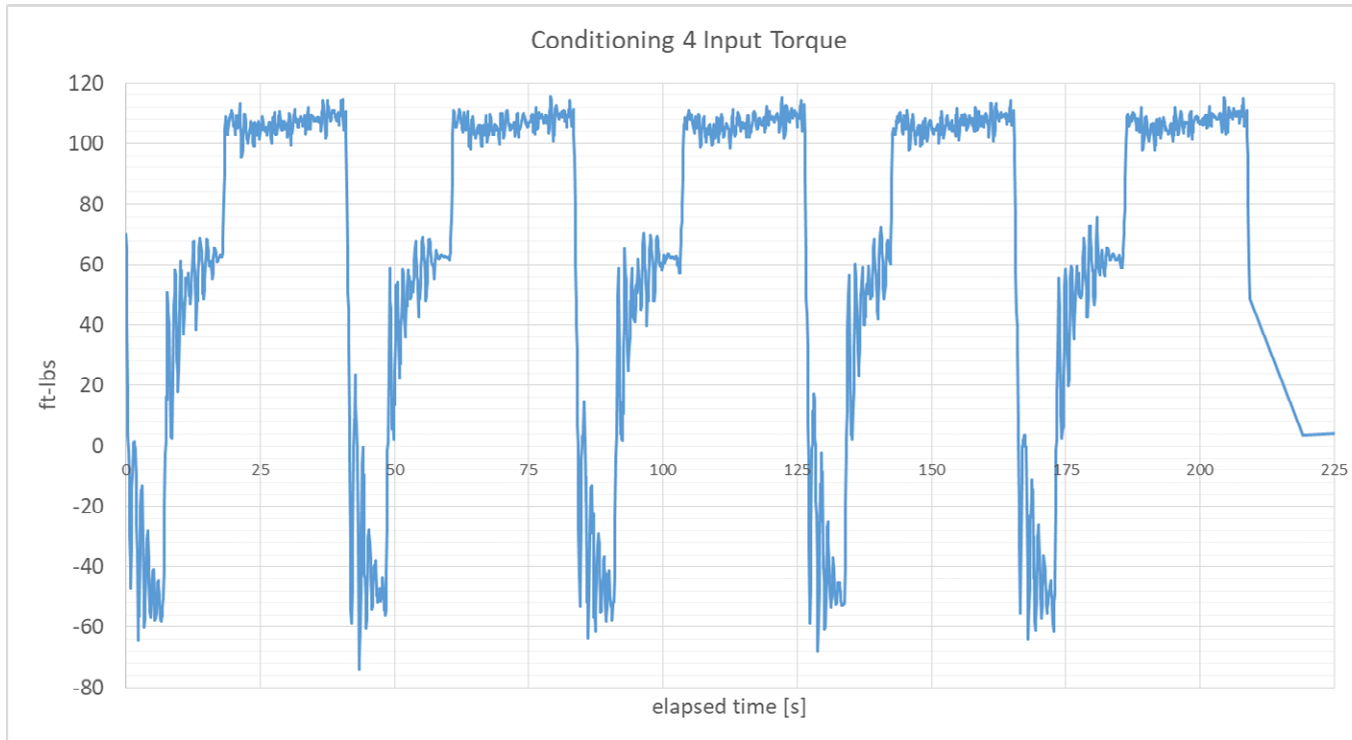
Conditioning 3			
Input Torque [ft-lb]		Input Speed [rpm]	
Target	70 ± 5	Target	3350
Avg	69.9	Avg	3346
Min	48.9	Min	3343
Max	82.0	Max	3349

Conditioning 3



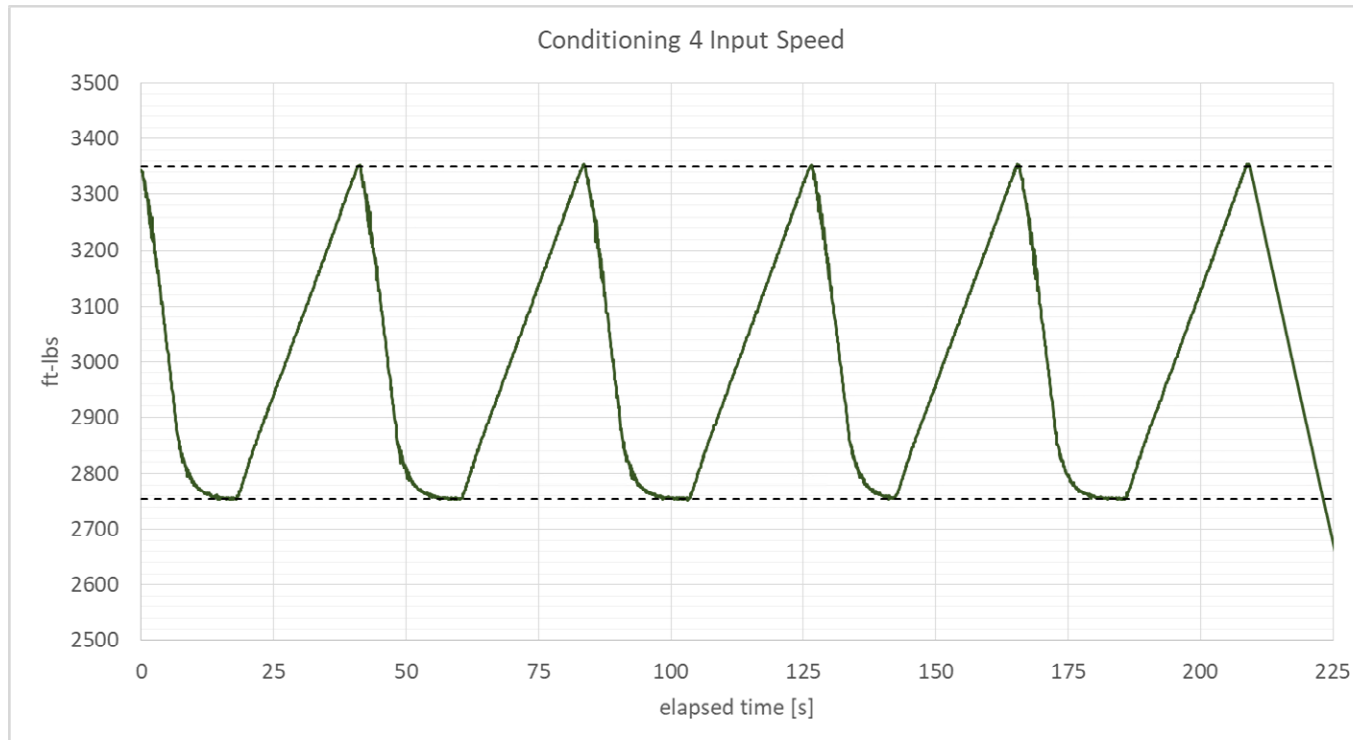
Conditioning 3			
Input Torque [ft-lb]		Input Speed [rpm]	
<i>Target</i>	70 ± 5	<i>Target</i>	3350
<i>Avg</i>	69.9	<i>Avg</i>	3346
<i>Min</i>	48.9	<i>Min</i>	3343
<i>Max</i>	82.0	<i>Max</i>	3349

Conditioning 4



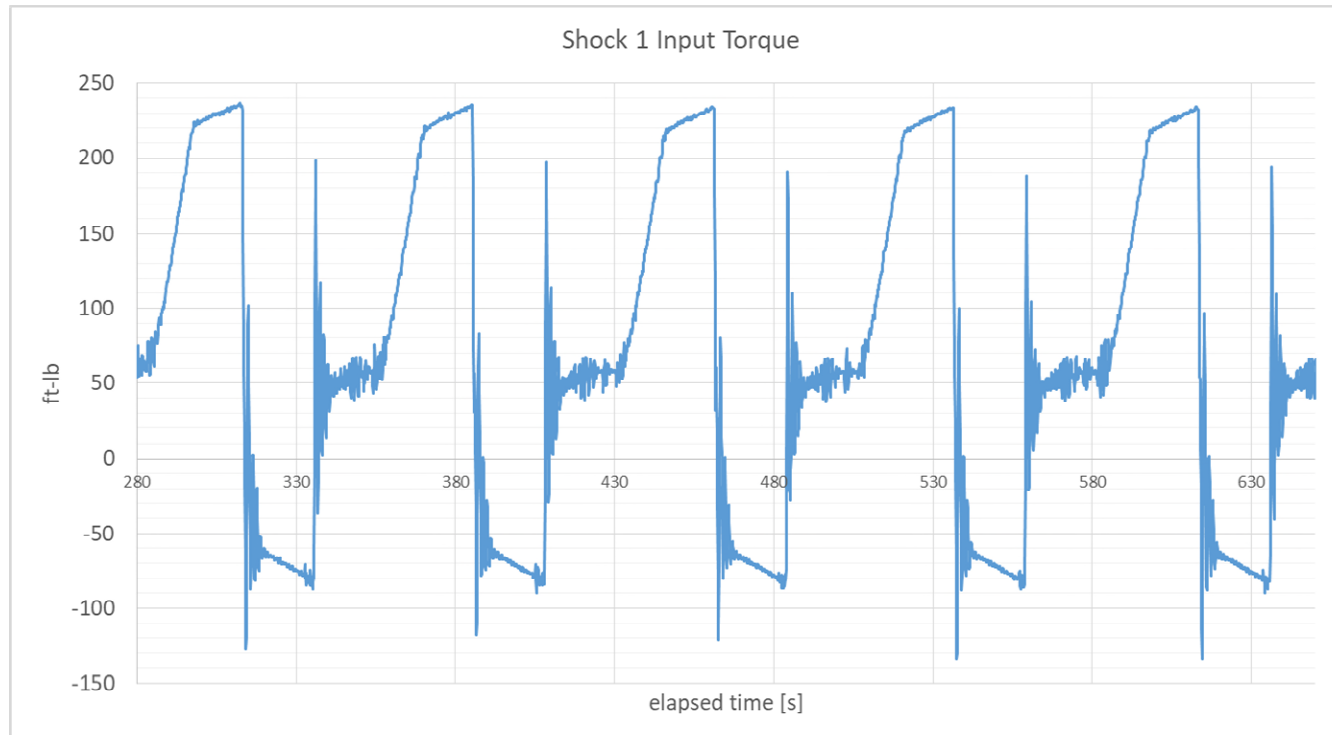
Conditioning 4			
Peak Input Torque Drive [ft-lb]		Peak Input Torque Coast [ft-lb]	
Target		Target	
Avg	115.0	Avg	-66.8
Min	114.3	Min	-74.3
Max	115.5	Max	-63.6

Conditioning 4



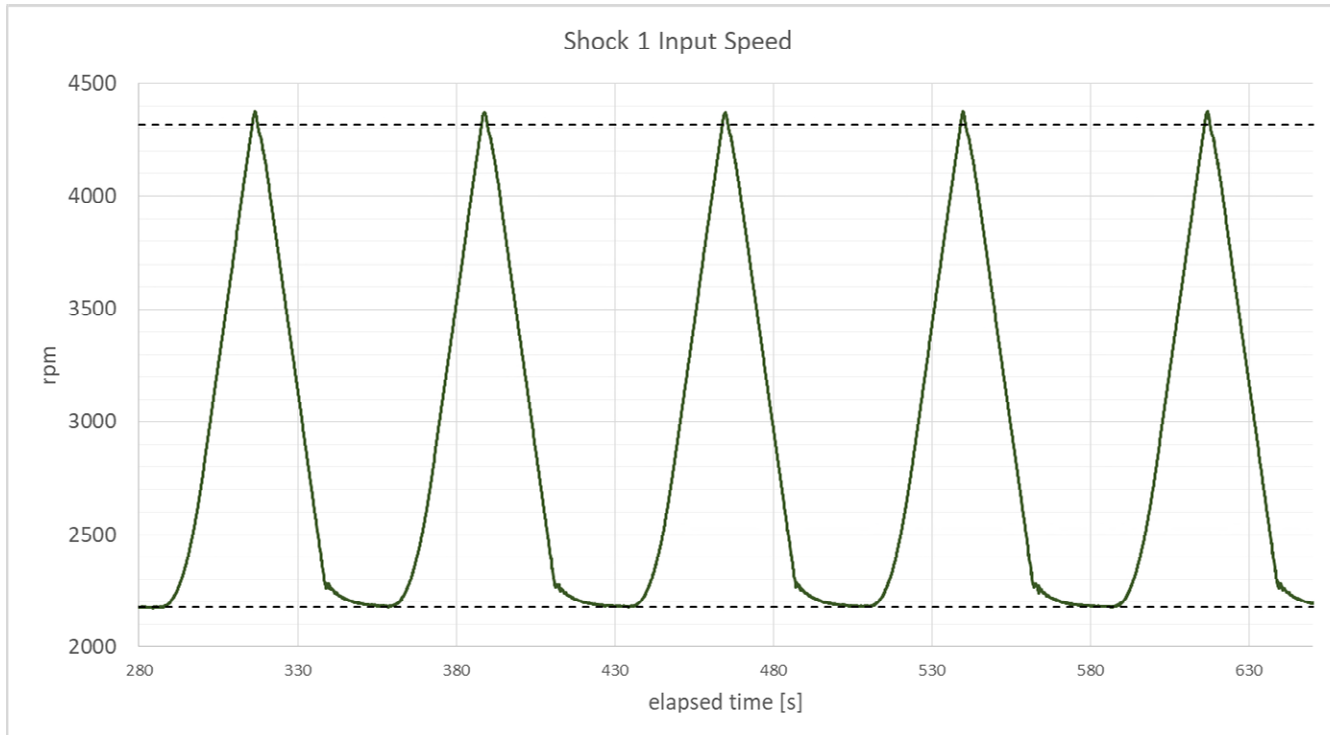
Conditioning 4			
Maximum Input Speed [rpm]		Minimum Input Speed [rpm]	
<i>Target</i>	3350	<i>Target</i>	2754
<i>Avg</i>	3354	<i>Avg</i>	2753
<i>Min</i>	3352	<i>Min</i>	2753
<i>Max</i>	3355	<i>Max</i>	2754

Shock I



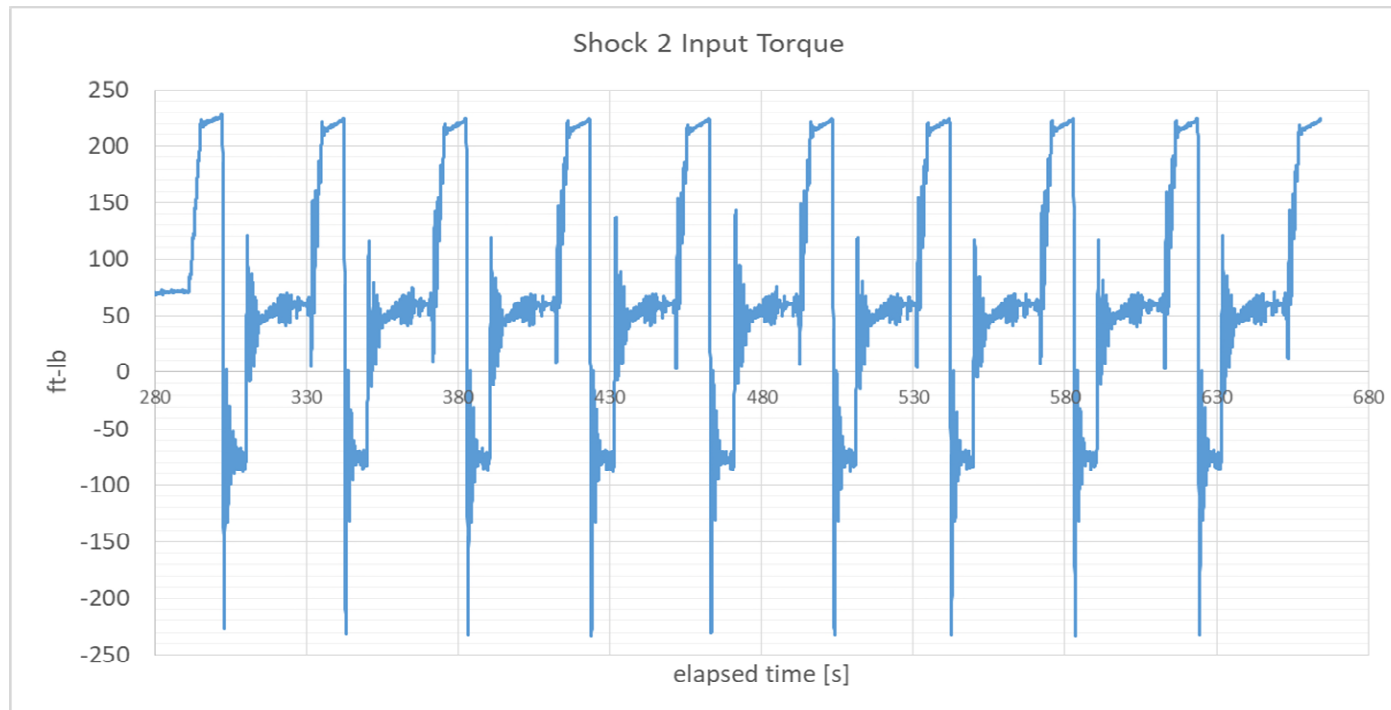
Shock 1			
Peak Input Torque Drive [ft-lb]		Peak Input Torque Coast [ft-lb]	
Target		Target	
Avg	235.0	Avg	-126.8
Min	233.9	Min	-133.7
Max	236.7	Max	-118.2

Shock I



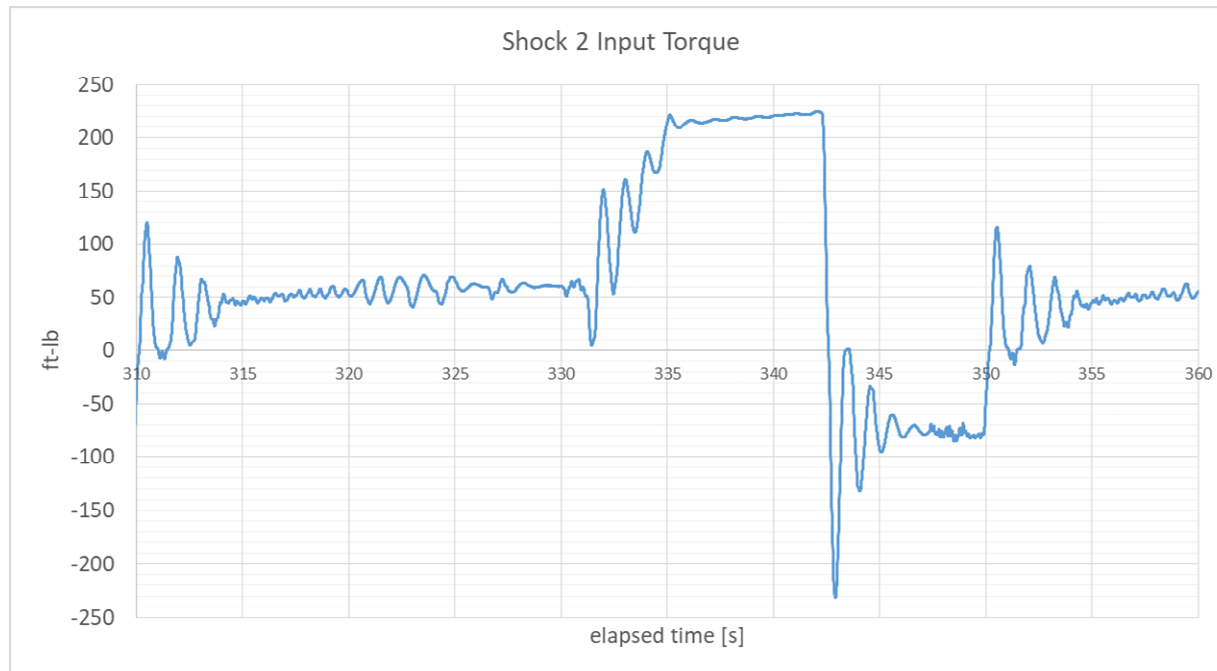
Shock 1			
	Maximum Input Speed [rpm]		Minimum Input Speed [rpm]
<i>Target</i>	4316	<i>Target</i>	2178
<i>Avg</i>	4377	<i>Avg</i>	2177
<i>Min</i>	4375	<i>Min</i>	2176
<i>Max</i>	4380	<i>Max</i>	2178

Shock 2

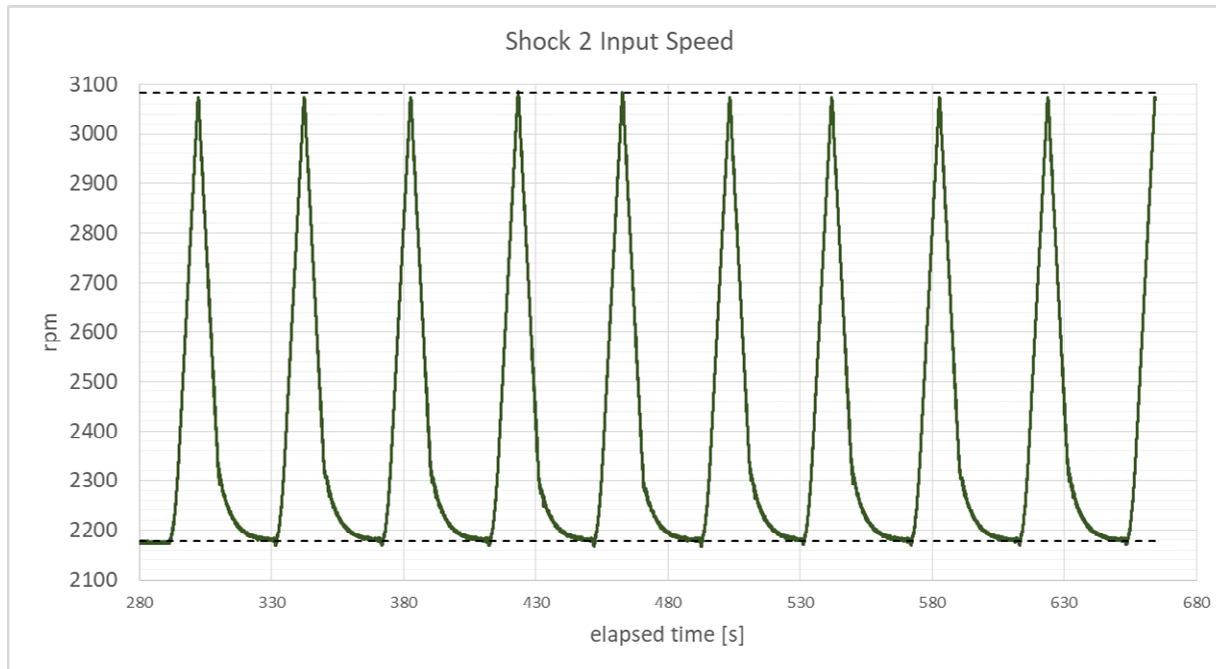


Shock 2			
Peak Input Torque Drive [ft-lb]		Peak Input Torque Coast [ft-lb]	
Target		Target	
Avg	225.3	Avg	-231.7
Min	224.3	Min	-232.9
Max	228.6	Max	-226.6

Shock 2



Shock 2



Shock 2			
Maximum Input Speed [rpm]		Minimum Input Speed [rpm]	
<i>Target</i>	3082.5	<i>Target</i>	2178.3
<i>Avg</i>	3077	<i>Avg</i>	2170
<i>Min</i>	3075	<i>Min</i>	2167
<i>Max</i>	3086	<i>Max</i>	2173

Conclusions and Next Steps

Conclusions

- Conditioning appears to protect drive side appropriately as is
 - No visible scoring on coast side after conditioning
- Polishing on pinion and scoring on ring at Shock 1 indicate that Shock 1 is too severe
- Shock 2 contributes significant scoring on top of Shock 1 scoring

Next Steps

- Leave Conditioning severity as is
 - Run 4 cycles for Conditioning 2 (instead of 5)
 - Torque blip at the beginning of Conditioning 3 attributed to dyno control and has been corrected
- Reduce Shock 1 severity—target peak coast side torque of -75 ft lbs to -85 ft lbs
- Leave Shock 2 severity as is (run 10 cycles instead of 9)

L-42-1 Development Hardware Donation

Current batch at 2 of the 4 labs is C1L446 / P8AD132

- ▲ Afton has recently ordered a new batch, but has retained some of this batch

Development should ideally be done all on same batch

Afton and Lubrizol have agreed to donate 4 axles each

- ▲ Status?

2022? Hardware Order

▲ 1 lab has <1 year of axles left in stock

▲ Order status?

▲ When do other labs anticipate they will need more axles?

▲ Could be long lead time from Dana

▲ Update?

New Issues



Thanks!

**L-42 Surveillance Panel Membership/Attendance
PRI, Warrendale, PA and Microsoft Teams Virtual Meeting
February 9, 2022**

Present	Name	Voting Non-Voting	Company Name Company Address	Contact information	
	Aguirre, Nancy	NV	Intertek Automotive Research 5404 Bandera Rd. San Antonio, TX 78238	Phone:	
				E-mail:	nancy.aguirre@intertek.com
<i>Virtual</i>	Banas, Rob	V	ExxonMobil Fuels, Lubricants & Specialties 114 Arcadia Park Dr. Canton, GA 30114	Phone:	678-493-3930
				E-mail:	rob.a.banas@exxonmobil.com
	Barrera, Tony	NV	Intertek Automotive Research 5404 Bandera Rd. San Antonio, TX 78238	Phone:	210-523-4653
				E-mail:	tony.barrera@intertek.com
	Bealko, Steven	NV	The Lubrizol Corporation	Phone:	
				E-mail:	
<i>DJB</i>	Beck, Dylan	V	ASTM Test Monitoring Center <i>203</i> <i>Armstrong</i> -6555 Penn Ave Pittsburg, PA 15206	Phone:	724-355-1854
				E-mail:	djb@astmtmc.org

Drie Freeport, PA



**L-42 Surveillance Panel Membership/Attendance
PRI, Warrendale, PA and Microsoft Teams Virtual Meeting
February 9, 2022**

Present	Name	Voting Non-Voting	Company Name Company Address	Contact information	
DB	Bell, Don	NV	Afton Chemical	Phone:	804-788-6332
			500 Spring St. Richmond, VA 23219	E-mail:	don.bell@aftonchemical.com
	Cabaj, Mike	V	Linamar	Phone:	313-820-0119
			32233 W. 8 Mile Road Livonia, MI 48152	E-mail:	michael.cabaj@linamar.com
	Camposo, Lucas	NV	Evonik	Phone:	215-706-5809
			723 Electronic Dr Horsham, PA 19044	E-mail:	lucas.camposo@evonik.com
JC	Carter, Jason	V	Meritor	Phone:	248 - 435 - 1544
			2135 W Maple Troy MI, 48084	E-mail:	Jason.Carter@meritor.com
	Cereghino, Brian	NV	IPAC Inc.	Phone:	
				E-mail:	bcereghino@ipac-inc.com

**L-42 Surveillance Panel Membership/Attendance
PRI, Warrendale, PA and Microsoft Teams Virtual Meeting
February 9, 2022**

Present	Name	Voting Non-Voting	Company Name Company Address	Contact information	
	Clark, Jeff	NV	ASTM Test Monitoring Center	Phone:	412-365-1032
			6555 Penn Ave Pittsburg, PA 15206	E-mail:	jac@astmtmc.org
P	Comfort, Allen	V	US Army CCDC	Phone:	586-282-4225
				E-mail:	allen.s.comfort.civ@mail.mil
	Drlja, Kristijan	NV	The Lubrizol Corporation	Phone:	440-391-6374
			29400 Lakeland Boulevard Wickliffe, OH 44092	E-mail:	krdr@lubrizol.com
	Farber, Frank	NV	TMC	Phone:	412-365-1030
			6555 Penn Ave Pittsburg, PA 15206	E-mail:	fmf@astmtmc.org
	Foecking, Brian	NV	The Lubrizol Corporation	Phone:	440-347-2130
			29400 Lakeland Boulevard Wickliffe, OH 44092	E-mail:	bjf@lubrizol.com

**L-42 Surveillance Panel Membership/Attendance
PRI, Warrendale, PA and Microsoft Teams Virtual Meeting
February 9, 2022**

Present	Name	Voting Non-Voting	Company Name Company Address	Contact information	
	Goyal, Arjun	V	BASF	Phone:	914-785-2083
			500 White Plains Rd Tarrytown, NY 10591	E-mail:	arjun.goyal@basf.com
	Haynes, Troy	NV	IPAC Inc.	Phone:	
				E-mail:	thaynes@ipac-inc.com
	Horvath, Dan	NV	Afton Chemical	Phone:	248-514-2551
			2000 Town Center, Suite 1160 Southfield, MI 48075	E-mail:	dan.horvath@aftonchemical.com
	Jackson, Matt	NV	Southwest Research Institute	Phone:	210-522-6981
				E-mail:	matt.jackson@swri.org
	Joy, Tisha	NV	BASF	Phone:	914-785-2206
				E-mail:	tisha.joy@basf.com

**L-42 Surveillance Panel Membership/Attendance
PRI, Warrendale, PA and Microsoft Teams Virtual Meeting
February 9, 2022**

Present	Name	Voting Non-Voting	Company Name Company Address	Contact information	
	Kanga, Percy	NV	Exxon Mobil (Retired)	Phone:	
				E-mail:	
Virtual	Kostan, Travis	NV	Southwest Research Institute	Phone:	210.522.2407
				E-mail:	travis.kostan@swri.org
Virtual	LaBond, Jessica	NV	Meritor	Phone:	248-872-3055
			2135 W. Maple Rd Troy, MI 48084	E-mail:	Jessica.LaBond@meritor.com
L-42	Lange, Anthony	V	Intertek Automotive Research	Phone:	210-634-1103
			5404 Bandera Rd. San Antonio, TX 78238	E-mail:	anthony.lange@intertek.com
	Lonsway, Chris	NV	The Lubrizol Corporation	Phone:	440-347-4517
			29400 Lakeland Boulevard Wickliffe, OH 44092	E-mail:	chris.lonsway@lubrizol.com

**L-42 Surveillance Panel Membership/Attendance
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Present	Name	Voting Non-Voting	Company Name Company Address	Contact information	
	Morris, Jeanelle	NV	Navistar 2701 Navistar Dr Lisle, IL 60532	Phone:	331-332-1661
				E-mail:	jeanelle.morris@navistar.com
DM	Mosher, Donna	NV	BASF 100 Park Ave Florham Park, NJ 07932	Phone:	269-217-1715
				E-mail:	donna.mosher@basf.com
	Mueller, Caroline	NV	Southwest Research Institute 6220 Culebra Rd. San Antonio, TX 78238	Phone:	843-471-6283
				E-mail:	caroline.louis@swri.org
M	Muransky, Troy	V	AAM 1840 Holbrook Detroit, MI	Phone:	734-564-8406
				E-mail:	troy.muransky@aam.com
Virtual	Neil, Suzanne	NV	Daimler Trucks/Detroit Diesel	Phone:	
				E-mail:	suzanne.neal@daimler.com

**L-42 Surveillance Panel Membership/Attendance
PRI, Warrendale, PA and Microsoft Teams Virtual Meeting
February 9, 2022**

Present	Name	Voting Non-Voting	Company Name Company Address	Contact information	
P	Sangpeal, Matt	V/Chair	Afton Chemical	Phone:	804-788-5364
			500 Spring St. Richmond, VA 23219	E-mail:	matt.sangpeal@aftonchemical.com
	Sattler, Eric	NV	CCDC-GVSC	Phone:	586-282-2272
			Warren, MI	E-mail:	eric.r.sattler.civ@mail.mil
	Schwenk, Daniel	NV	Afton Chemical	Phone:	804-788-6326
			500 Spring St. Richmond, VA 23219	E-mail:	daniel.schwenk@aftonchemical.com
P	Slocum, Robert	V	The Lubrizol Corporation	Phone:	440-347-5102
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February 9, 2022**

Present	Name	Voting Non-Voting	Company Name Company Address	Contact information	
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RW	Warden, Rebecca	V	Southwest Research Institute	Phone:	210-522-6266
				E-mail:	rebecca.warden@swri.org
	Zreik, Khaled	NV	General Motors	Phone:	248-977-9214
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Present	Name	Voting Non-Voting	Company Name Company Address	Contact information	
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			6720 Culebra Rd San Antonio, TX 78227	E-mail:	Caroline.Louis@suri.org
✓	Steve Bealko	NV	Lubrizol	Phone:	440-347-4356
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✓	Brad Jordan	NV	Shell	Phone:	804-516-1238
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Present	Name	Voting Non-Voting	Company Name Company Address	Contact information	
				Phone:	
				E-mail:	
				Phone:	
				E-mail:	
				Phone:	
				E-mail:	
				Phone:	
				E-mail:	