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### **Committee D02 on PETROLEUM PRODUCTS AND LUBRICANTS**

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August 15<sup>th</sup>, 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](mailto: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:

**August 10, 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 Headquarters, Warrendale, PA and Virtual Meeting – Microsoft Teams

August 10, 2022

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

<b>R. Banas (Exxon-Mobil)*</b>	P. Kanga (Retired)*	<b>M. Sangpeal (Afton/C)</b>
<b>D. Beck (TMC)</b>	J. LaBond (Meritor)	E. Sattler (US Army)*
D. Bell (Afton)	<b>A. Lange (Intertek)</b>	N. Schaup (LZ)
M. Caridi (BASF)	<b>C. Louis (SwRI)</b>	<b>R. Slocum (LZ)</b>
M. Charron (SwRI)	D. Moser (BASF)	W. Venhoff (LZ)
<b>A. Goyal (BASF)</b>	<b>T. Muransky (AAM)</b>	<b>A. Zyski (Dana)</b>
D. Horvath (Afton)	S. Neil (Daimler)*	

### Call to Order

#### Review of Agenda

The meeting agenda is attached.

#### Review of Membership

Mike Cabaj was removed from voting member list.

#### Approval of Meeting Minutes

Meeting minutes for approval:

- ▲ “20220511\_SP” → May 10, 2022 – Surveillance Panel Meeting – Plymouth, MI

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

Motion: A. Goyle

Second: T. Muransky

All in favor, no objections, no abstentions.

#### L-42-1 Development

C. Louis presented on SwRI’s progress on electric L-42-1 test development. Four tests were run on C1L446/P8AD132 axles, two with TMC 117 oil (High Ref) and two with TMC 113 oil (Discrimination). Stand settings were unchanged from most recent tests run in April 2022. EOT scoring results began converging: High Ref severity increased, and Discrimination severity decreased. Discrimination scoring is no longer double High Ref scoring (results would not be valid for candidate testing).

Two further tests will be run on the same batch of axles with no changes to stand settings. This will help to determine if down time or seasonal weather changes are impacting stand severity. Results will be reviewed, and next steps will be determined by sub-committee. SwRI will also review operational data to check for other possible reasons for severity shift (ambient test cell conditions, motor current/voltage, etc.). Additional details can be found in the attached presentation.

**L-42-1 Hardware Donation**

Afton and Lubrizol will each donate five more C1L446/P8AD132 axles to the L-42-1 hardware development project.

**Hardware Order**

Labs were asked when they will need to place an order with Dana for more hardware. Two labs indicated that they would need to place an order very soon.

Action Item: M. Sangpeal will contact B. May (Dana Sales) with needed quantities and request a quote.

**New/Open Issues**

None.

**Adjournment**

A motion was made to adjourn.

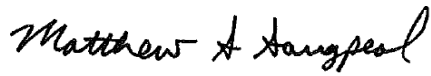
Motion: A. Lange

Second: T. Muransky

All in favor, no objections, no abstentions.

Meeting adjourned.

Respectfully submitted,

A handwritten signature in black ink that reads "Matthew A. Sangpeal". The signature is written in a cursive style with a large initial 'M' and a long, sweeping tail on the 'l'.

Matt Sangpeal

L-42 Surveillance Panel Chairman



# L-42 Surveillance Panel Meeting

ASTM D7452

PRI Headquarters

Warrendale, PA

August 10, 2022

1:00 – 1:30 PM EDT

Passion for Solutions™

# Agenda

- ▲ **Call to Order**
- ▲ **Agenda**
- ▲ **Membership Review & Update**
- ▲ **Approval of Meeting Minutes**
  - ▲ 20220511 SP Meeting - IAR, Plymouth, MI
- ▲ **L-42-1 Development Updates**
  - ▲ Update from SwRI
- ▲ **Hardware Inventory Check**
- ▲ **New Issues**
- ▲ **Adjournment**

## L-42 SP Voting Members

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

# Approval of Meeting Minutes

## SP Meeting Minutes

- ▲ “20220511\_SP” → May 11, 2022 – Surveillance Panel Meeting – IAR, Plymouth, MI and Virtual Meeting via Microsoft Teams

# L-42-I Test Summary

SOUTHWEST RESEARCH INSTITUTE®

Caroline Mueller

8/10/2022



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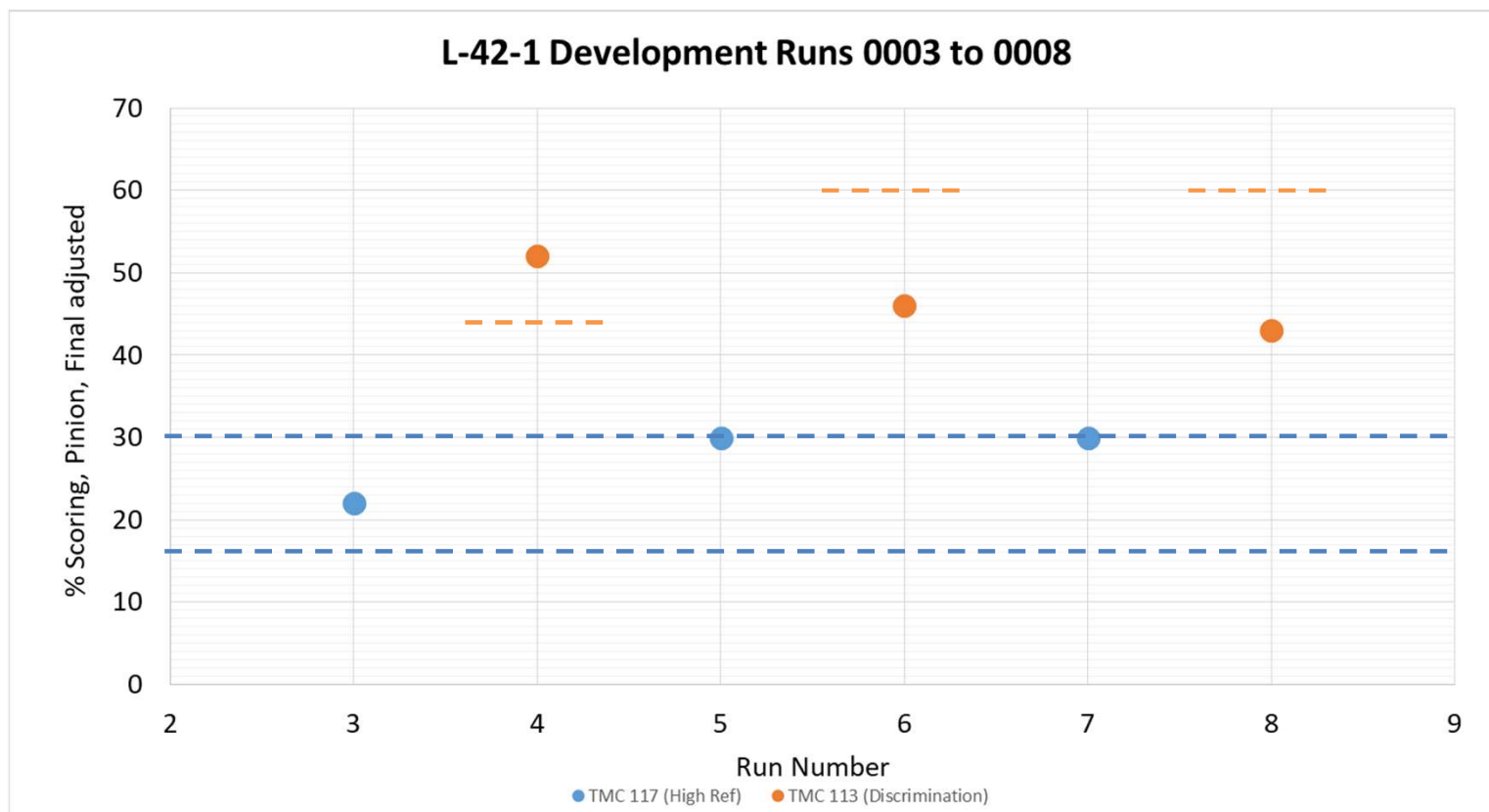


# All Tests Summary

Test Number	Oil Code	EOT Date	Final Pinion Rating (Adjusted)	Final Ring Rating (Adjusted)	On L-42 Target?
01-0003	TMC 117 (High Ref)	4/22/22	22%	15%	Y
01-0004	TMC 113 (Disc. Oil)	4/25/22	52%	42%	Y
01-0005	TMC 117 (High Ref)	6/16/22	30%	18%	Y
01-0006	TMC 113 (Disc. Oil)	6/17/22	46%	36%	N
01-0007	TMC 117 (High Ref)	6/20/22	30%	20%	Y
01-0008	TMC 113 (Disc. Oil)	6/20/22	43%	33%	N



# Ratings and Targets Plot



Note: Discrimination run targets are defined by the high reference run immediately preceding them. Discrimination oils must have twice as much scoring, or more, than their immediately preceding high reference run per the L-42 procedure. There is no upper limit for scoring on the discrimination oil.

# Data Analysis

- No Shock 1 scoring on any oil, any run
  - All scoring coming from Shock 2
- Conditioning 4 appears correlated with mild runs on discrimination oil and severe runs on high ref oil
  - 115 ft-lbs average coast side Cond 4 for runs 0005-0008
  - 100 ft-lbs average coast side Cond 4 for runs 0003&0004
- Shock 1 has consistent average coast side torque values for all 6 runs
  - Shock 1 has greatest cycle-to-cycle variability among all dynamic portions of test
- Shock 2 has fairly consistent average coast side torque values for all 6 runs. Less variable cycle-to-cycle than Shock 1



# Next Steps

## ▪ Option 1:

### Eliminate Shock 1

- Remove Shock 1 which is acting as additional conditioning
- Improve Conditioning 4 consistency
- Potential tweaks to Shock 2

▪ Pros: simpler test profile, eliminate polishing from overlapping scored regions, simpler test metric

▪ Cons: Loss of additional discrimination for oils where Shock 1 scoring occurs but does not significantly overlap with Shock 2 tooth area

## ▪ Option 2:

### Tweak steps to match current test profile

- Reduce severity of Conditioning 4, and increase consistency
- Target higher Shock 1 torque vals if this does not return Shock 1 scoring on discrimination oil
- Potential severity reduction for Shock 2

▪ Pros: maintains historical test profile, more likely to achieve good discrimination

▪ Cons: More complex test profile, maintains polishing from overlapping scored regions



# Test Equipment Information

## Motor

- 250 hp, 3,600 rpm nominal speed
- Requires overspeed to approximately 4,300 rpm

## Energy Absorption (Braking Resistor)

- Custom braking resistor setup from Crohm Resistors
  - Up to 33kW
  - 4.65  $\Omega$



# REFERENCE

# All Operational Data



# Test Number 01-0003, TMC 117 (High Reference Oil)



# Stats—Conditioning 01-0003

Conditioning 1			
Input Torque [ft-lb]		Input Speed [rpm]	
Target	60 ± 5	Target	2363
Avg	60.0	Avg	2360
Min	45.8	Min	2356
Max	75.3	Max	2365

Conditioning 3			
Input Torque [ft-lb]		Input Speed [rpm]	
Target	70 ± 5	Target	3350
Avg	69.8	Avg	3345
Min	56.4	Min	3342
Max	84.9	Max	3350.7

Conditioning 2							
Peak Input Torque Drive [ft-lb]		Peak Input Torque Coast [ft-lb]		Maximum Input Speed [rpm]		Minimum Input Speed [rpm]	
Target		Target		Target	2365	Target	1582
Avg	113.0	Avg	-62.9	Avg	2366	Avg	1581
Min	110.9	Min	-66.7	Min	2364	Min	1581
Max	115.6	Max	-60.9	Max	2367	Max	1582

Conditioning 4							
Peak Input Torque Drive [ft-lb]		Peak Input Torque Coast [ft-lb]		Maximum Input Speed [rpm]		Minimum Input Speed [rpm]	
Target		Target		Target	3353	Target	2754
Avg	101.3	Avg	-67.1	Avg	3353	Avg	2753
Min	114.5	Min	-72.9	Min	3352	Min	2752
Max	115.5	Max	-56.9	Max	3355	Max	2754





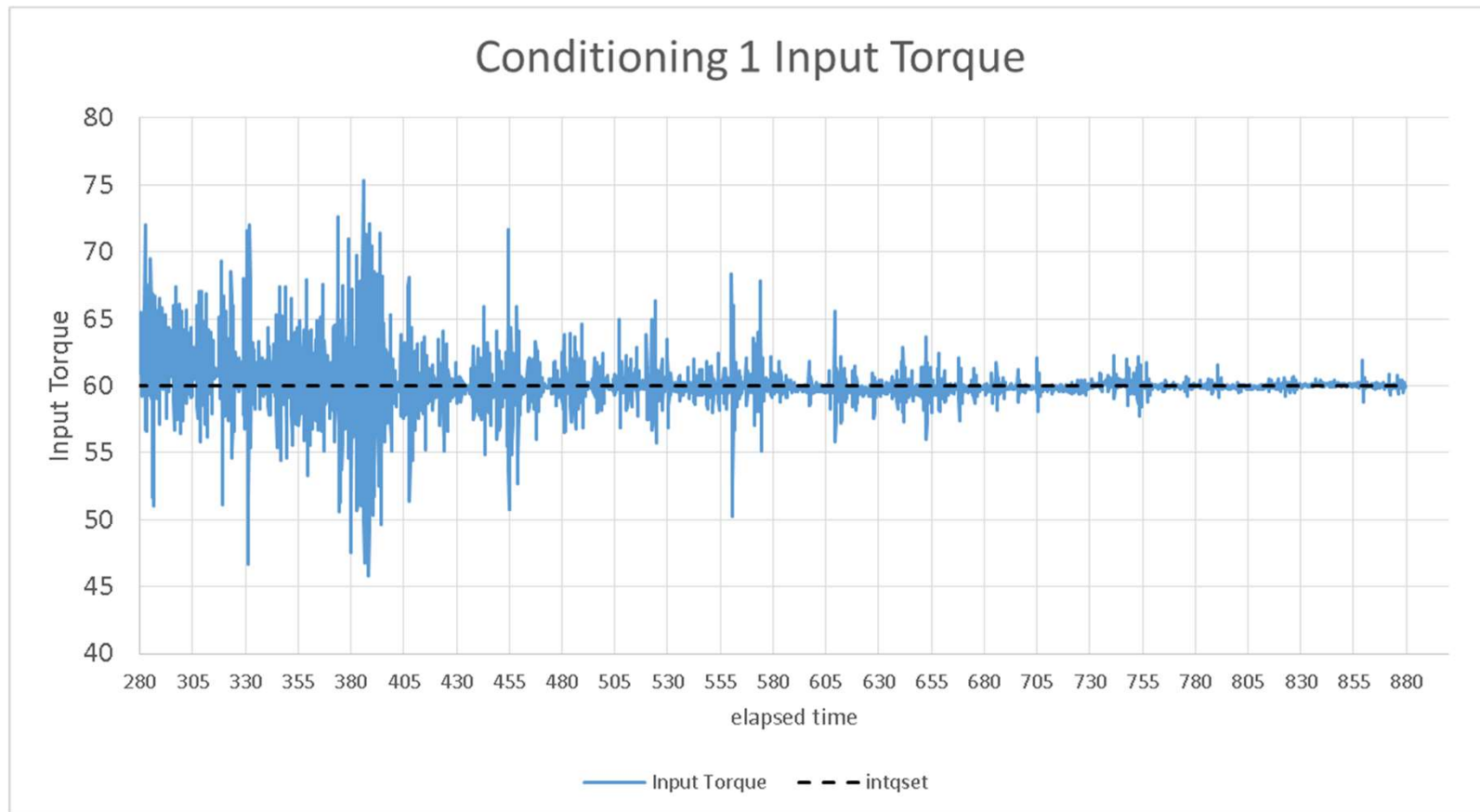
# Stats—Shocks 01-0003

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	233.9	Avg	-63.4	Avg	4350	Avg	2191
Min	233.0	Min	-76.7	Min	4348	Min	2173
Max	236.4	Max	-58.4	Max	4353	Max	2196

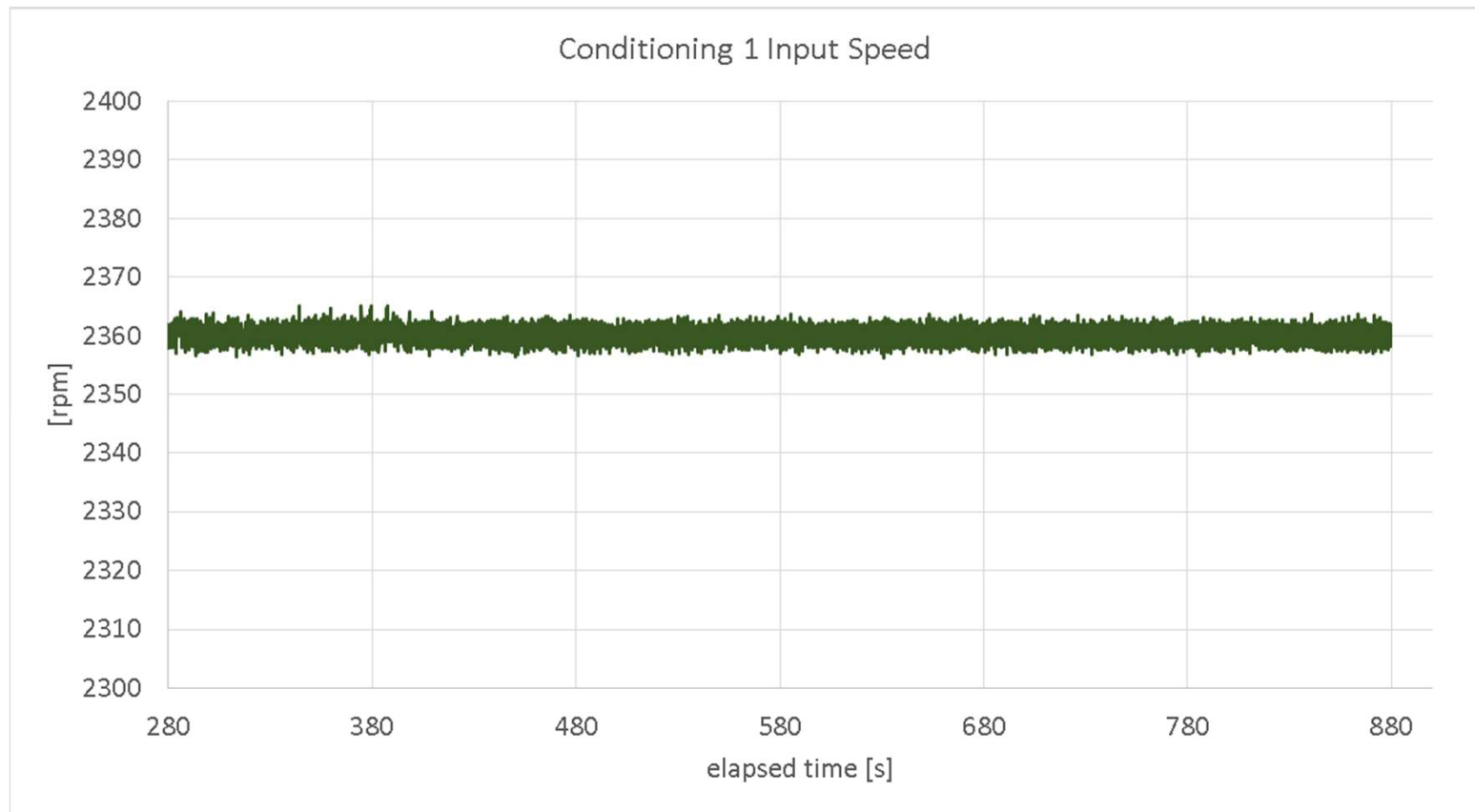
Shock 2							
Peak Input Torque Drive [ft-lb]		Peak Input Torque Coast [ft-lb]		Maximum Input Speed [rpm]		Minimum Input Speed [rpm]	
<i>Target</i>		<i>Target</i>		<i>Target</i>	3068	<i>Target</i>	2178
Avg	225.8	Avg	-229.5	Avg	3075	Avg	2169
Min	224.5	Min	-233.0	Min	3074	Min	2168
Max	228.8	Max	-217.3	Max	3076	Max	2171



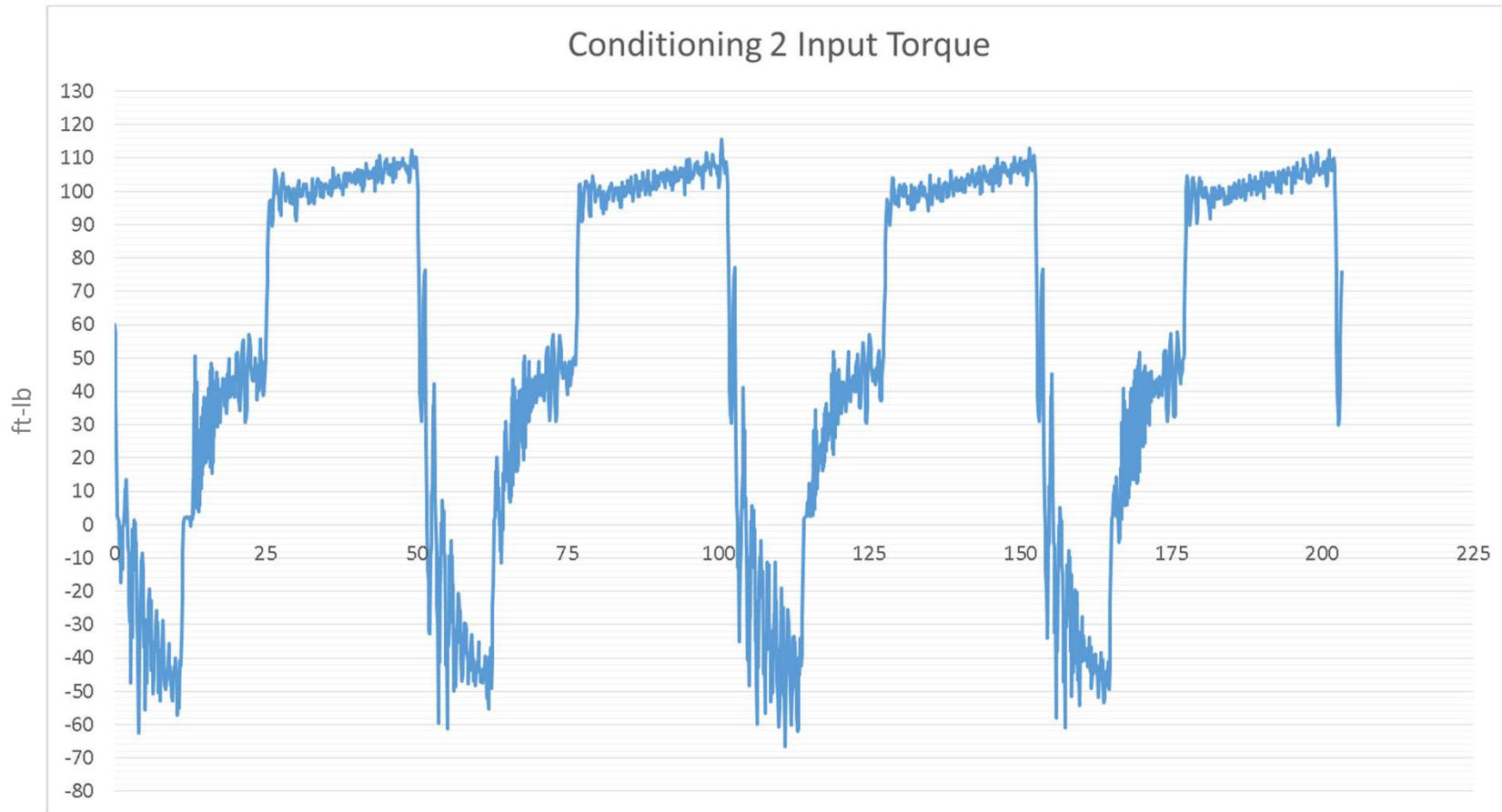
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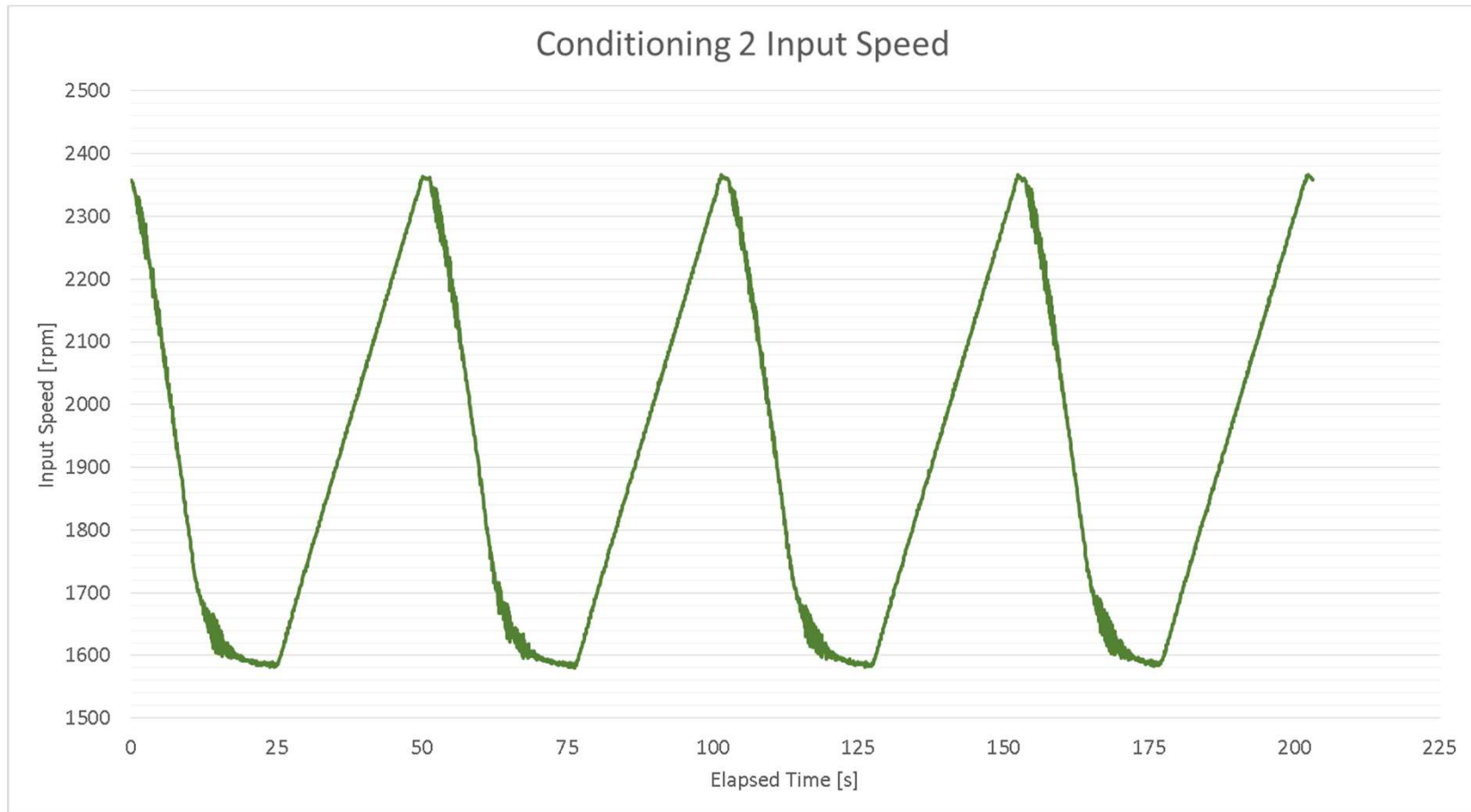
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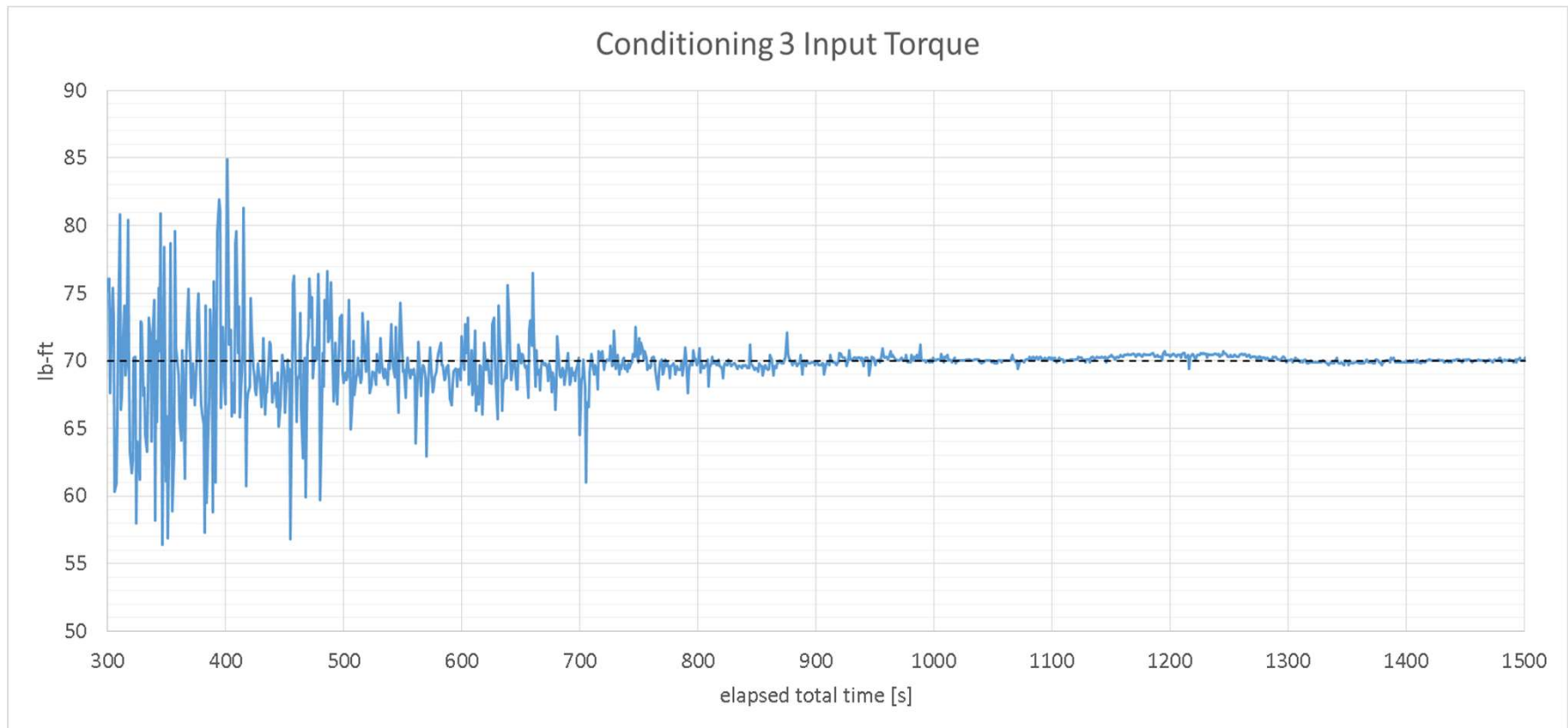
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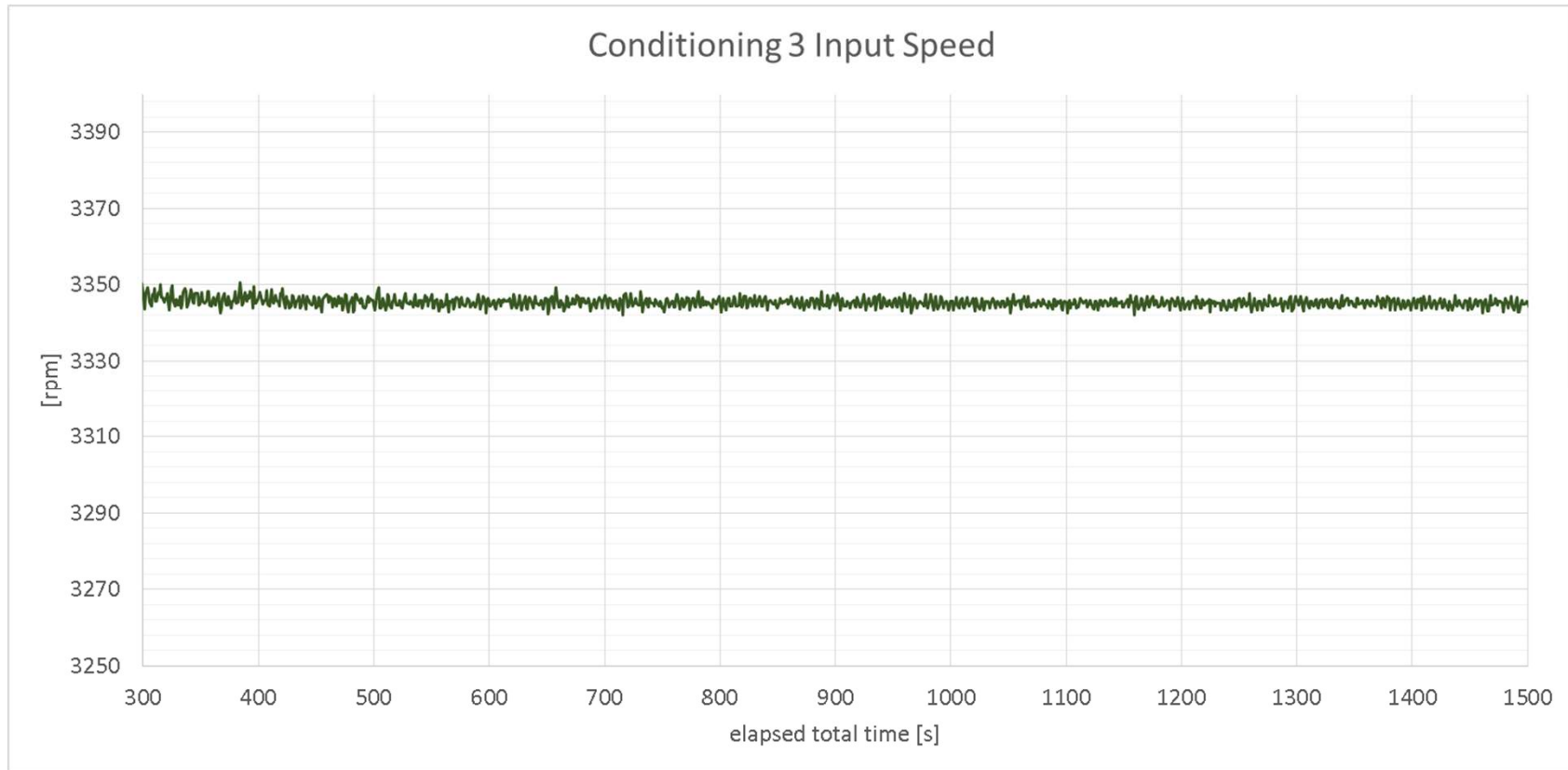
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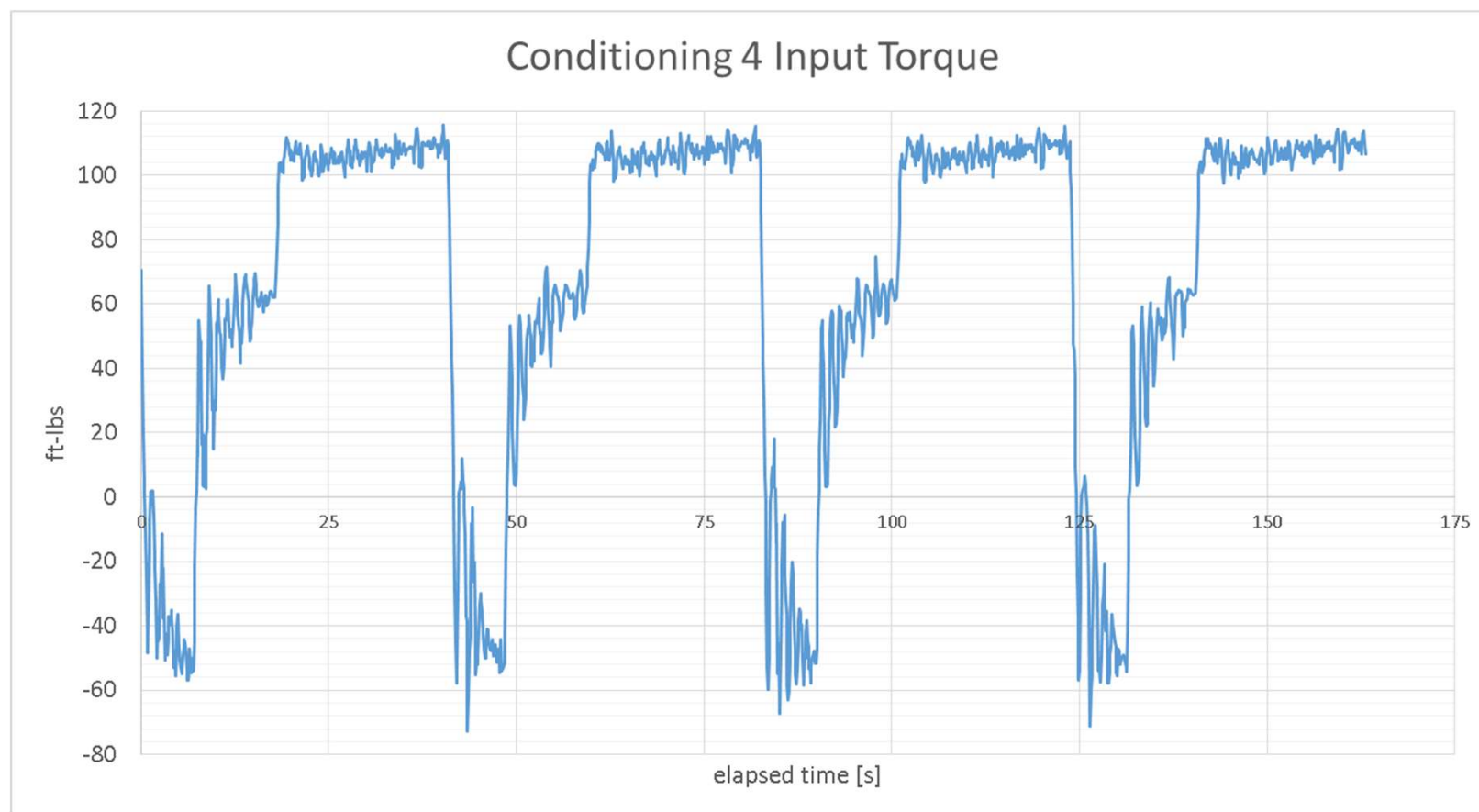
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# Conditioning 3—01-0003

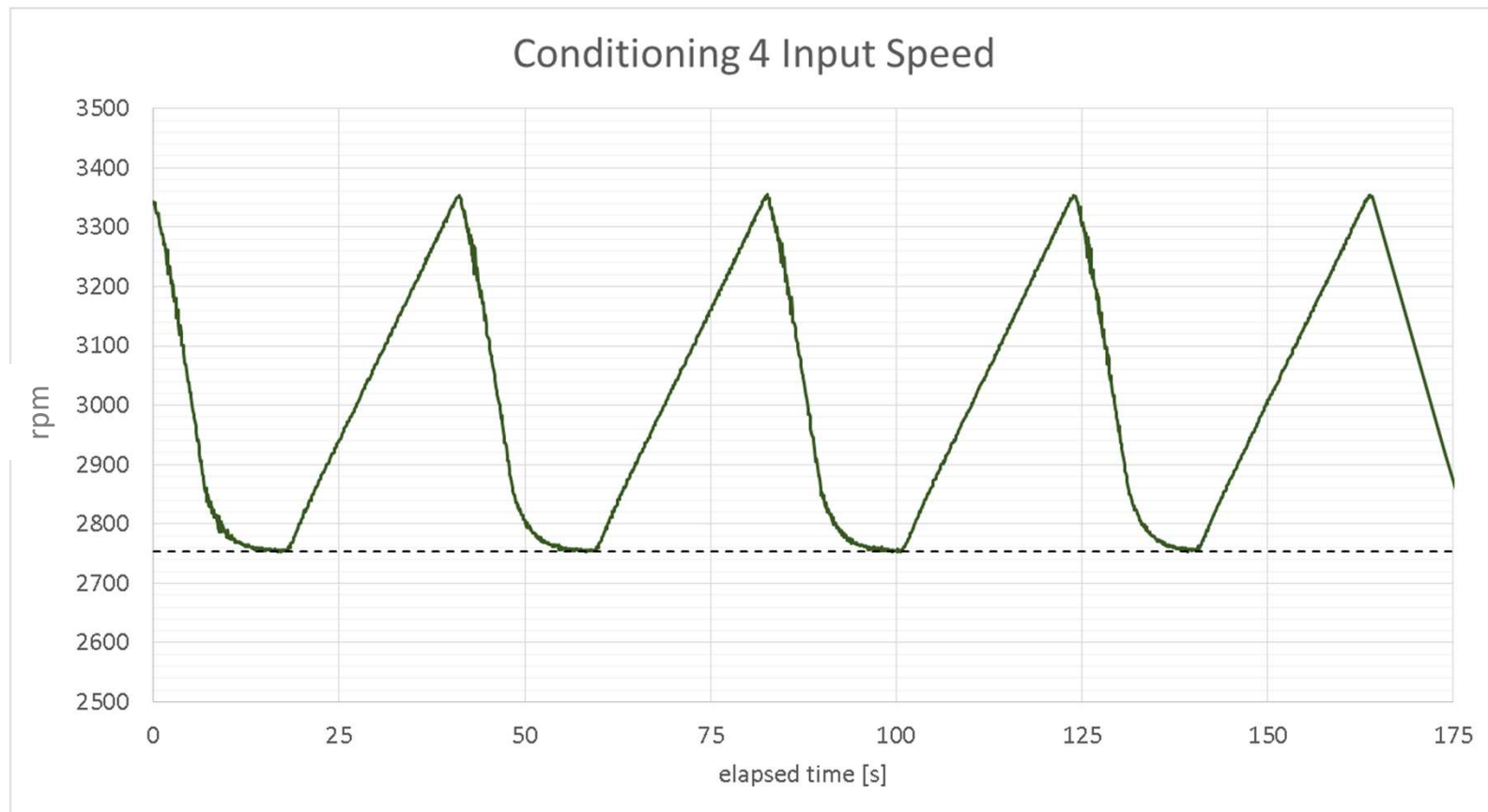


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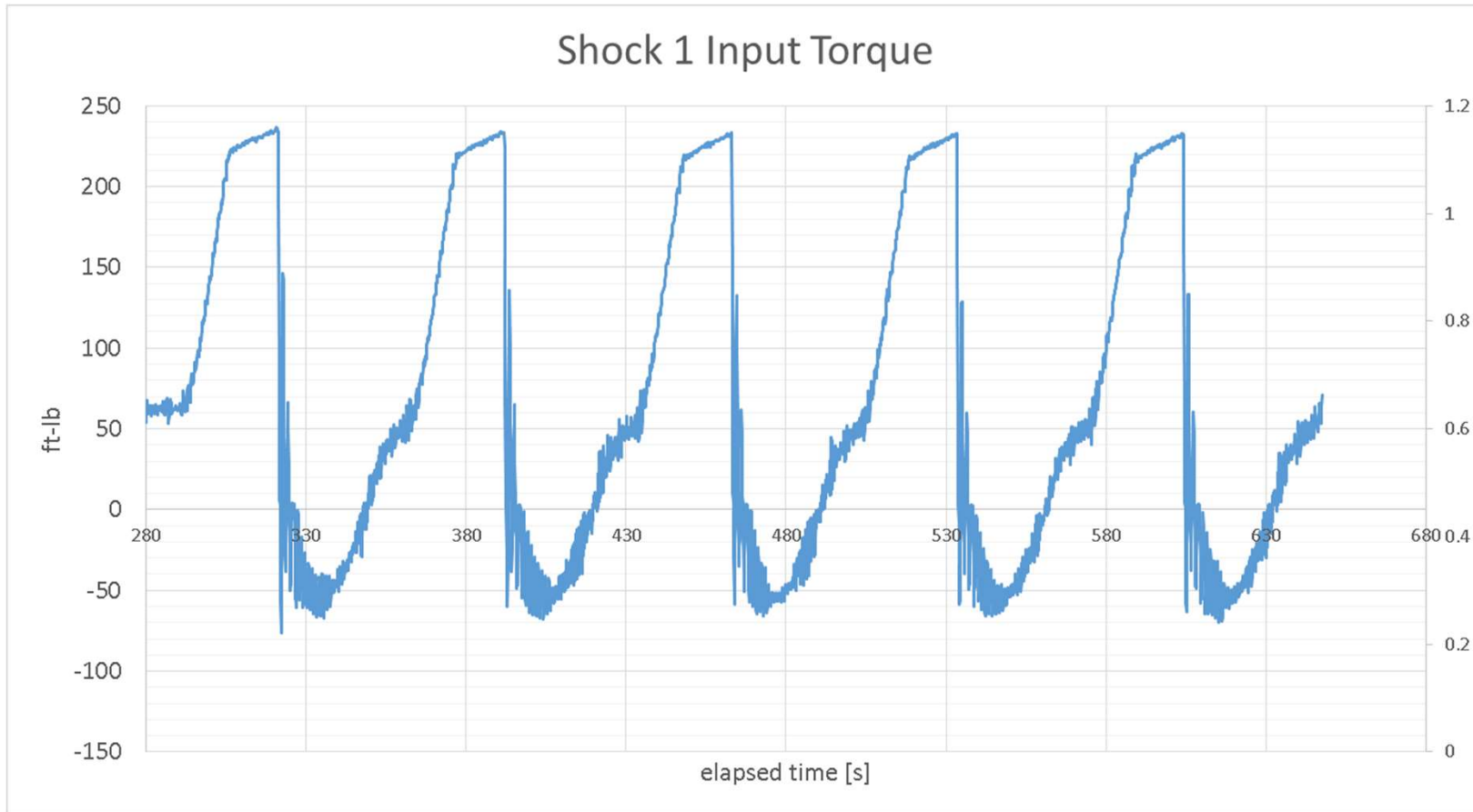




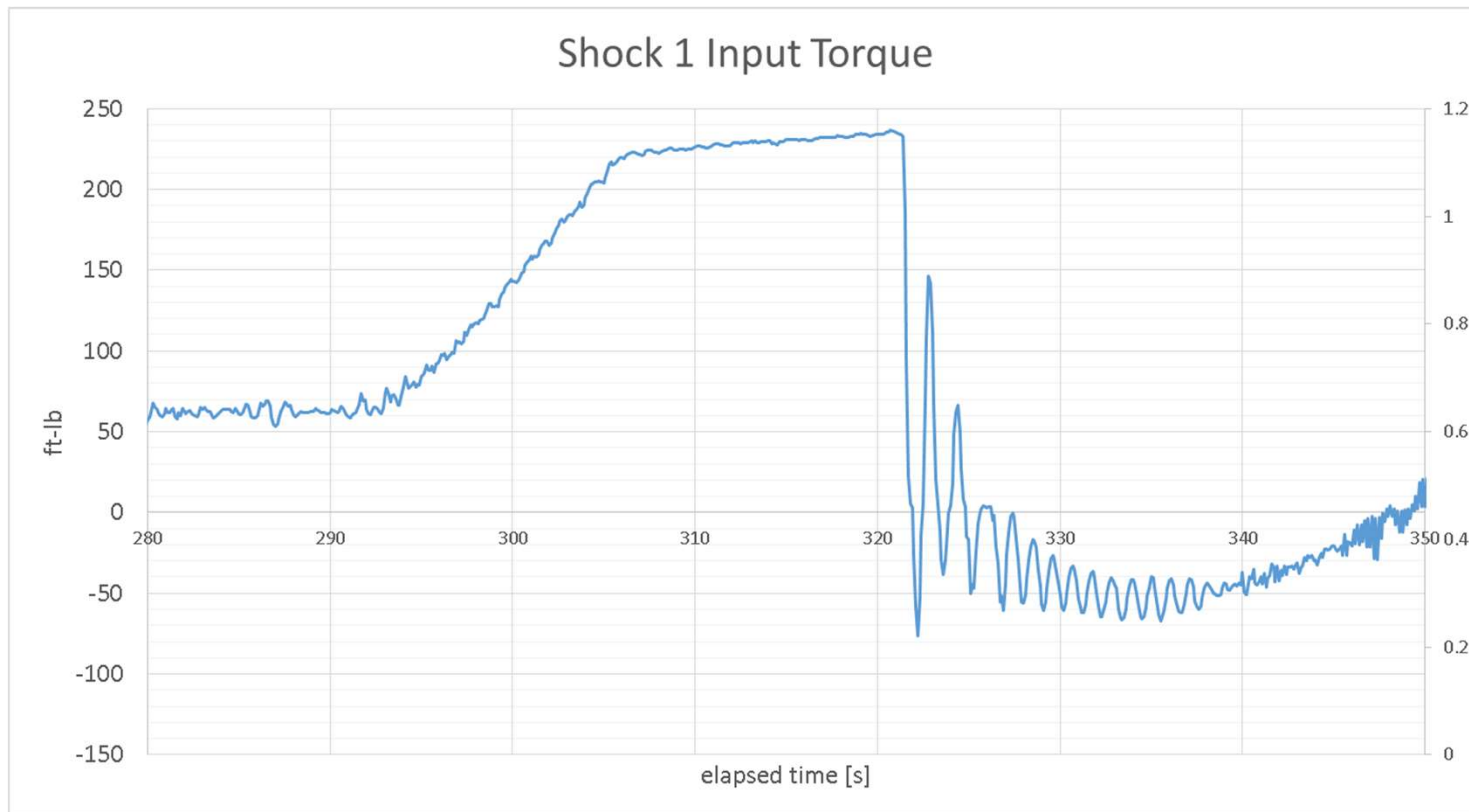
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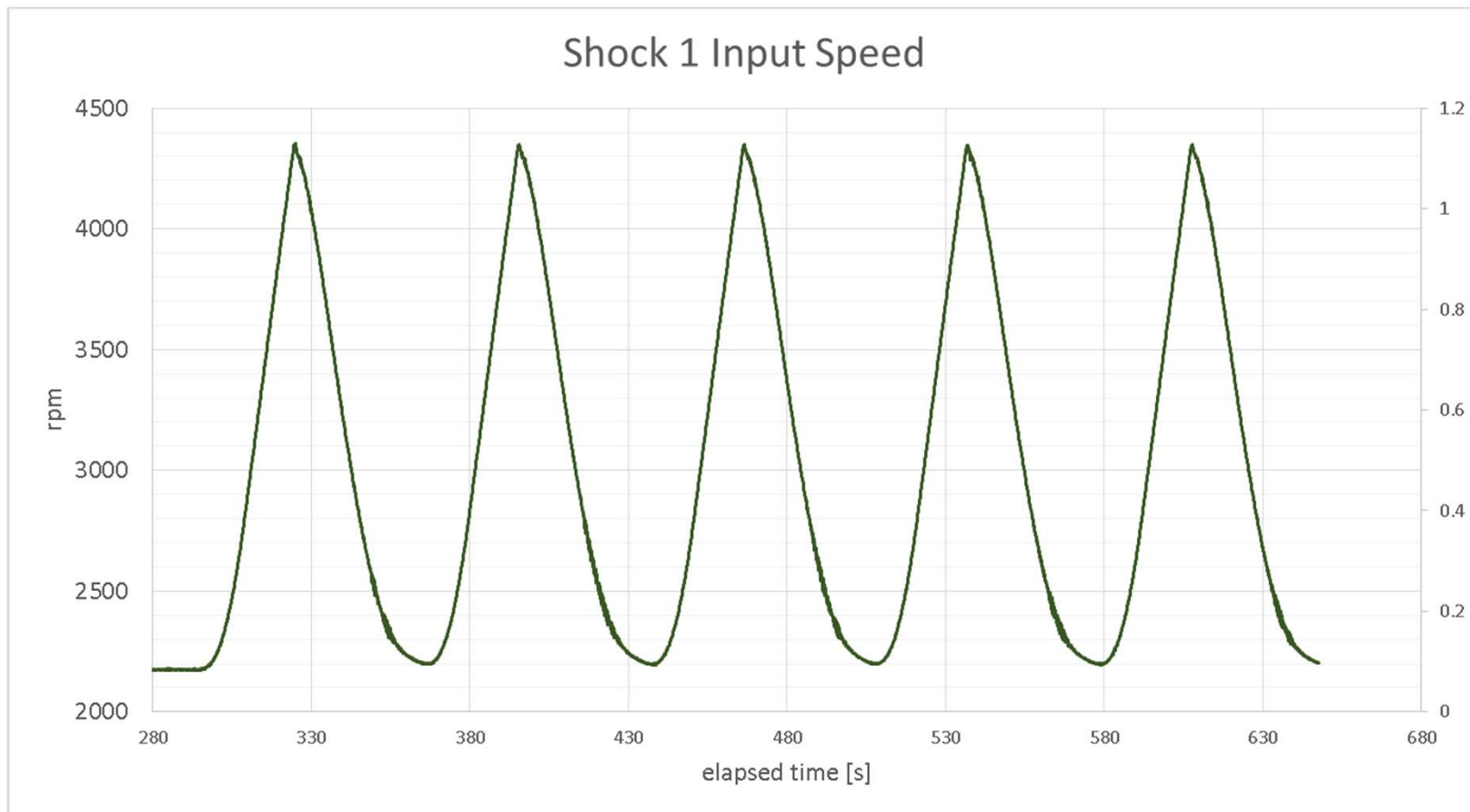
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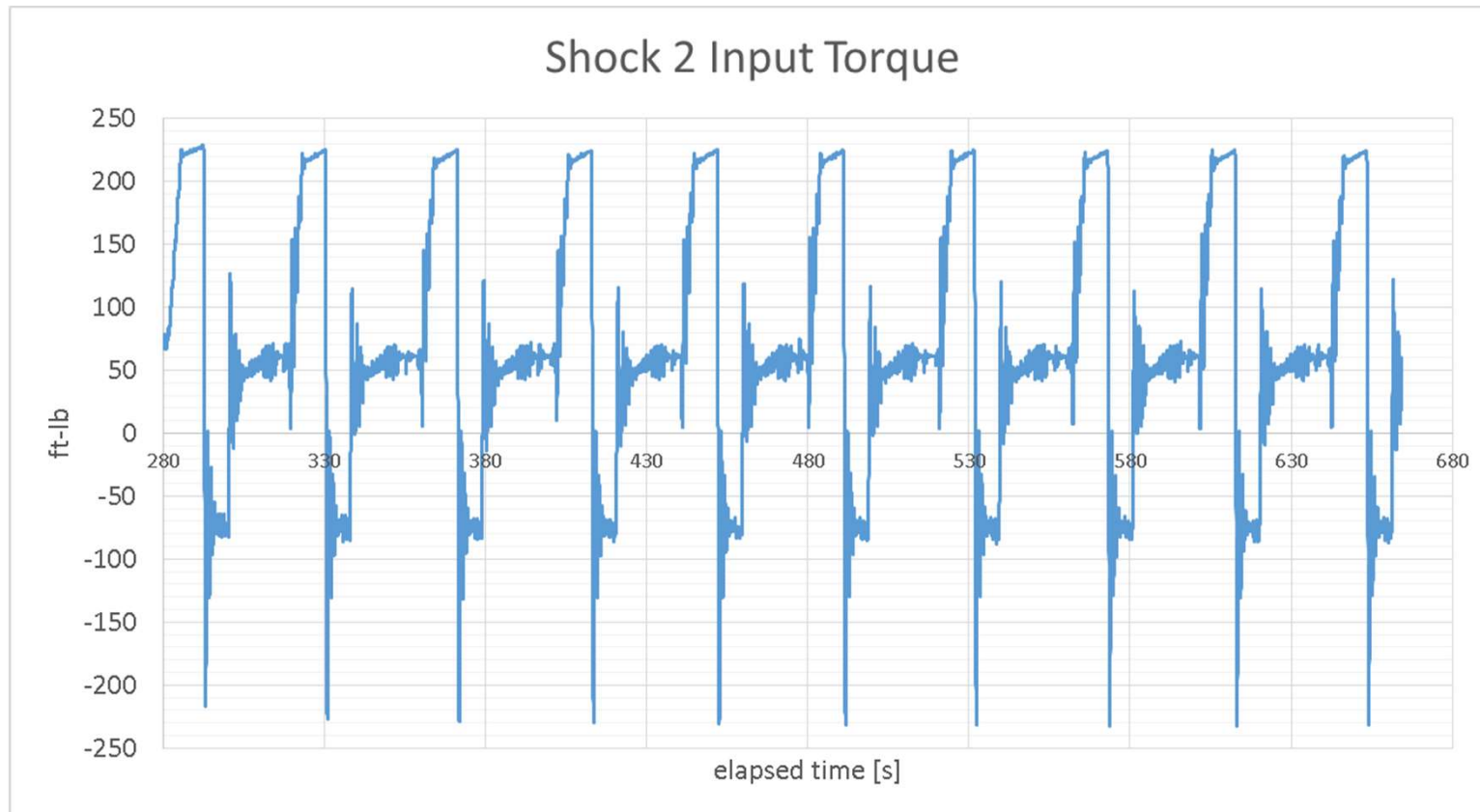
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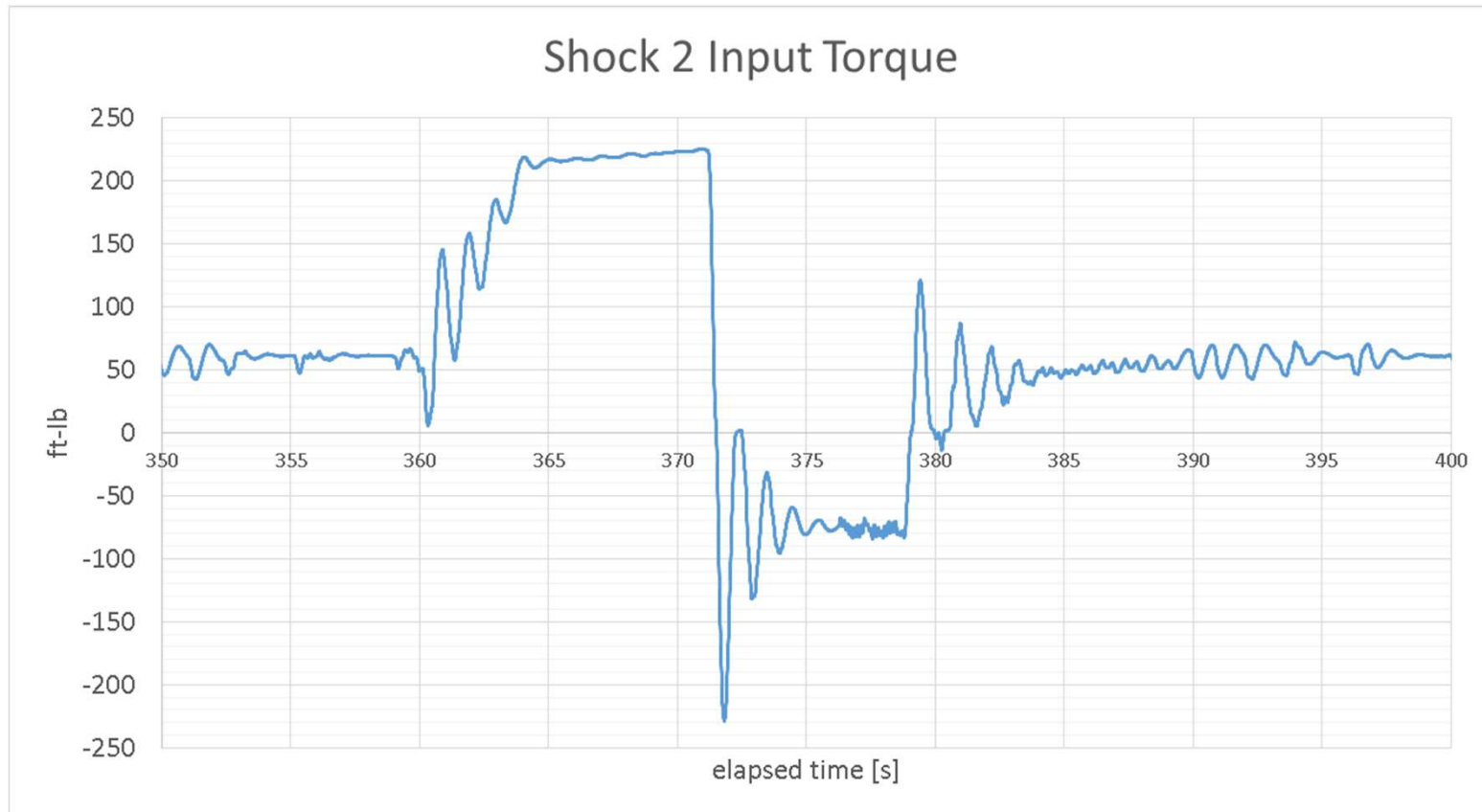
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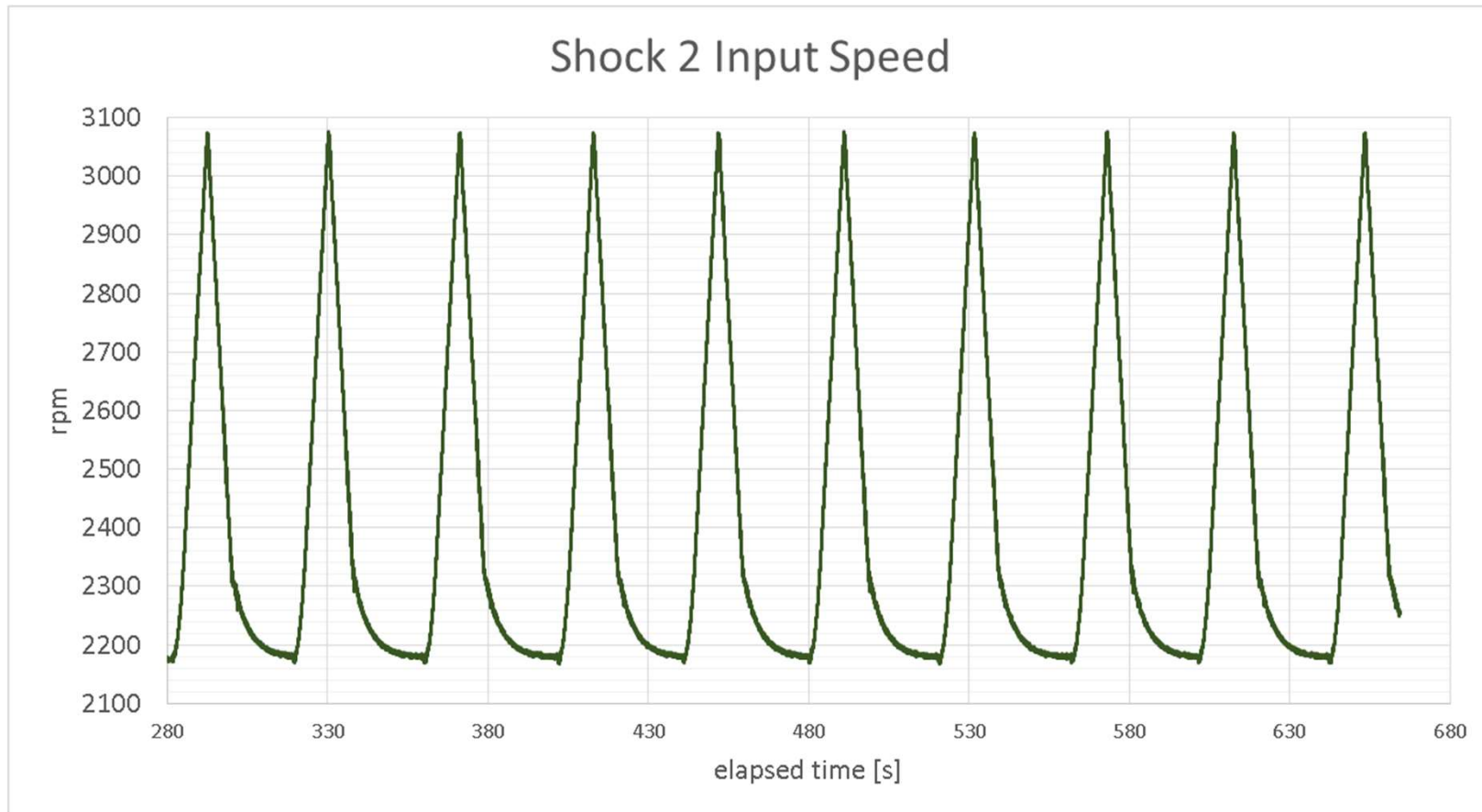
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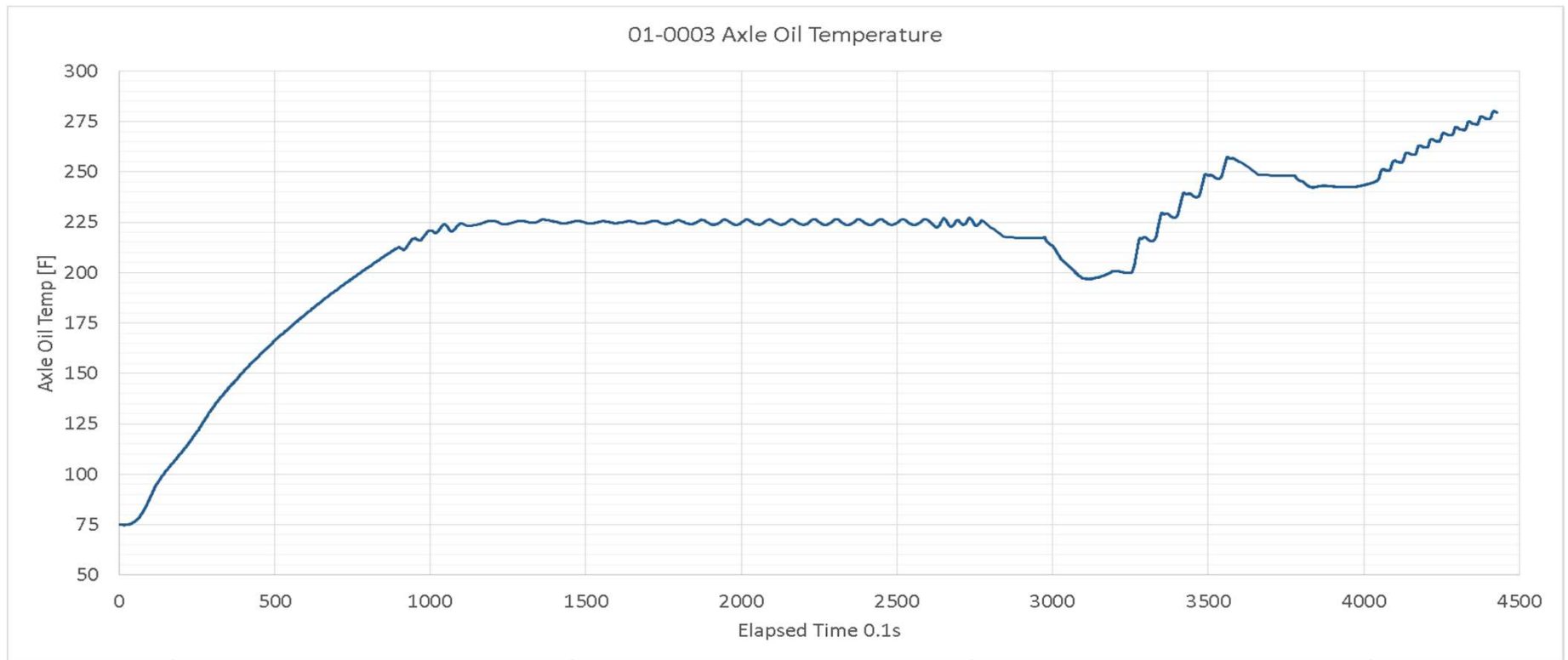
# Shock 2—01-0003



# Shock 2—01-0003



# Temperature Plot—01-0003



Phase	Min Temp	Max Temp
Shock 1	200.1	257.1
Shock 2	246.4	279.8



# Test Number 01-0004, TMC 113 (Discrimination Oil)



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# Stats—Conditioning 0 I-0004

Conditioning 1			
Input Torque [ft-lb]		Input Speed [rpm]	
Target	60 ± 5	Target	2363
Avg	60.0	Avg	2360
Min	58.5	Min	2356
Max	62.2	Max	2364

Conditioning 3			
Input Torque [ft-lb]		Input Speed [rpm]	
Target	70 ± 5	Target	3350
Avg	69.9	Avg	3346
Min	49.7	Min	3342.6
Max	86.4	Max	3350.8

Conditioning 2							
Peak Input Torque Drive [ft-lb]		Peak Input Torque Coast [ft-lb]		Maximum Input Speed [rpm]		Minimum Input Speed [rpm]	
Target		Target		Target	2352	Target	1582
Avg	111.3	Avg	-59.9	Avg	2364	Avg	1581
Min	110.9	Min	-61	Min	2364	Min	1581
Max	112.2	Max	-58.4	Max	2365	Max	1582

Conditioning 4							
Peak Input Torque Drive [ft-lb]		Peak Input Torque Coast [ft-lb]		Maximum Input Speed [rpm]		Minimum Input Speed [rpm]	
Target		Target		Target	3350	Target	2754
Avg	100.5	Avg	-66.7	Avg	3353	Avg	2753
Min	113.8	Min	-74.0	Min	3352	Min	2752
Max	114.5	Max	-57.9	Max	3354	Max	2753



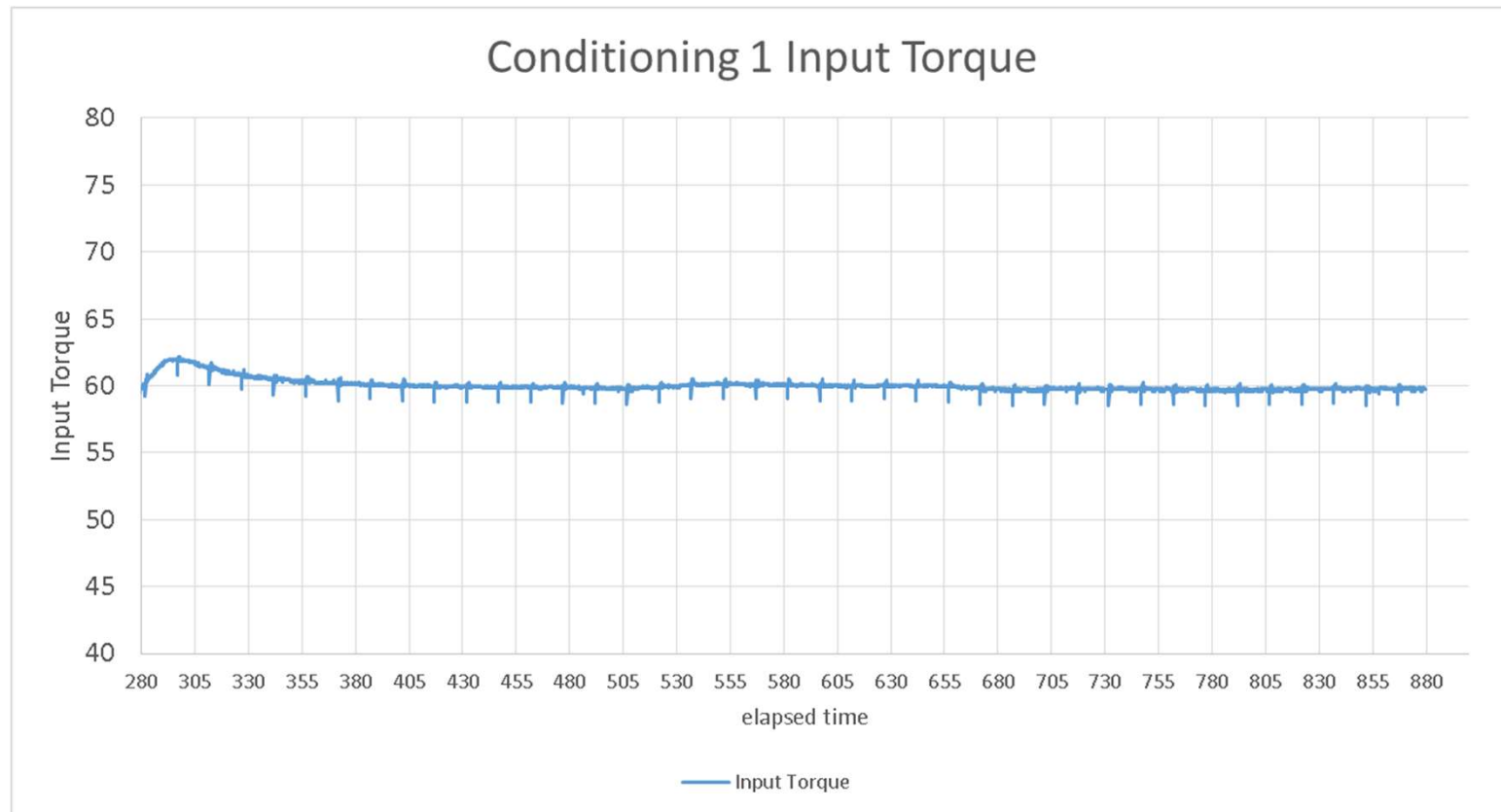
# Stats—Shocks 01-0004

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	235.7	Avg	-59.0	Avg	4350	Avg	2191
Min	234.8	Min	-72.3	Min	4349	Min	2173
Max	237.3	Max	-52.9	Max	4353	Max	2197

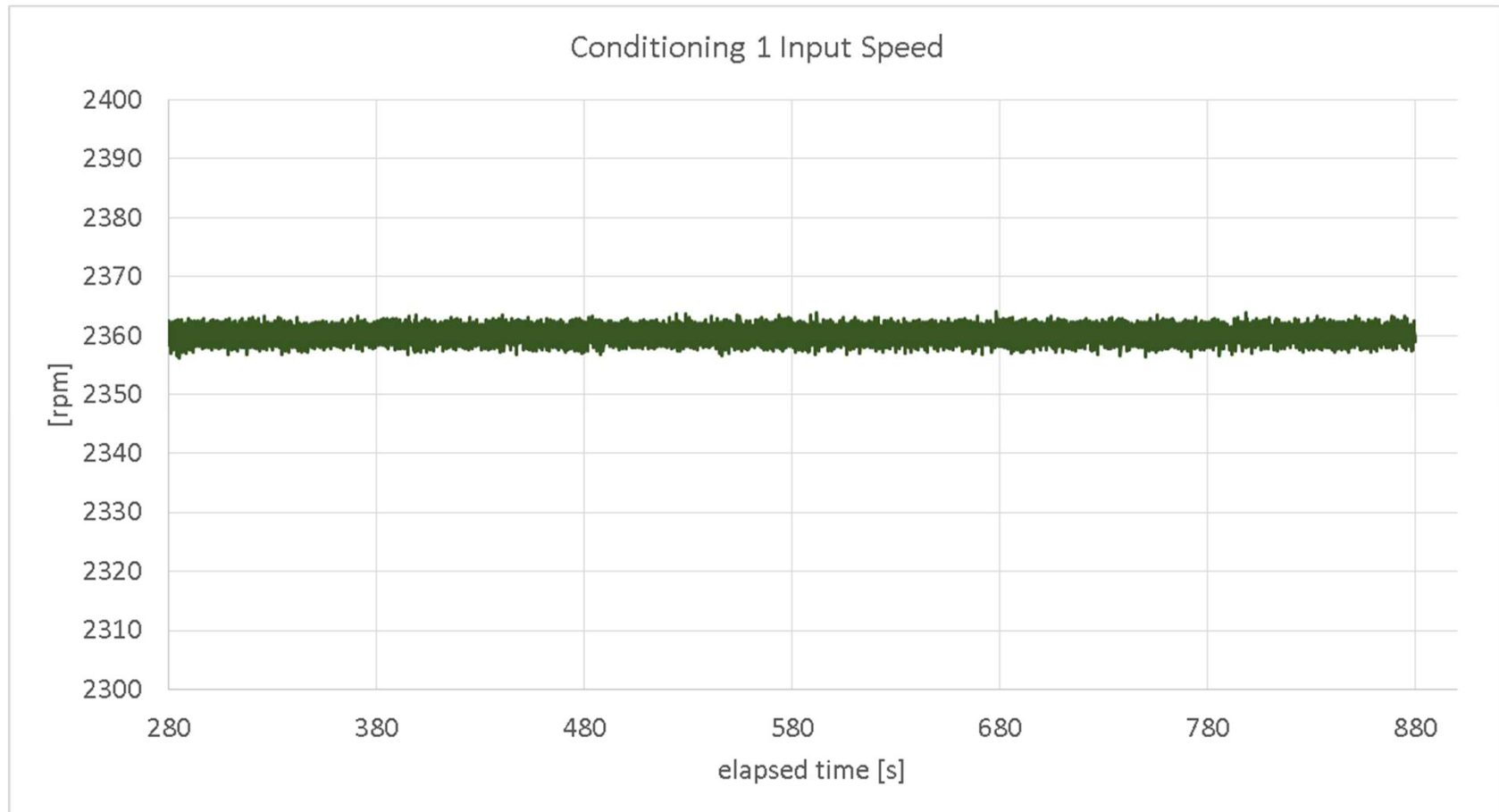
Shock 2							
Peak Input Torque Drive [ft-lb]		Peak Input Torque Coast [ft-lb]		Maximum Input Speed [rpm]		Minimum Input Speed [rpm]	
<i>Target</i>		<i>Target</i>		<i>Target</i>	3068	<i>Target</i>	2178
Avg	227.0	Avg	-224.0	Avg	3078	Avg	2169
Min	225.2	Min	-228.5	Min	3072	Min	2166
Max	229.3	Max	-212.2	Max	3086	Max	2172



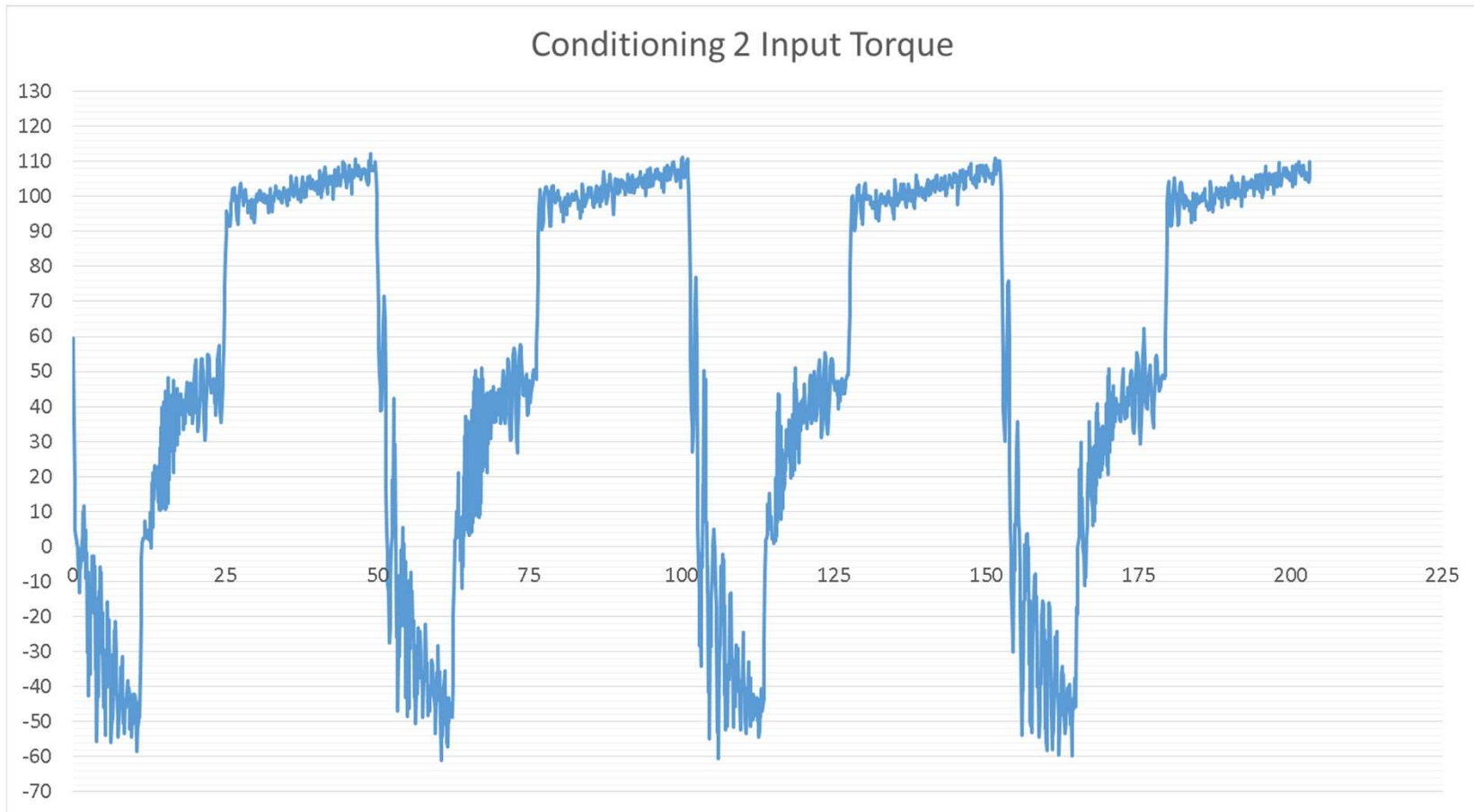
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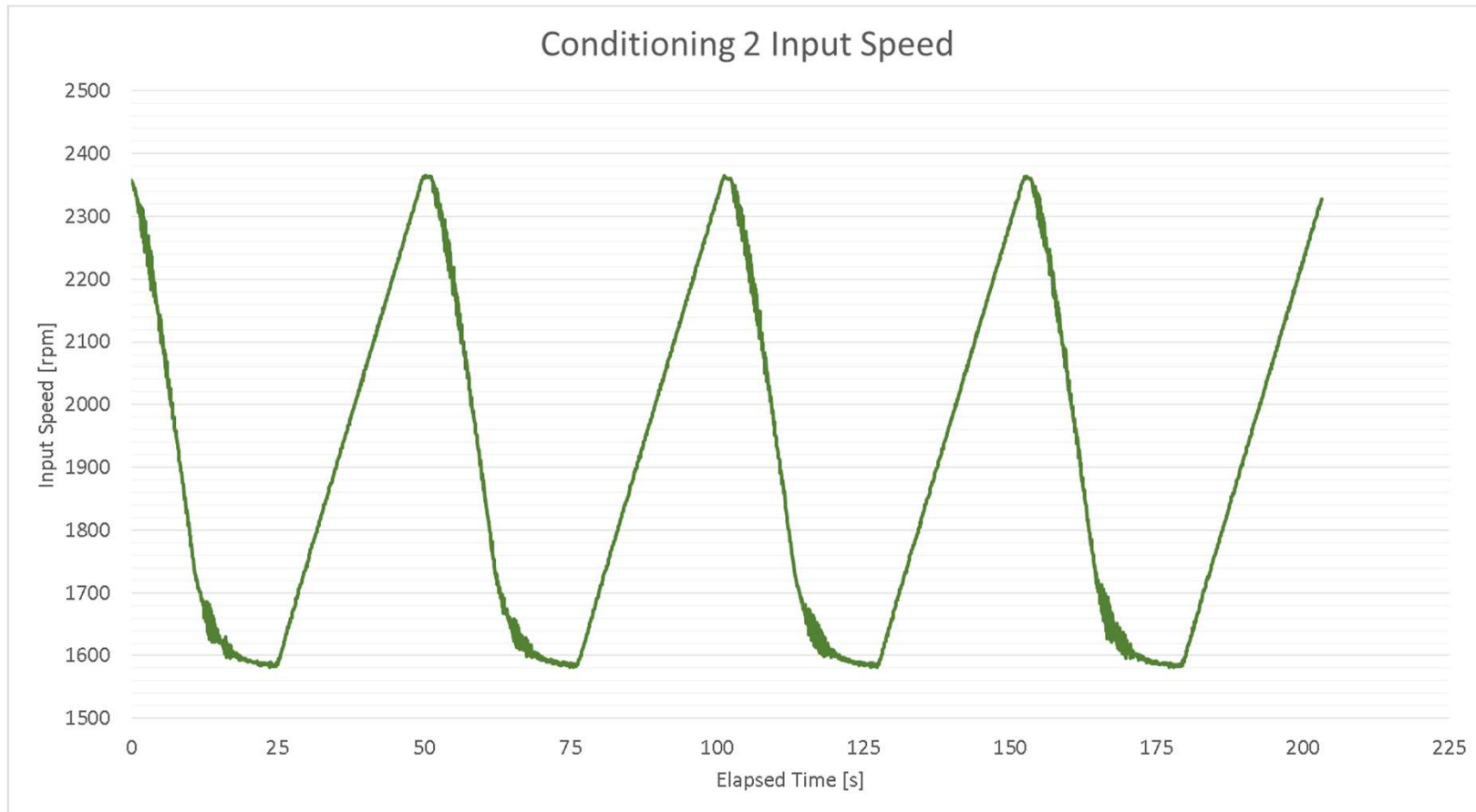
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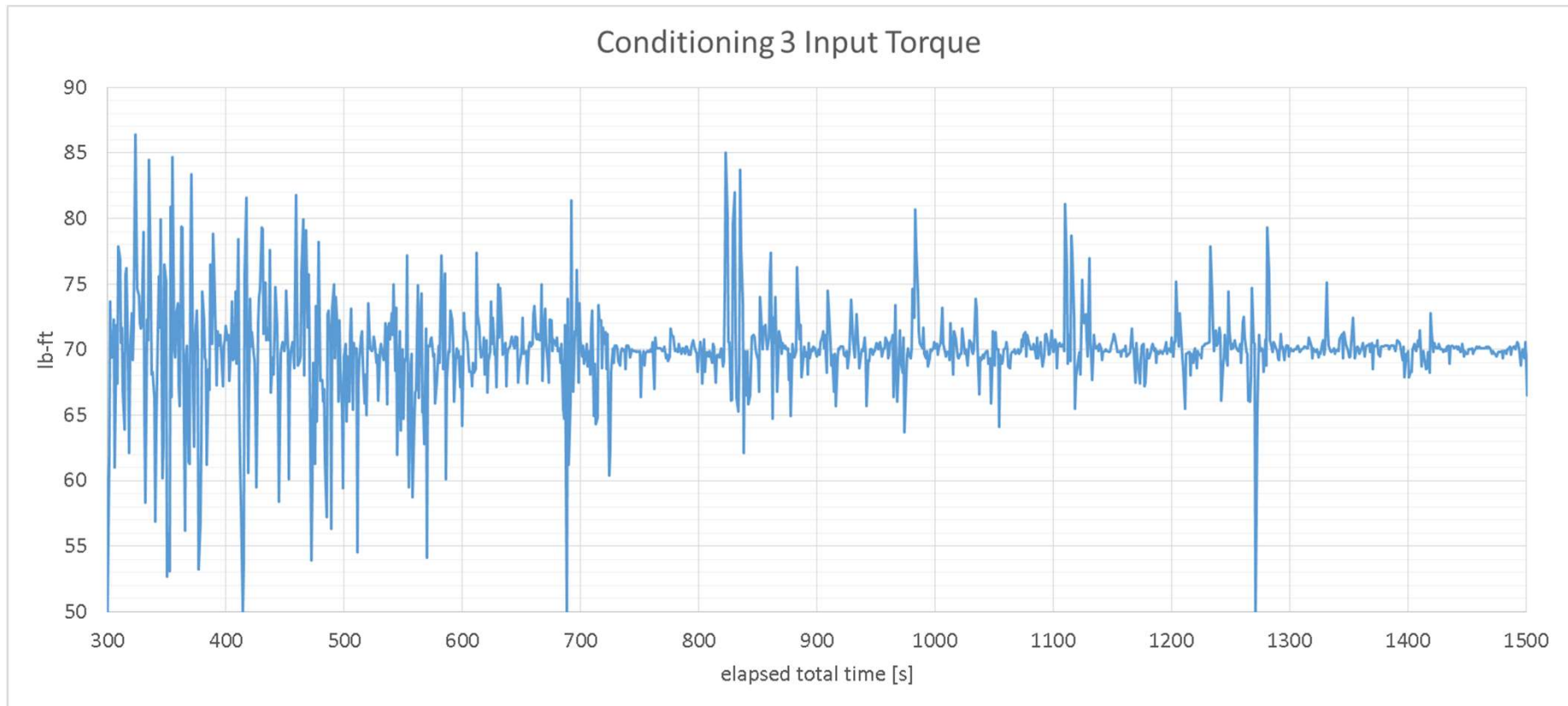
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# Conditioning 2—01-0004

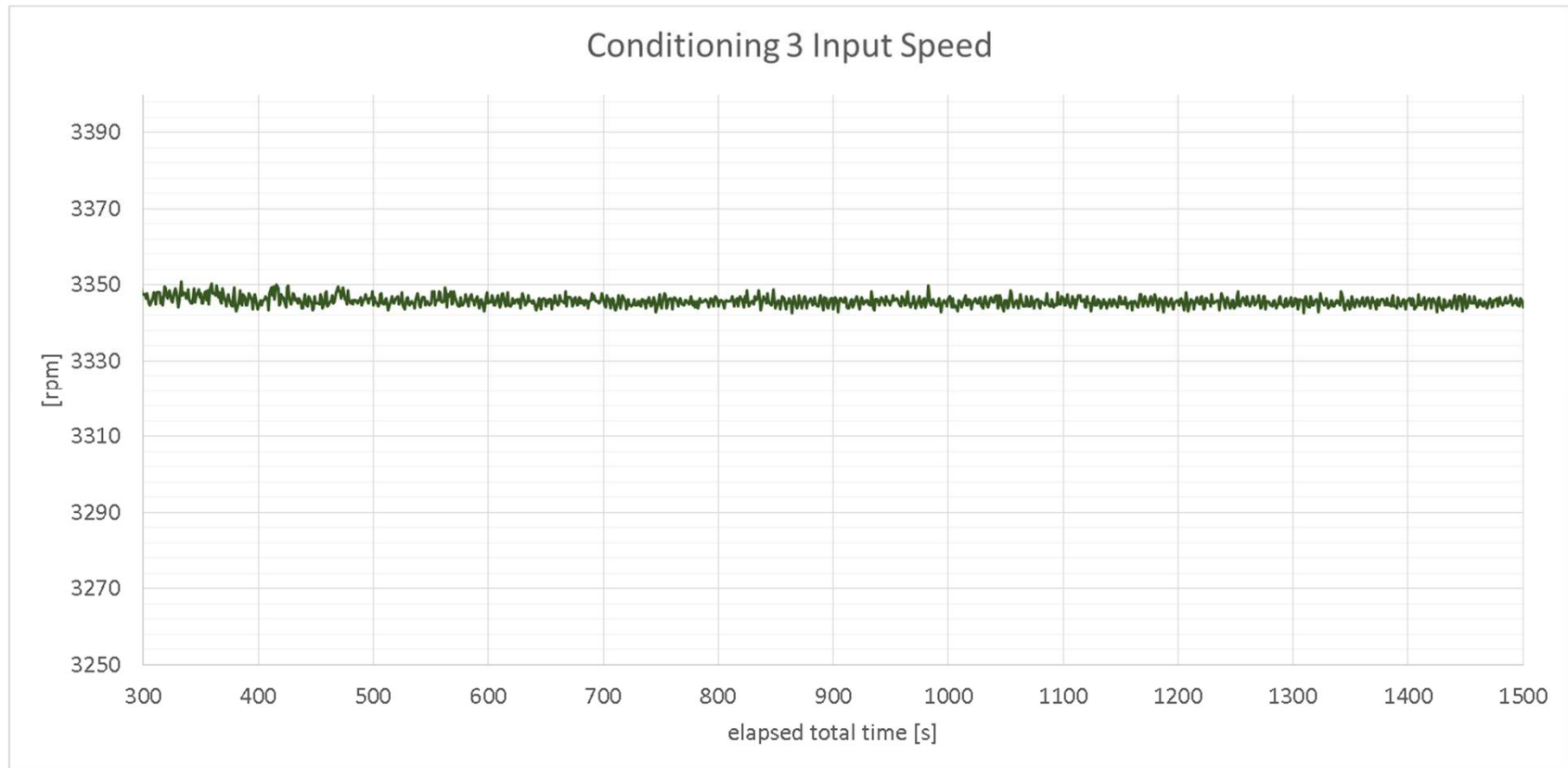


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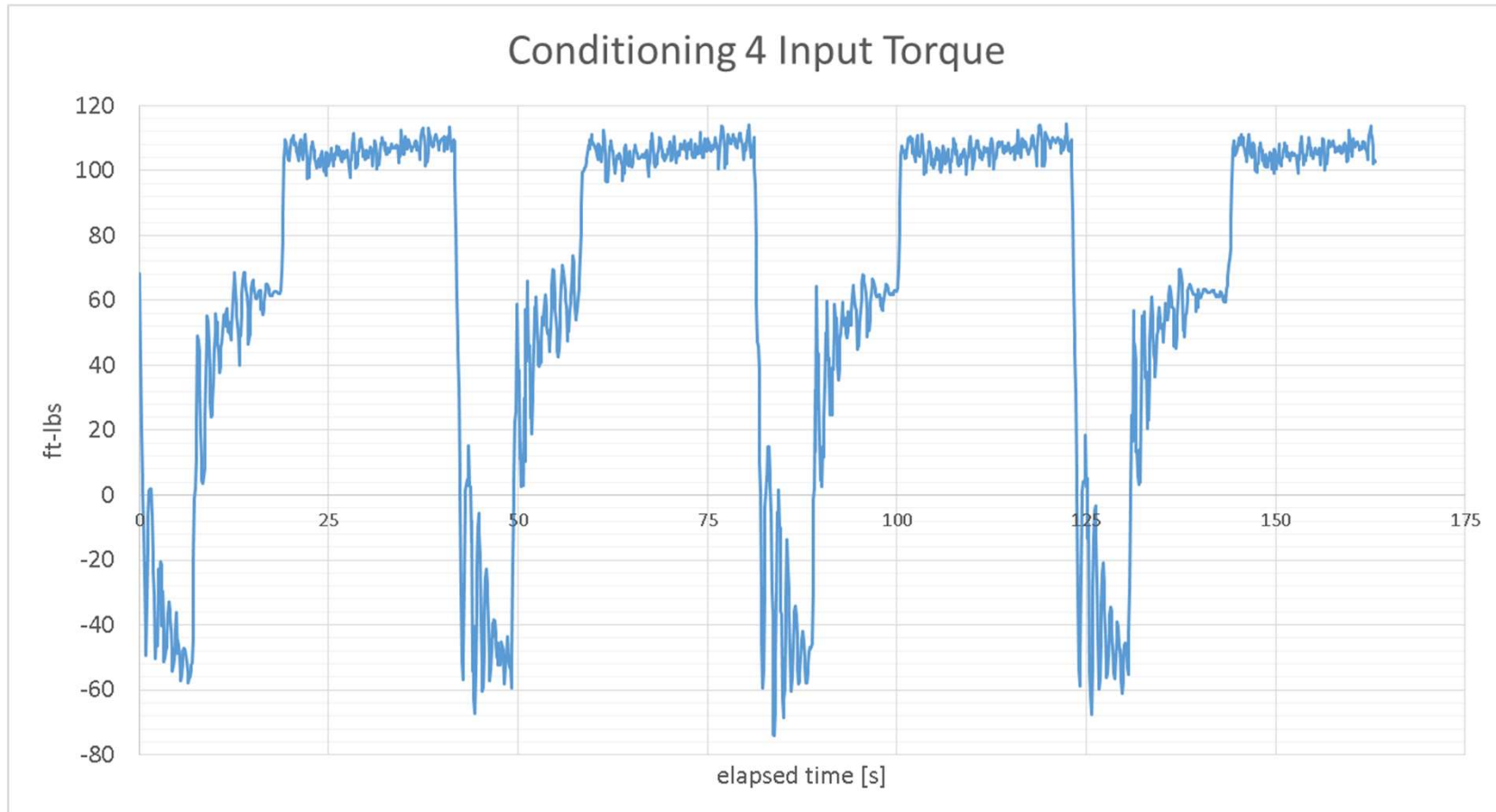




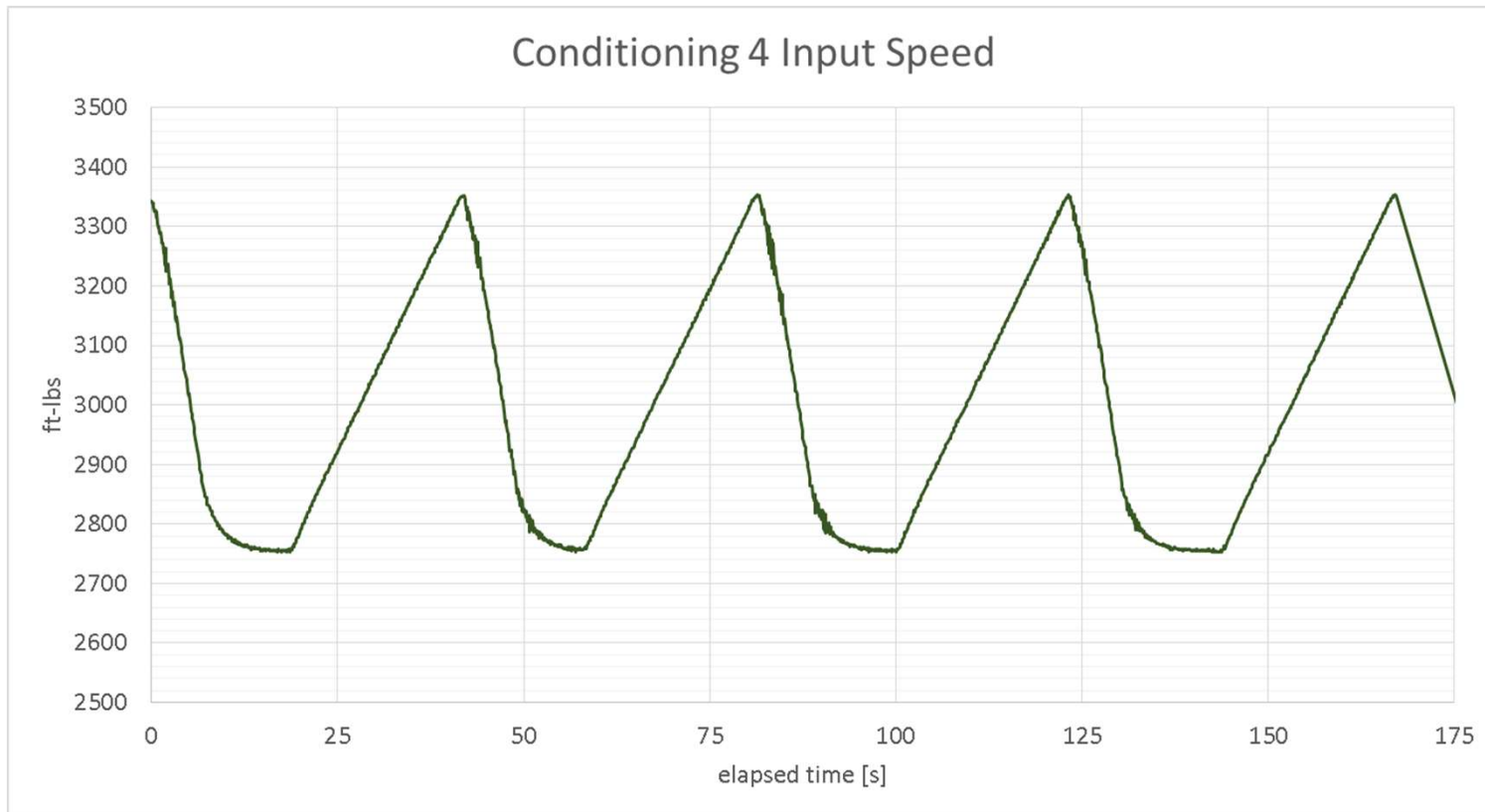
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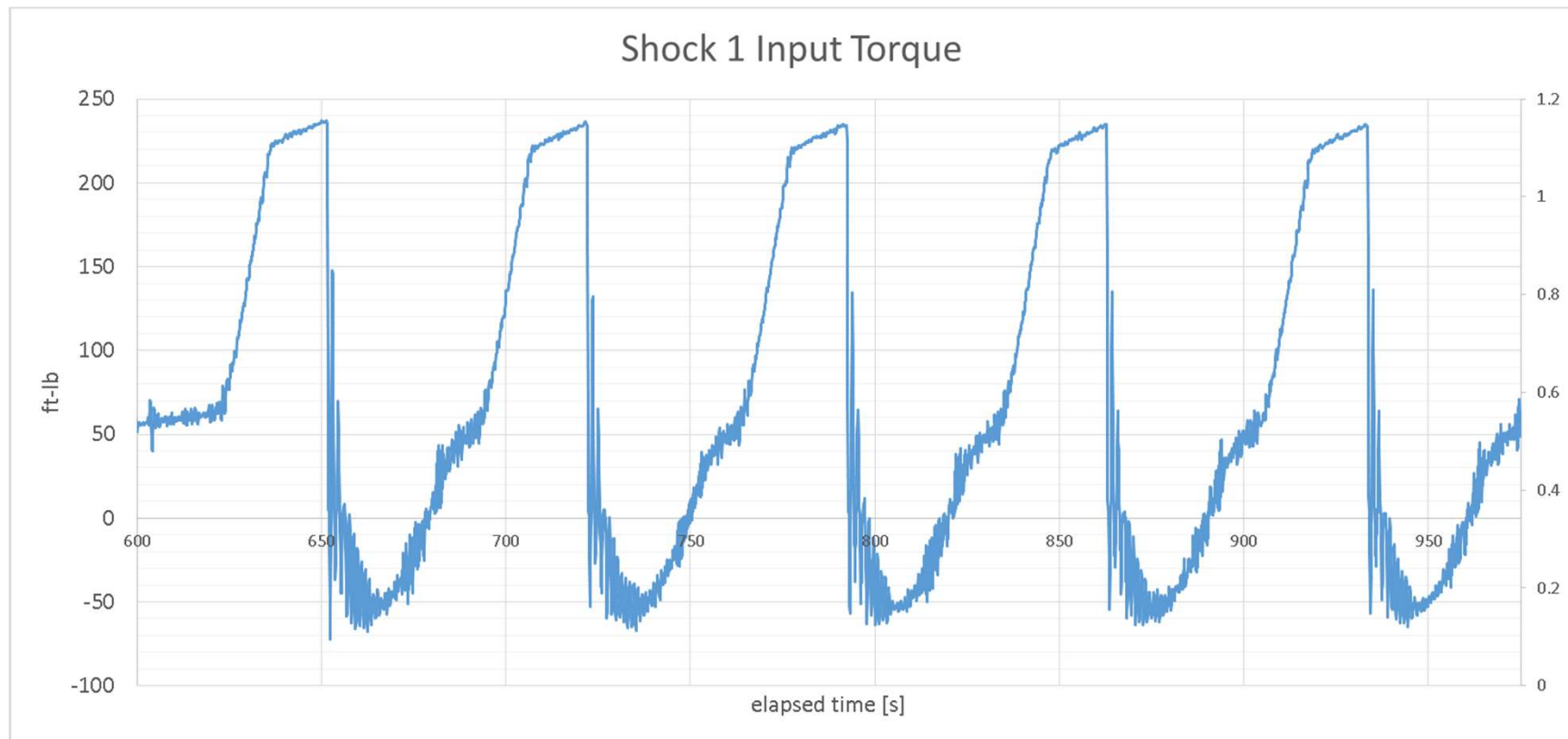
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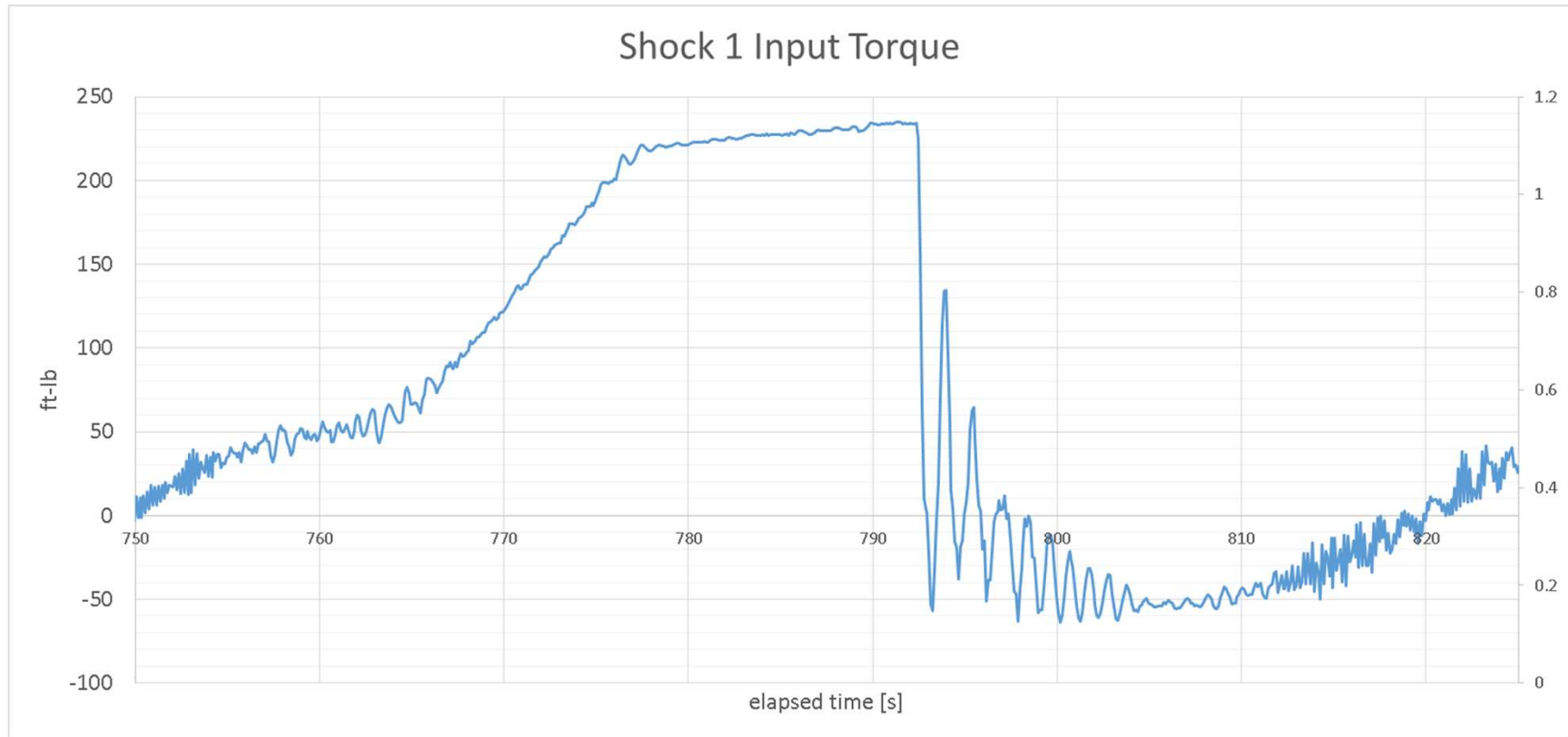
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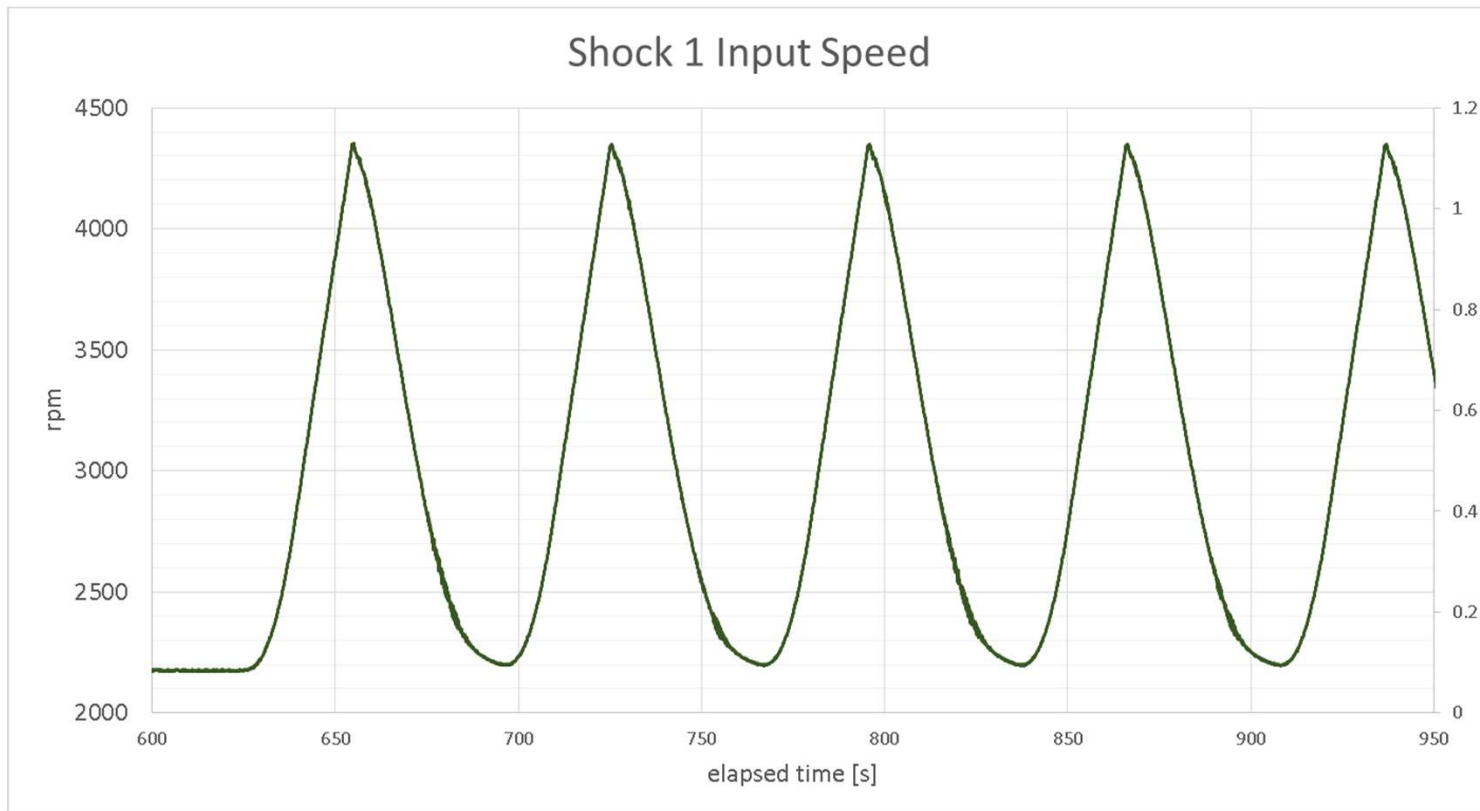
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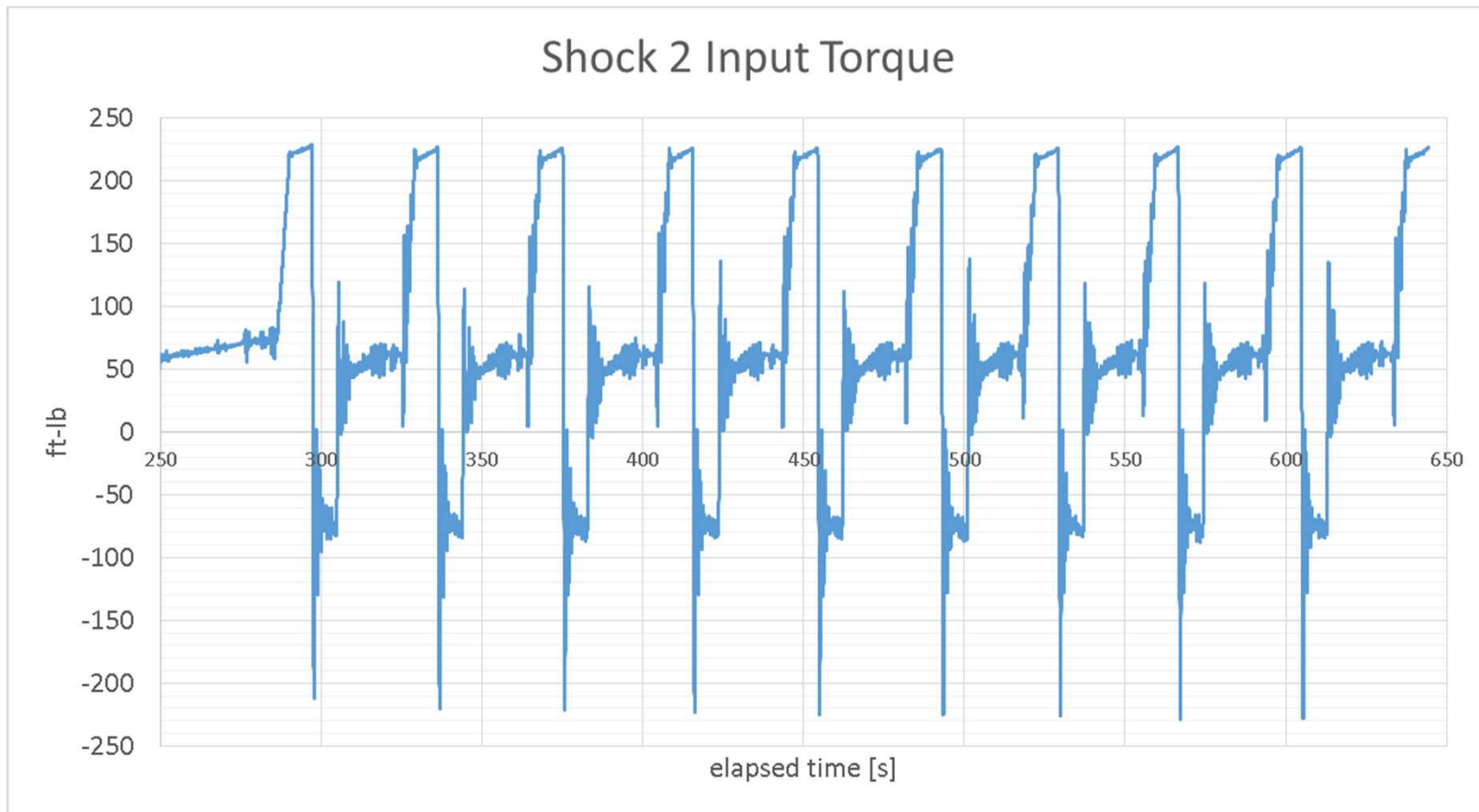
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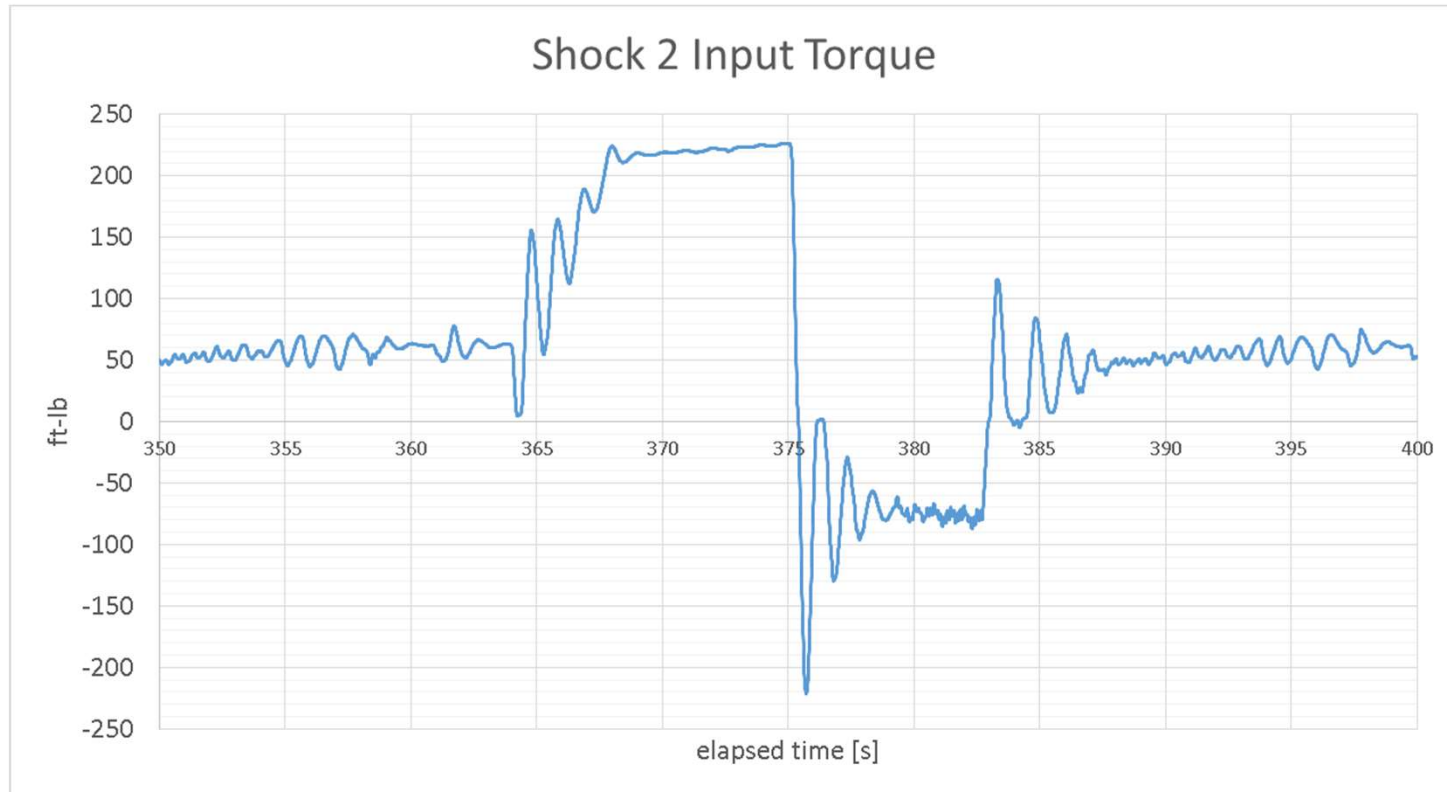
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# Shock 2—01-0004

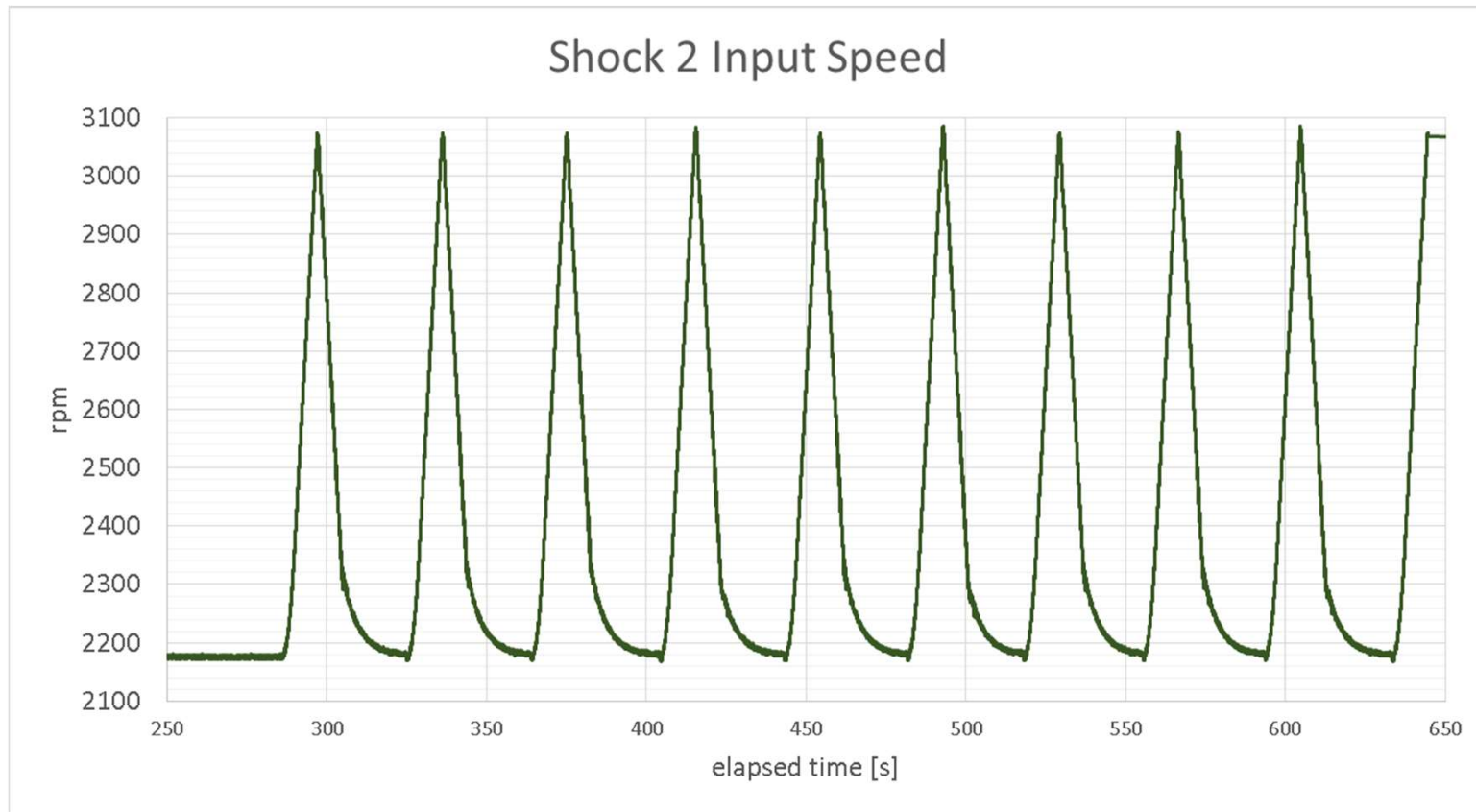


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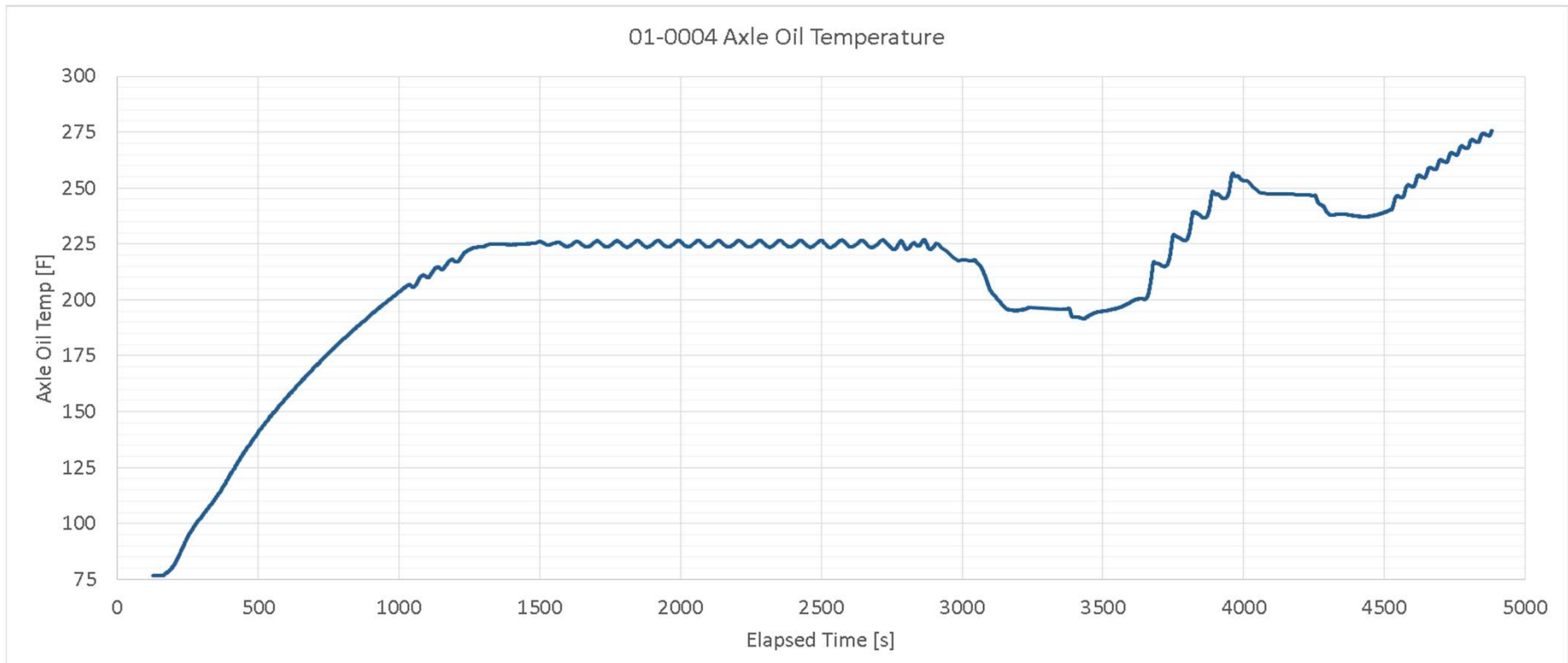




# Shock 2—01-0004



# Temperature Plot—01-0004



Phase	Min Temp	Max Temp
Shock 1	200.9	256.2
Shock 2	241.0	275.2

# Test Number 01-0005, TMC 117 (High Reference Oil)



# Stats—Conditioning 01-0005

Conditioning 1			
Input Torque [ft-lb]		Input Speed [rpm]	
Target	60 ± 5	Target	2363
Avg	59.8	Avg	2360
Min	40.4	Min	2356
Max	73.5	Max	2366

Conditioning 3			
Input Torque [ft-lb]		Input Speed [rpm]	
Target	70 ± 5	Target	3350
Avg	69.9	Avg	3345
Min	62.0	Min	3342.1
Max	74.8	Max	3348.4

Conditioning 2				Conditioning 2			
Peak Input Torque Drive [ft-lb]		Peak Input Torque Coast [ft-lb]		Maximum Input Speed [rpm]		Minimum Input Speed [rpm]	
Target		Target		Target	2363	Target	1582
Avg	112.1	Avg	-57.1	Avg	2364	Avg	1581
Min	110.5	Min	-59.8	Min	2364	Min	1580
Max	113.7	Max	-54.8	Max	2365	Max	1582

Conditioning 4				Conditioning 4			
Peak Input Torque Drive [ft-lb]		Peak Input Torque Coast [ft-lb]		Maximum Input Speed [rpm]		Minimum Input Speed [rpm]	
Target		Target		Target	3350	Target	2754
Avg	114.7	Avg	-64.3	Avg	3353	Avg	2753
Min	113.5	Min	-69.7	Min	3349	Min	2753
Max	116.5	Max	-60.6	Max	3354	Max	2754



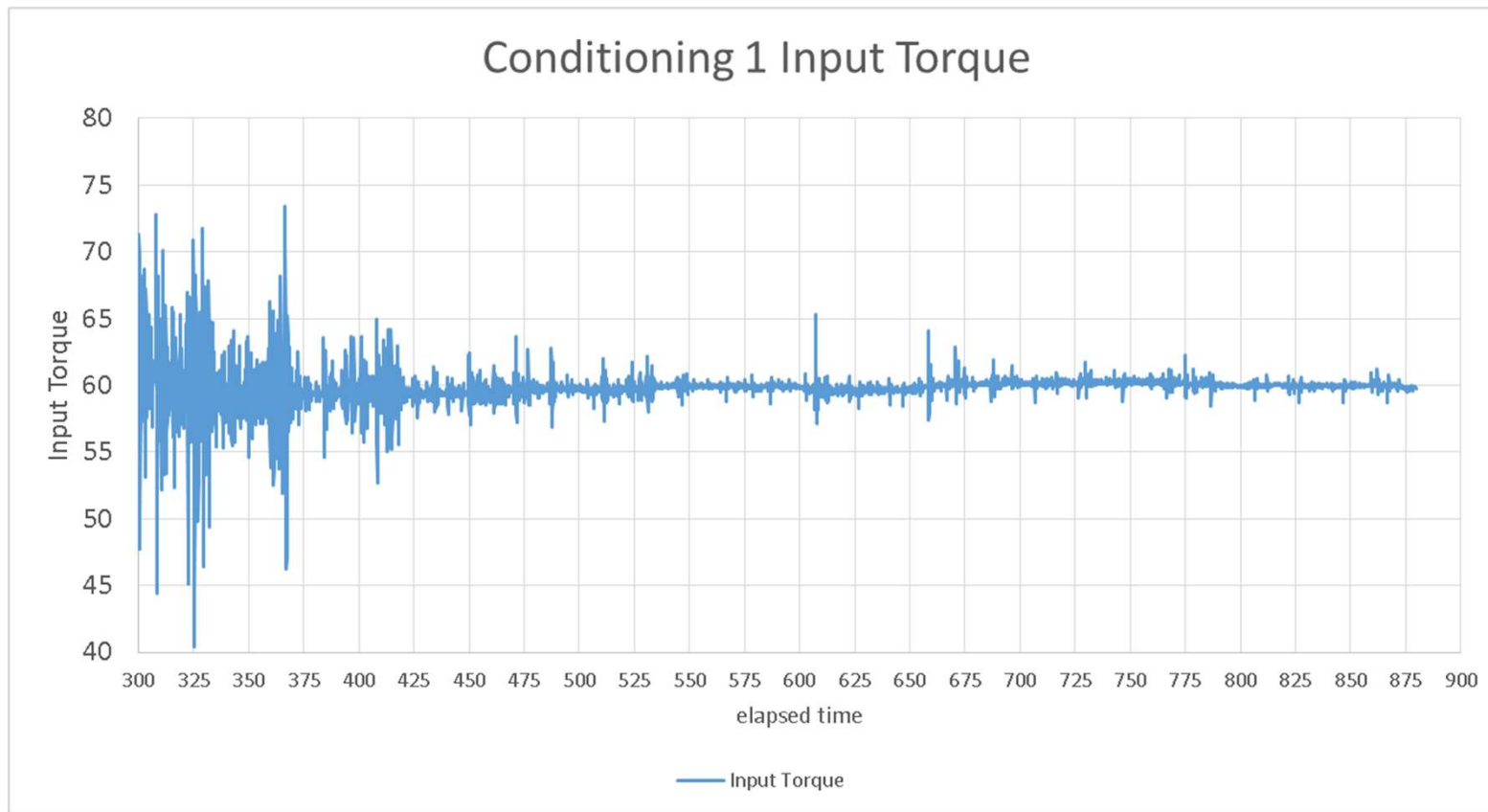
# Stats—Shocks 01-0005

Shock 1				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	235.3	Avg	-59.6	Avg	4350	Avg	2191
Min	233.9	Min	-75.4	Min	4348	Min	2172
Max	237.0	Max	-52.9	Max	4351	Max	2196

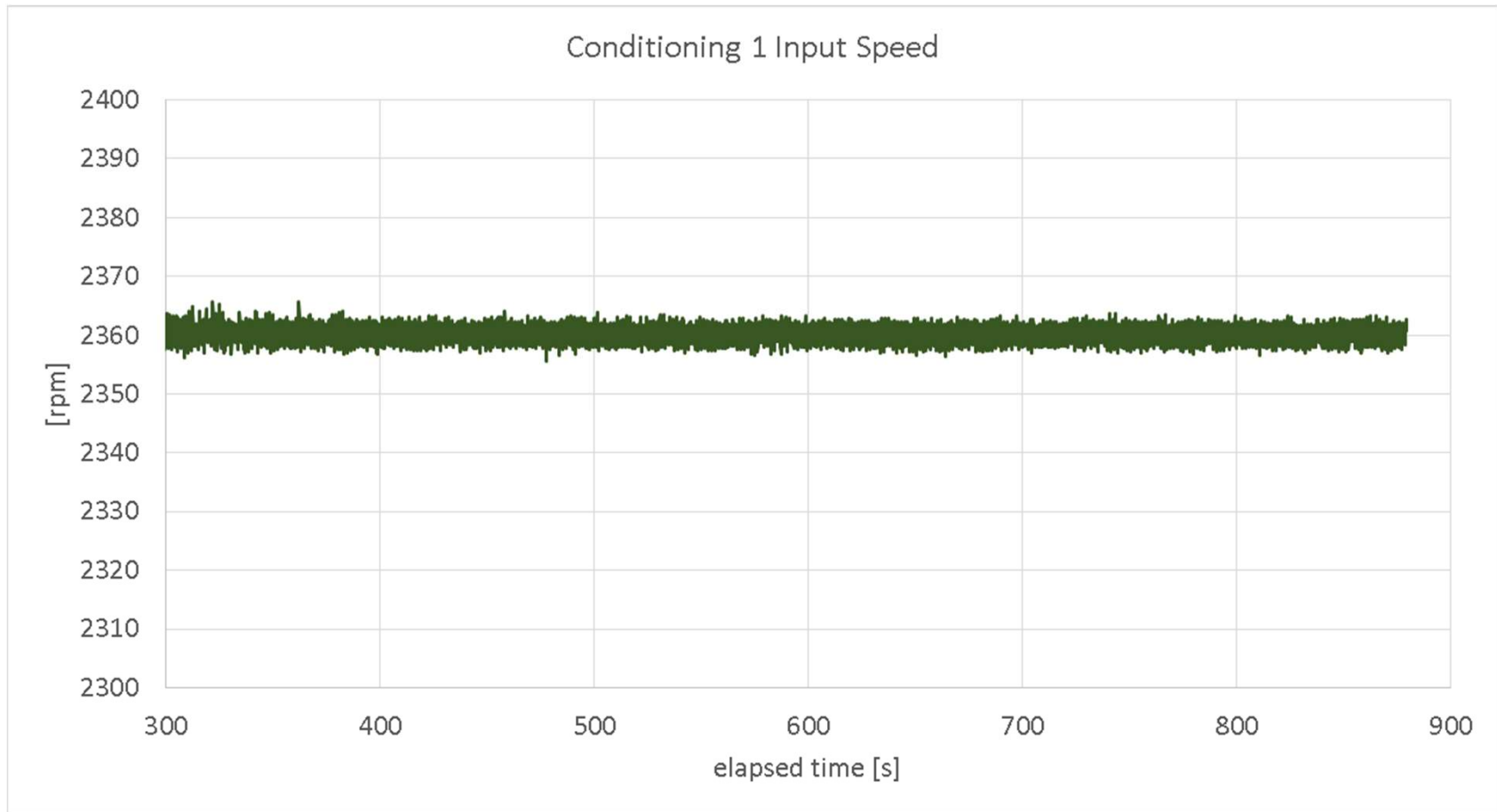
Shock 2				Shock 2			
Peak Input Torque Drive [ft-lb]		Peak Input Torque Coast [ft-lb]		Maximum Input Speed [rpm]		Minimum Input Speed [rpm]	
<i>Target</i>		<i>Target</i>		<i>Target</i>	3083	<i>Target</i>	2178
Avg	225.7	Avg	-223.9	Avg	3071	Avg	2169
Min	224.6	Min	-227.2	Min	3064	Min	2167
Max	229.6	Max	-210.4	Max	3077	Max	2172



# Conditioning I—0 I-0005

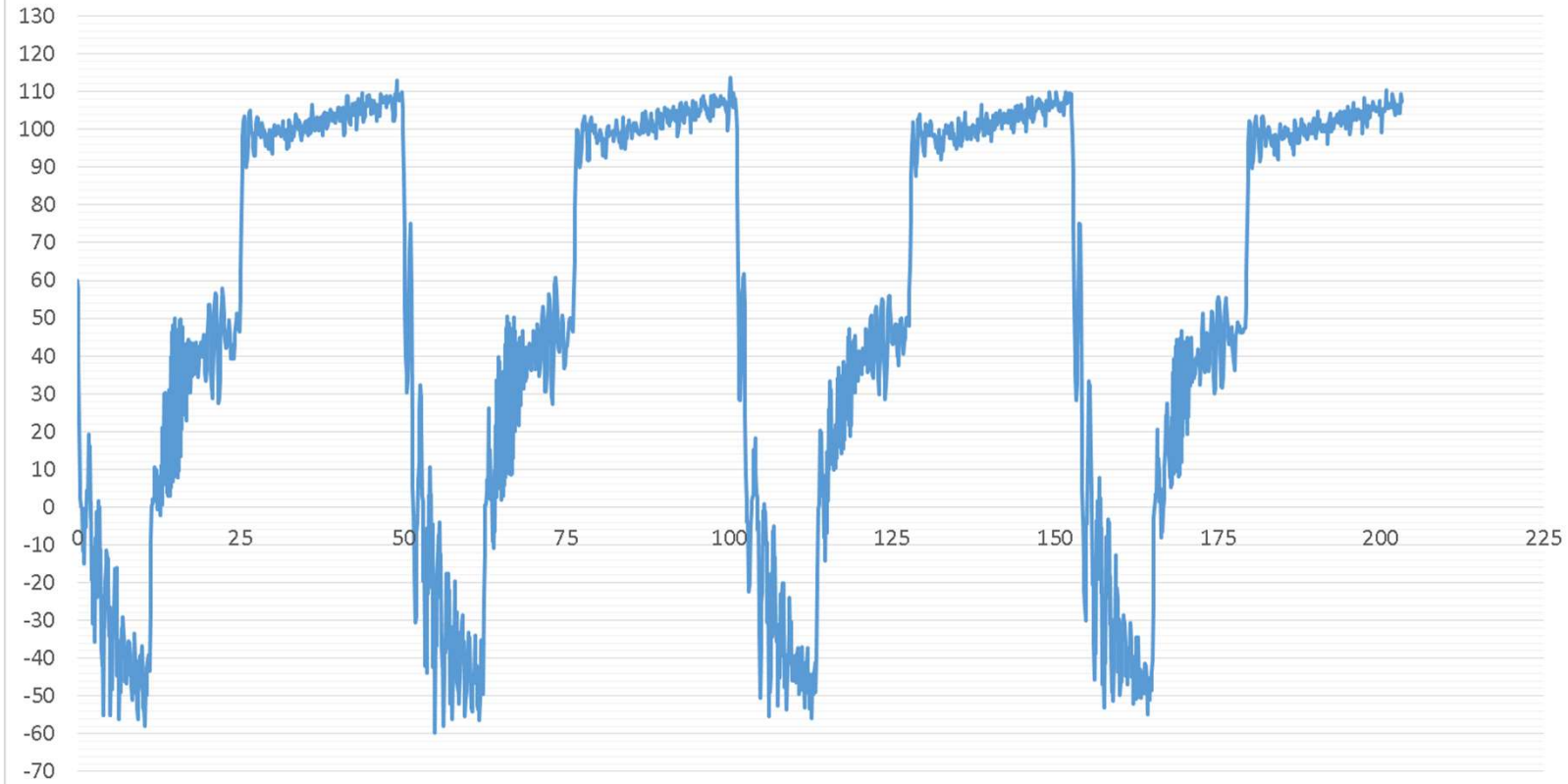


# Conditioning I—0 I-0005



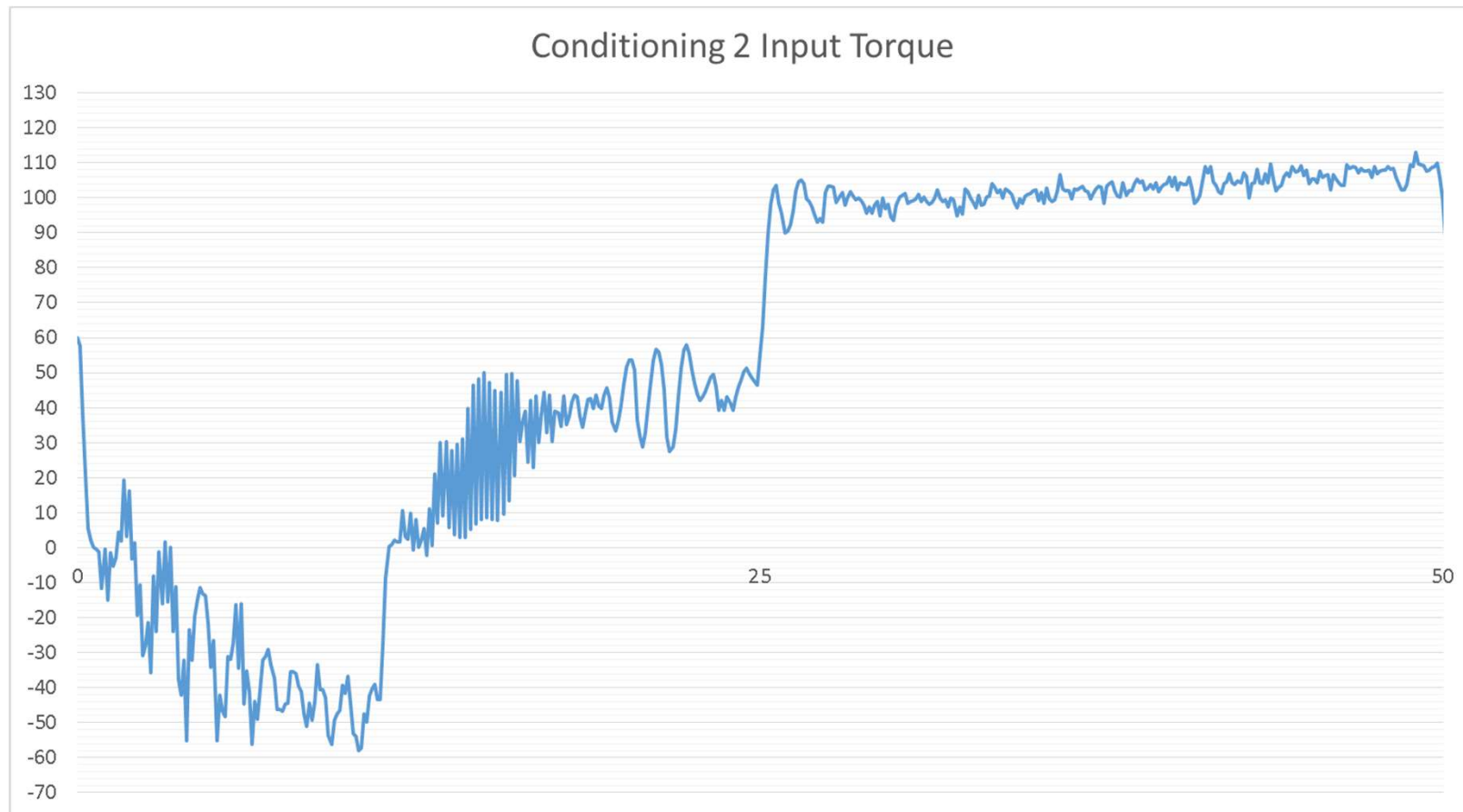
# Conditioning 2—01-0005

Conditioning 2 Input Torque

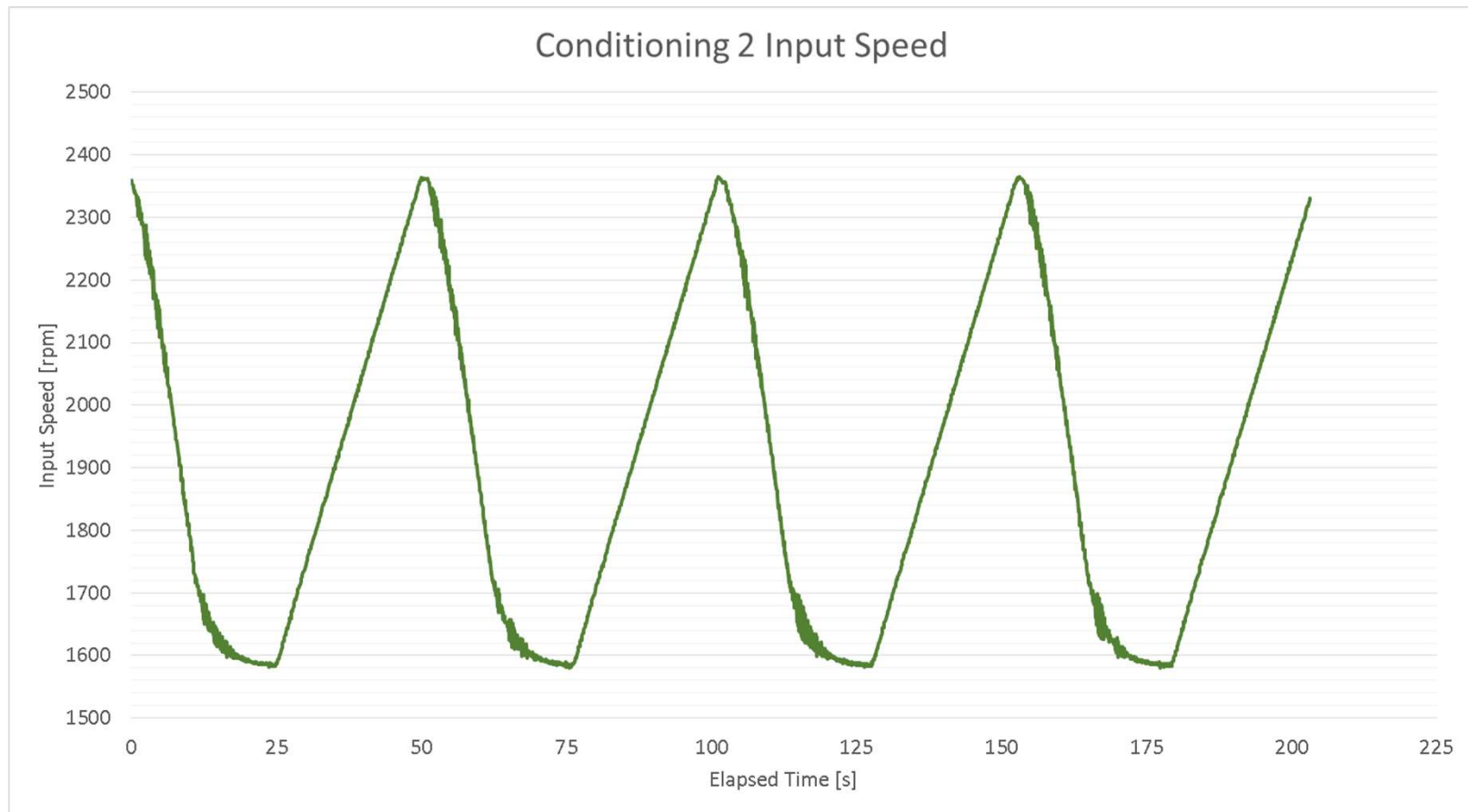




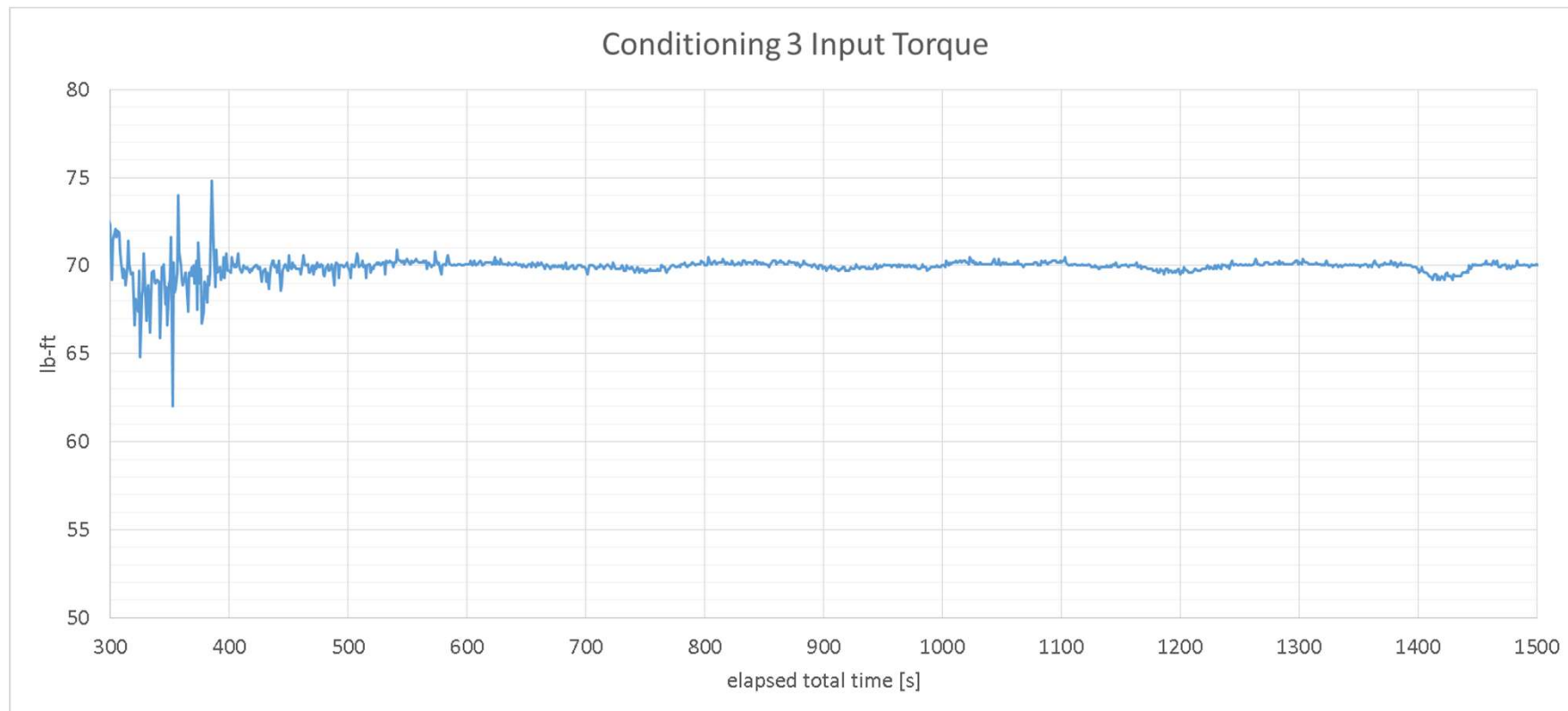
# Conditioning 2—01-0005



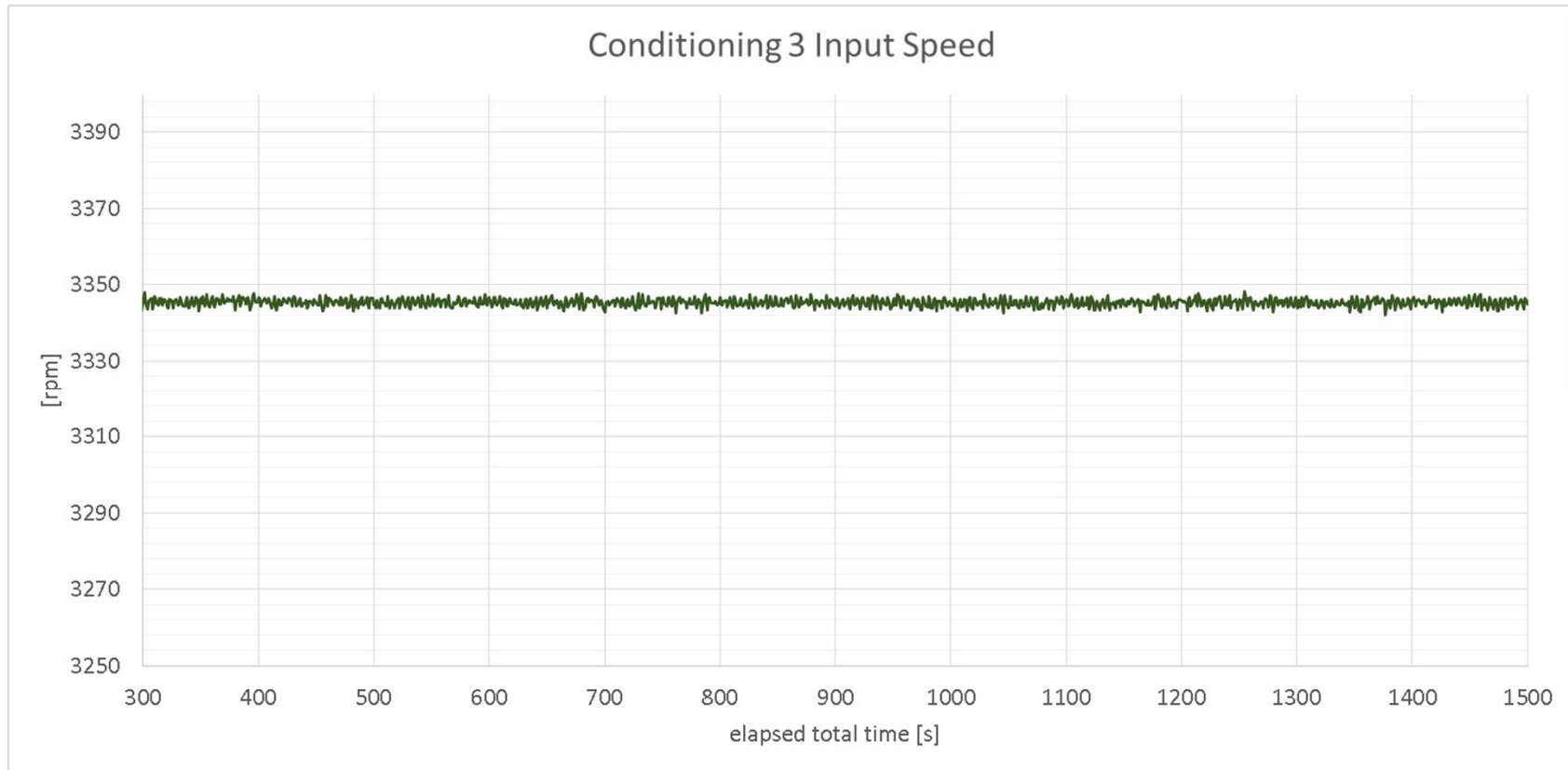
# Conditioning 2—01-0005



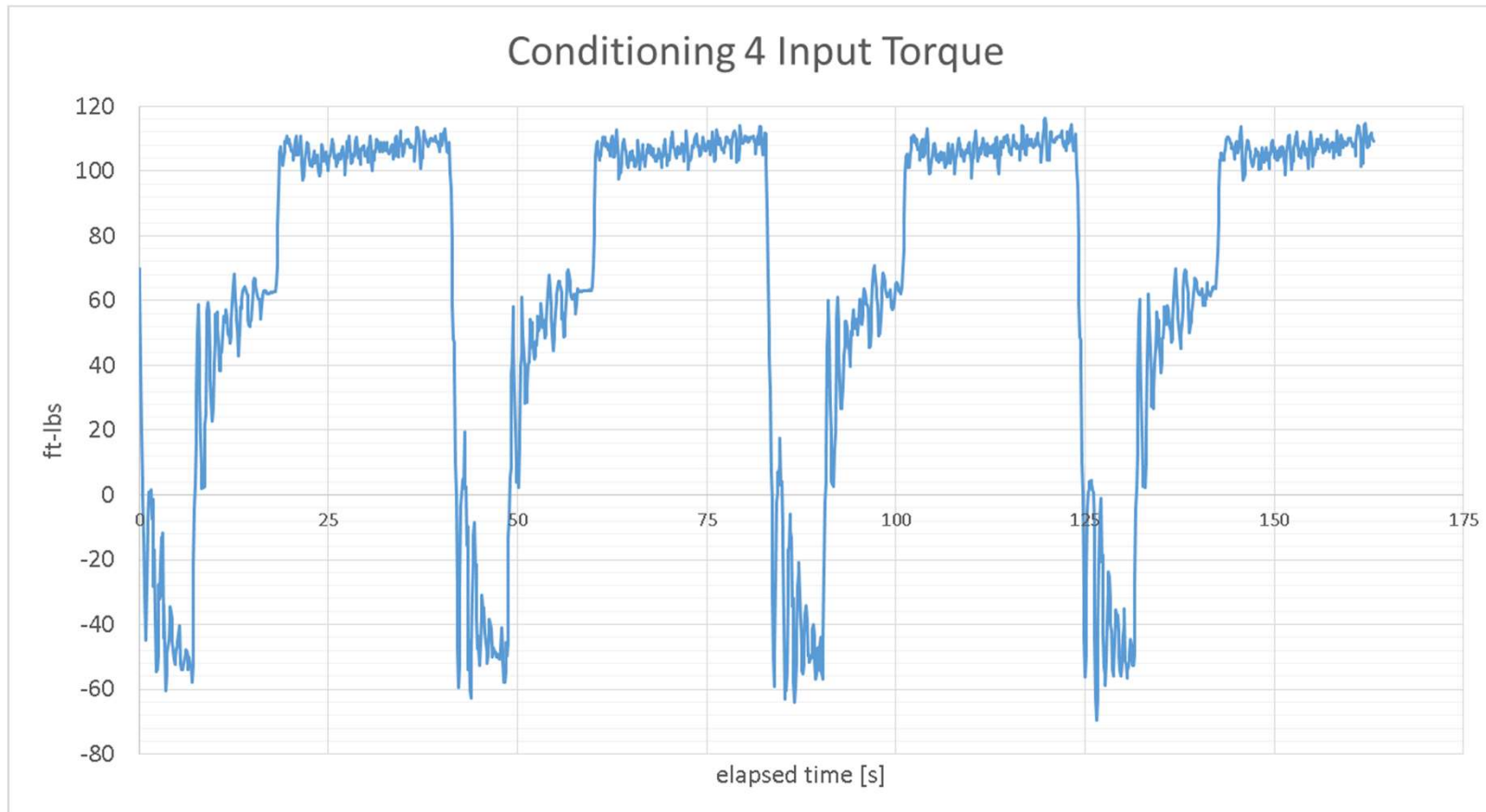
# Conditioning 3—01-0005



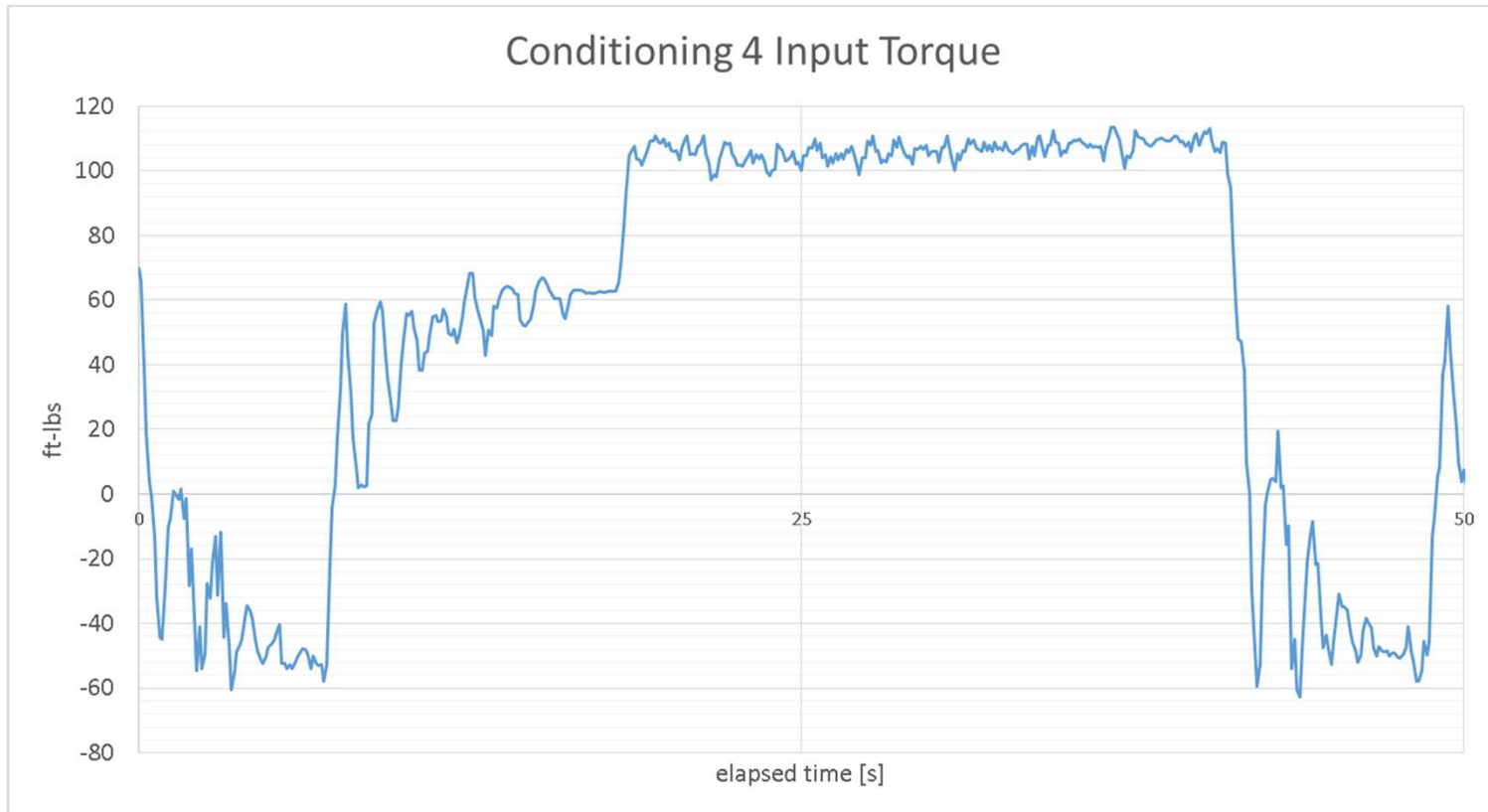
# Conditioning 3—01-0005



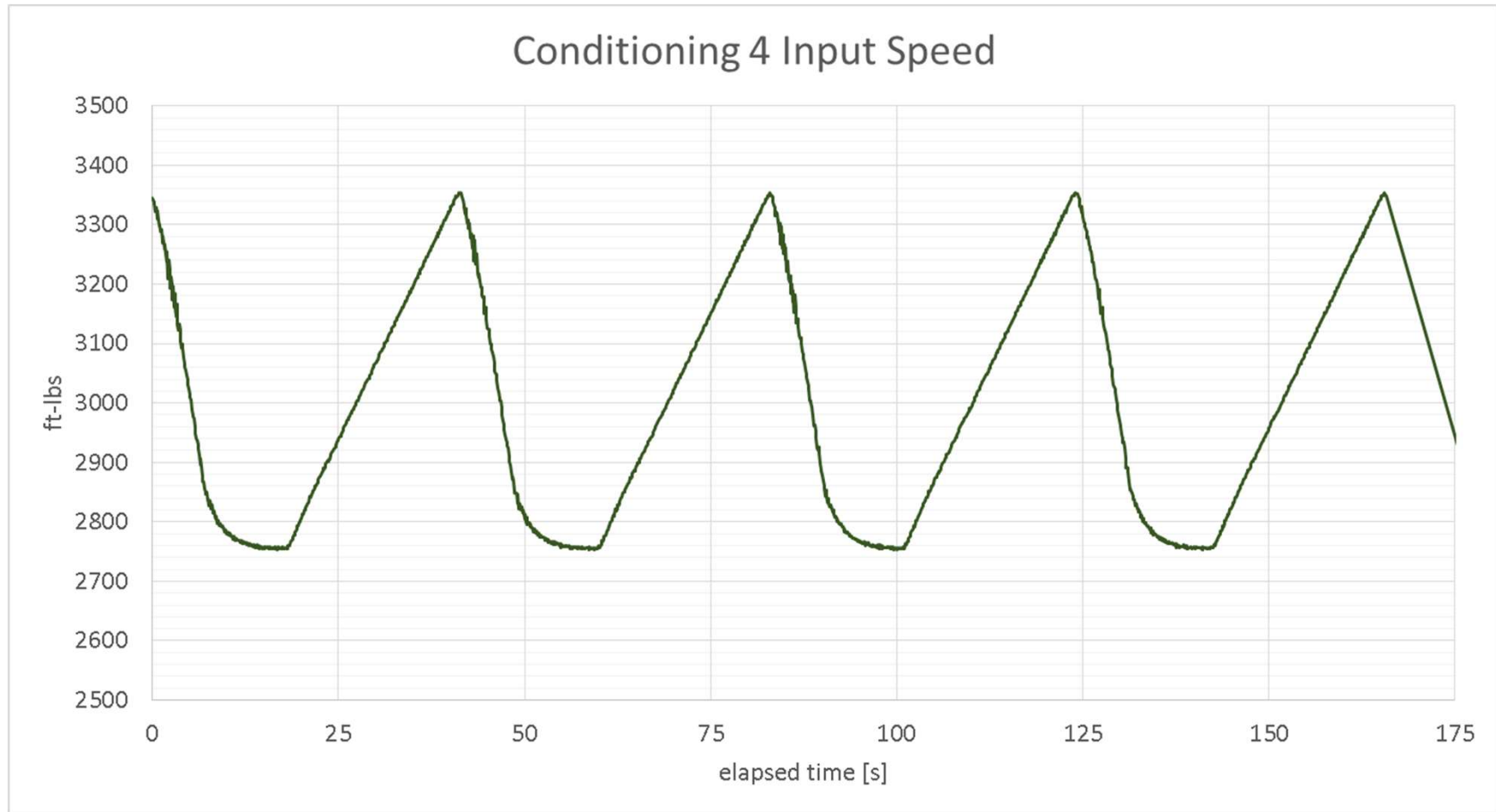
# Conditioning 4—01-0005



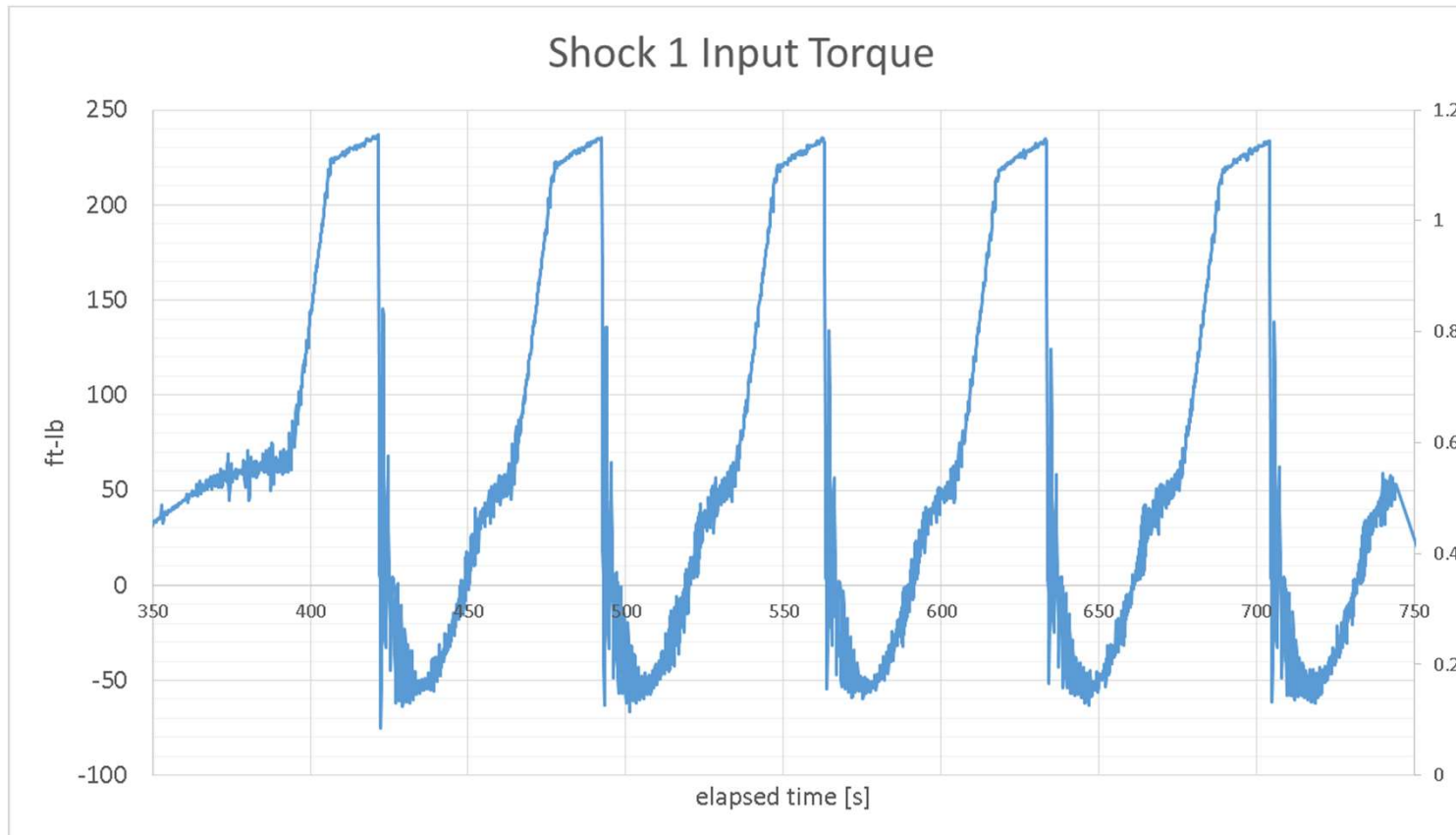
# Conditioning 4—01-0005



# Conditioning 4—01-0005

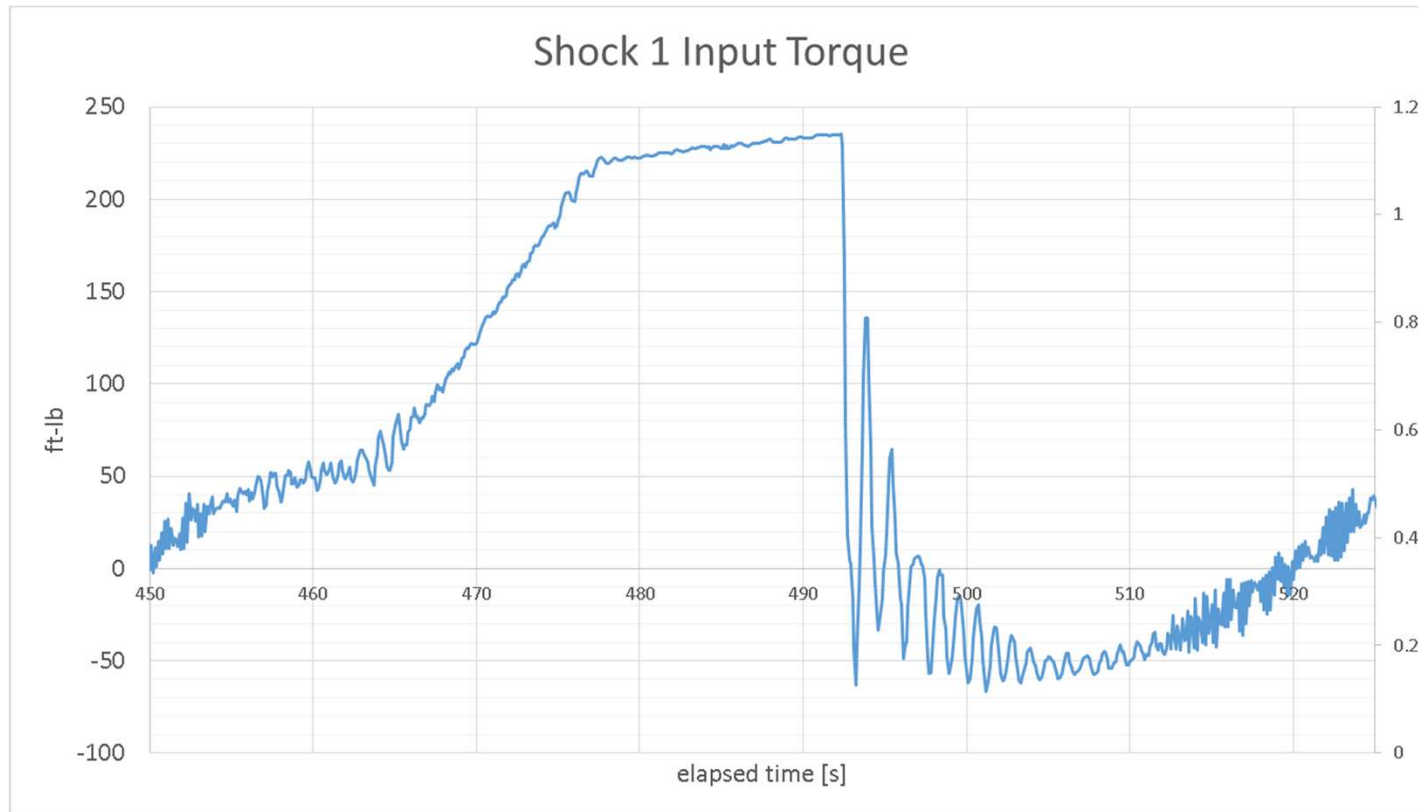


# Shock I—0 I-0005

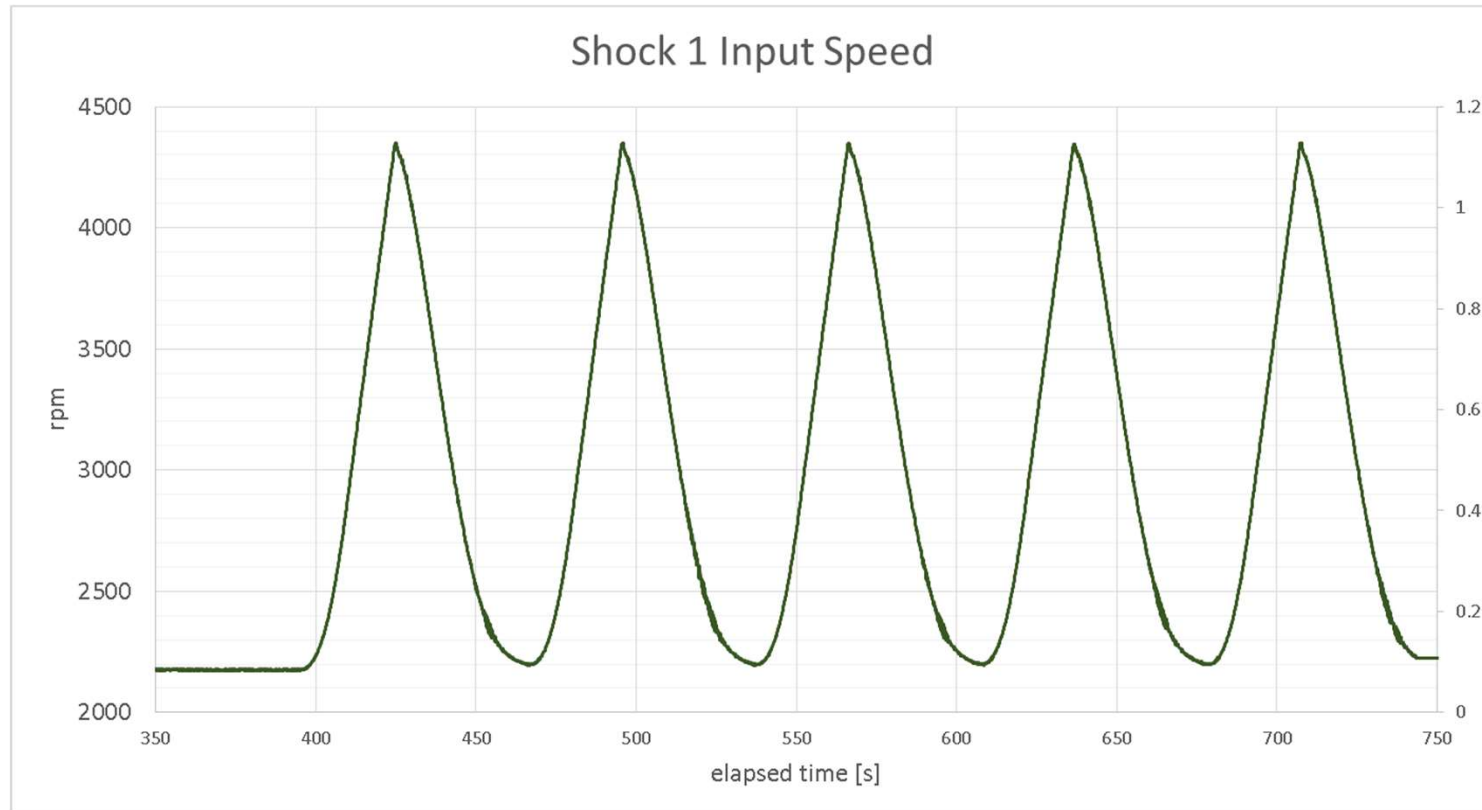




# Shock I—0 I-0005

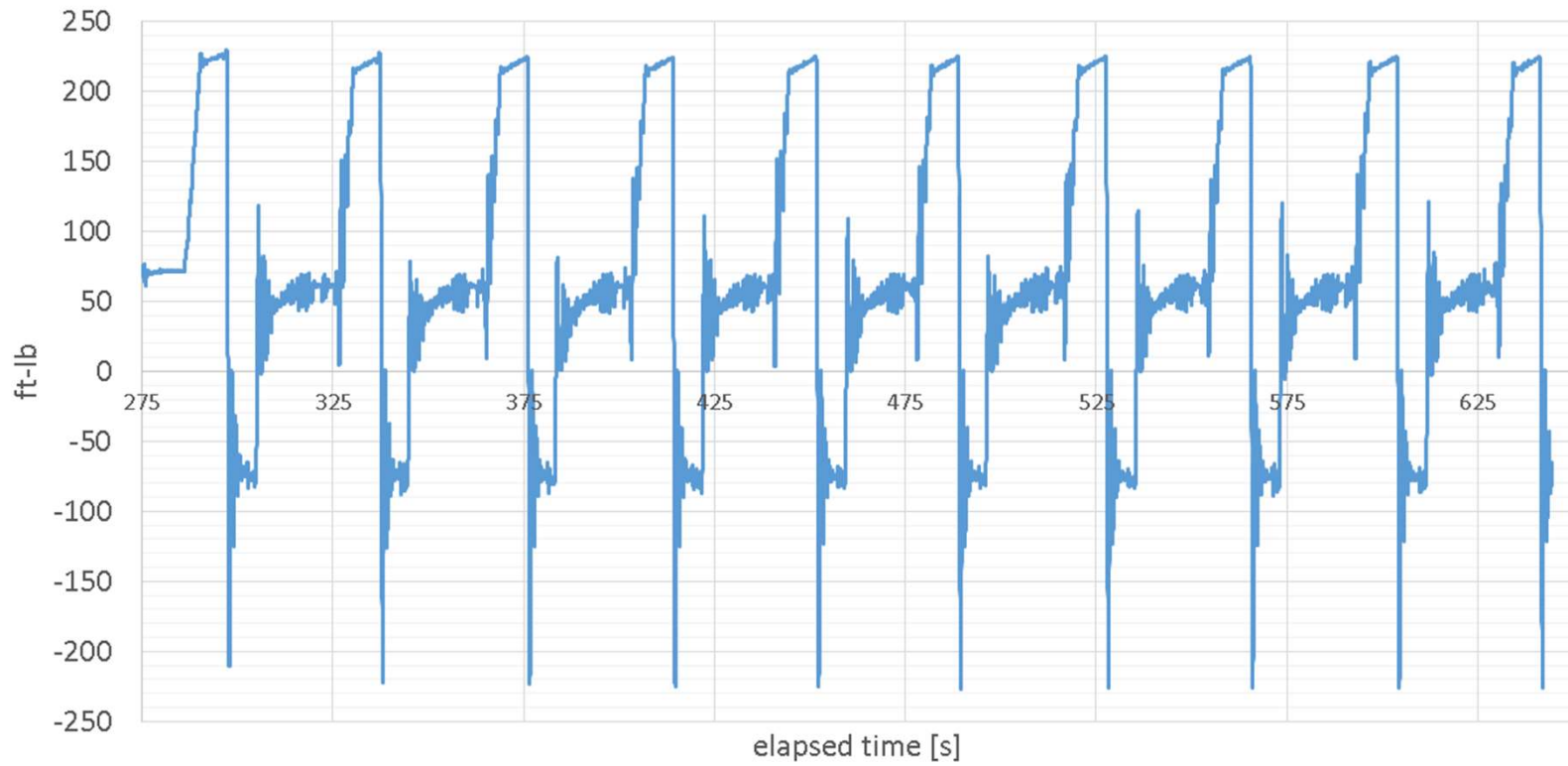


# Shock I—0 I-0005

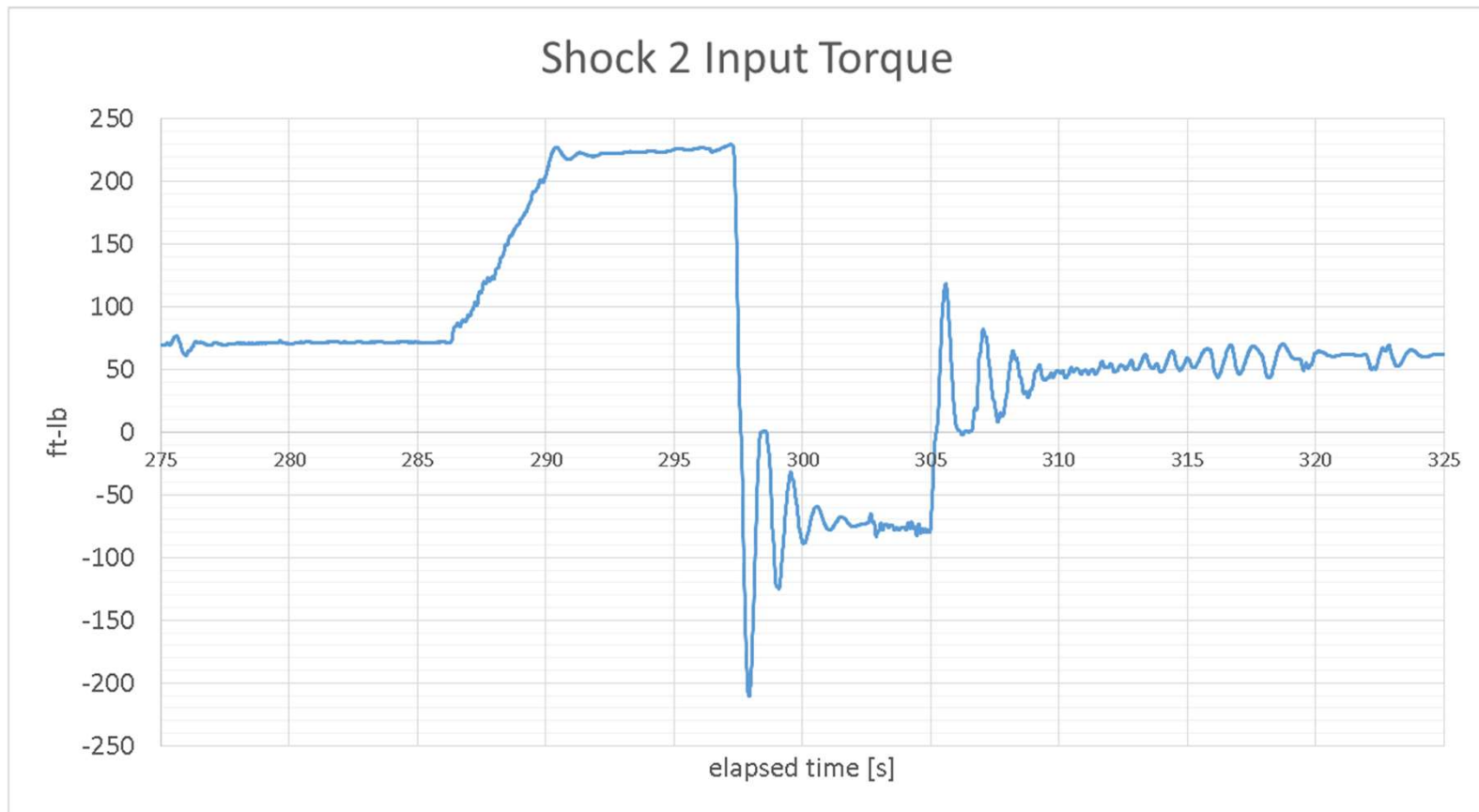


# Shock 2—01-0005

Shock 2 Input Torque

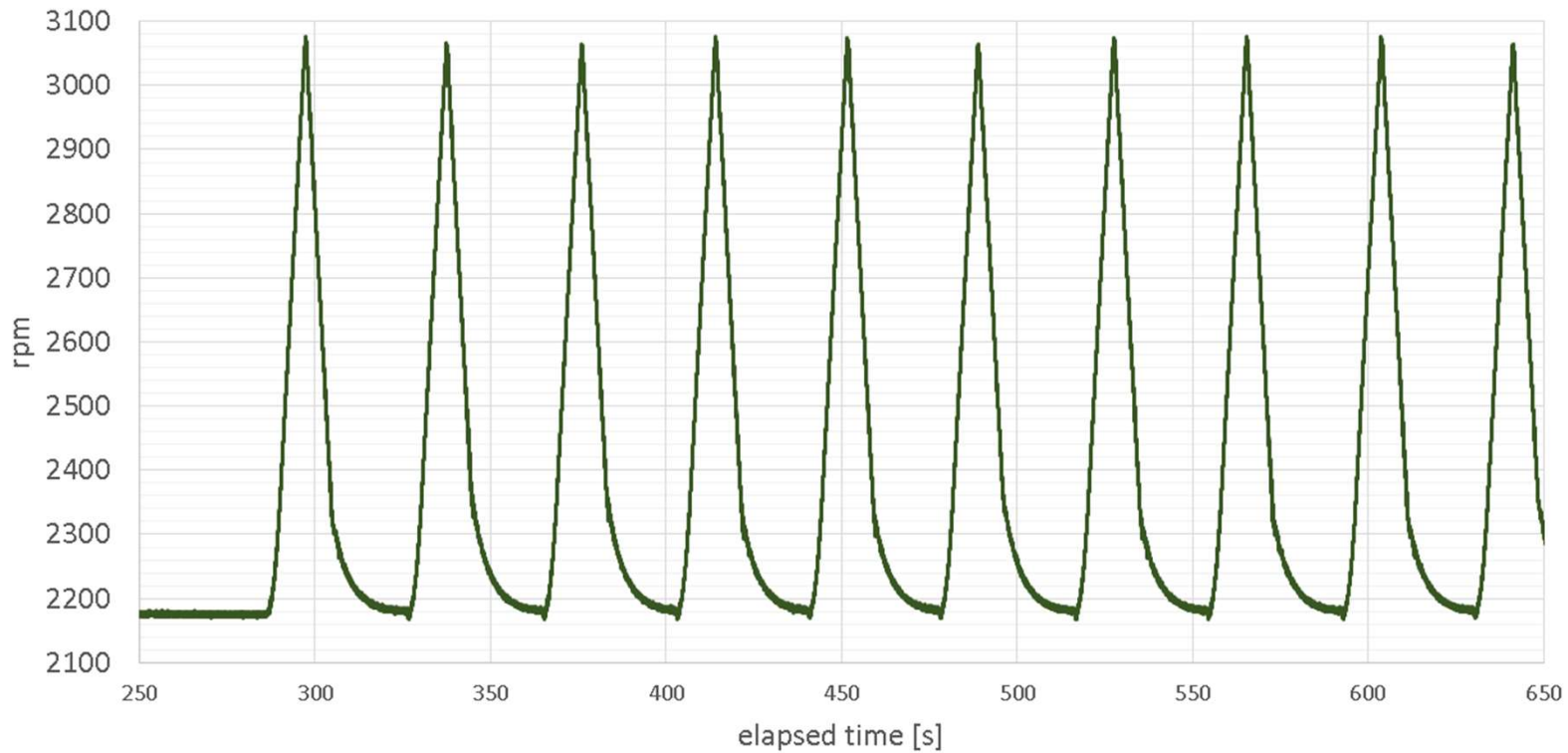


# Shock 2—01-0005

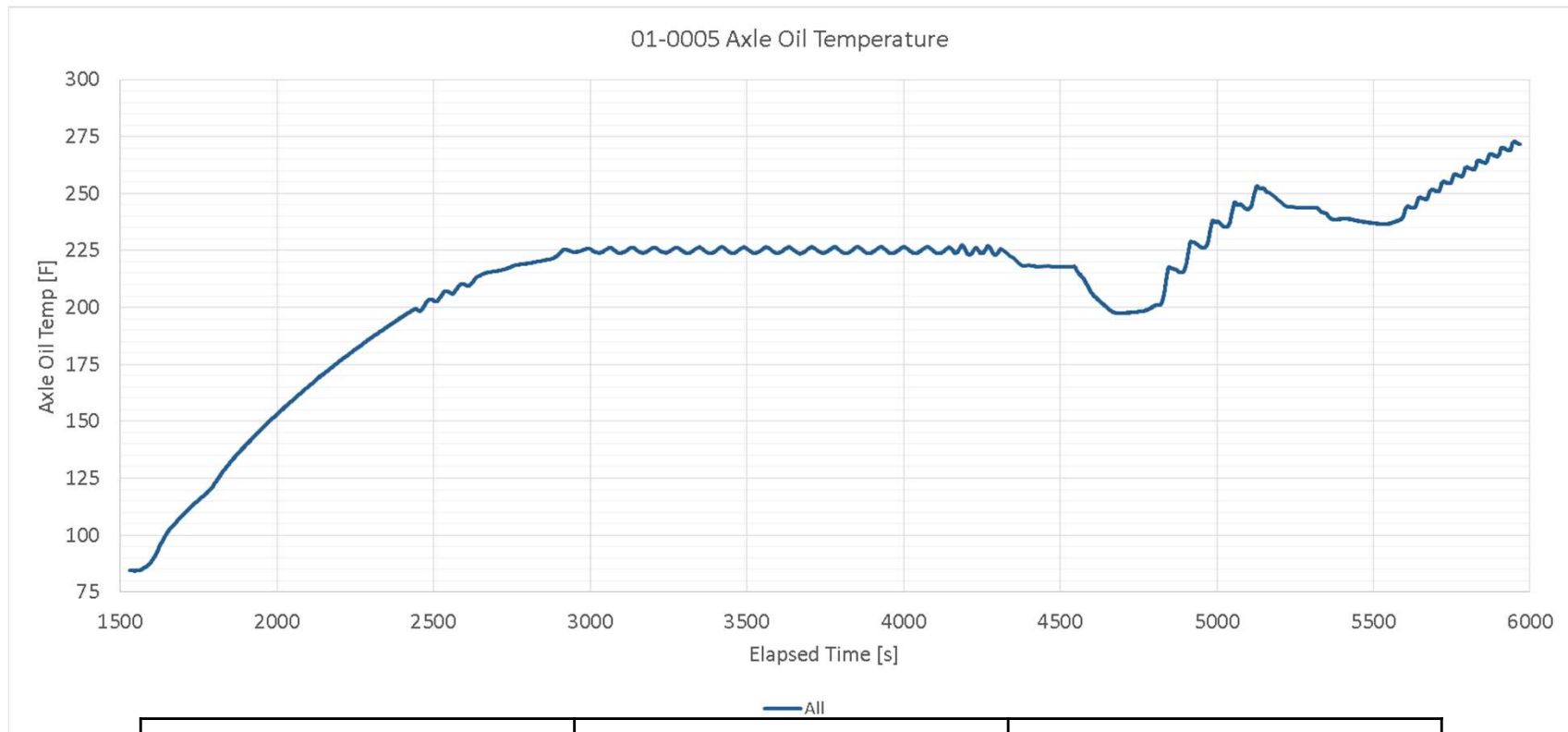


# Shock 2—01-0005

Shock 2 Input Speed



# Temperature Plot—01-0005



Phase	Min Temp	Max Temp
Shock 1	201.1	251.4
Shock 2	239.7	271.7

# Test Number 01-0006, TMC 113 (Discrimination Oil)



# Stats—Conditioning 01-0006

Conditioning 1			
Input Torque [ft-lb]		Input Speed [rpm]	
Target	60 ± 5	Target	2363
Avg	59.7	Avg	2360
Min	58.0	Min	2356
Max	61.5	Max	2365

Conditioning 3			
Input Torque [ft-lb]		Input Speed [rpm]	
Target	70 ± 5	Target	3350
Avg	69.9	Avg	3346
Min	51.2	Min	3342.2
Max	76.2	Max	3349.9

Conditioning 2				Conditioning 2			
Peak Input Torque Drive [ft-lb]		Peak Input Torque Coast [ft-lb]		Maximum Input Speed [rpm]		Minimum Input Speed [rpm]	
Target		Target		Target	2363	Target	1582
Avg	112.0	Avg	-59.8	Avg	2367	Avg	1580
Min	110.9	Min	-62.3	Min	2366	Min	1579
Max	112.5	Max	-57.5	Max	2367	Max	1581

Conditioning 4				Conditioning 4			
Peak Input Torque Drive [ft-lb]		Peak Input Torque Coast [ft-lb]		Maximum Input Speed [rpm]		Minimum Input Speed [rpm]	
Target		Target		Target	3350	Target	2754
Avg	114.1	Avg	-67.8	Avg	3353	Avg	2752
Min	113.6	Min	-72.0	Min	3353	Min	2752
Max	114.4	Max	-59.4	Max	3355	Max	2753





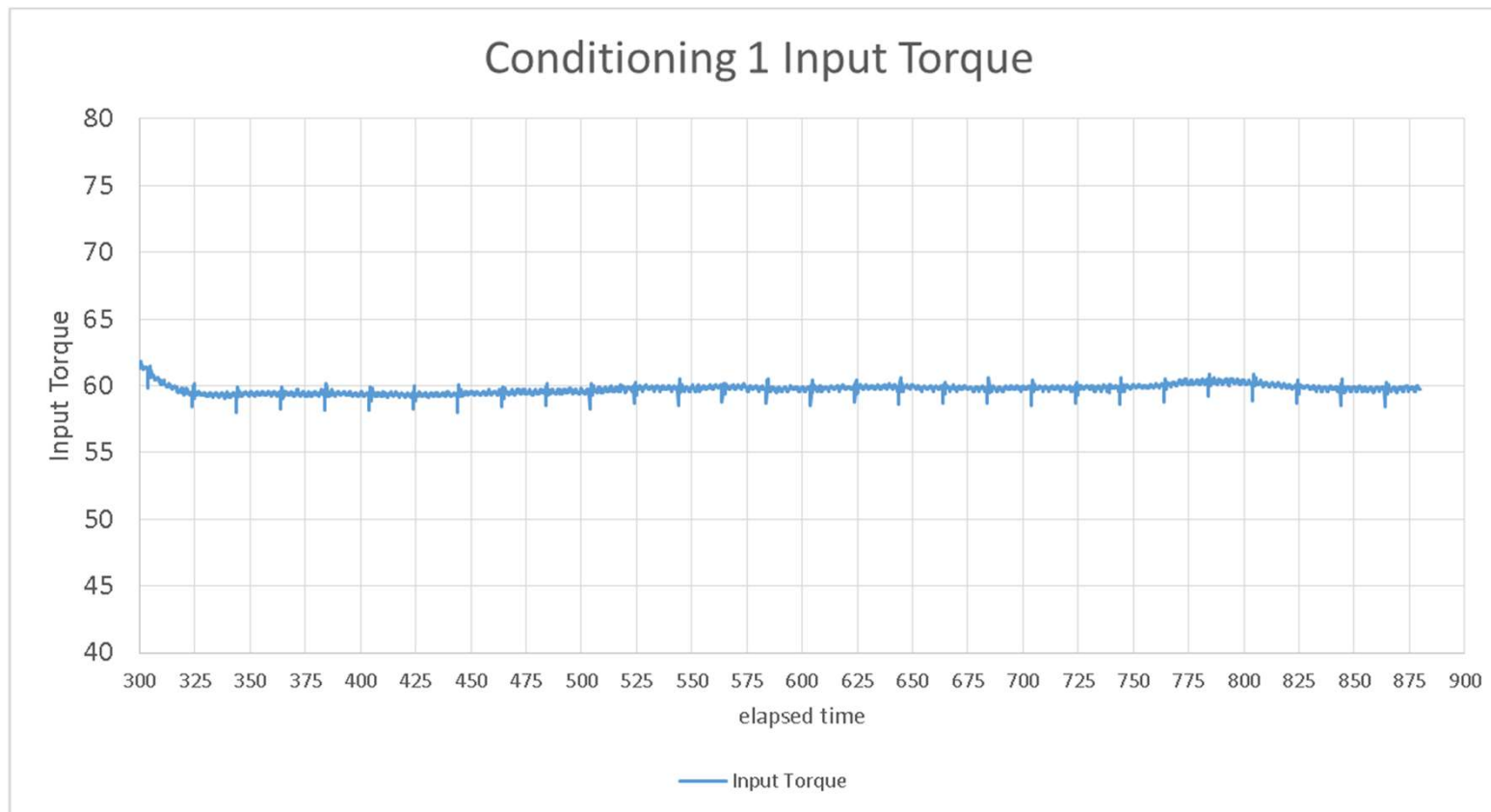
# Stats—Shocks 01-0006

Shock 1				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	234.8	Avg	-57.7	Avg	4350	Avg	2191
Min	233.3	Min	-66	Min	4349	Min	2173
Max	236.6	Max	-52.9	Max	4351	Max	2196

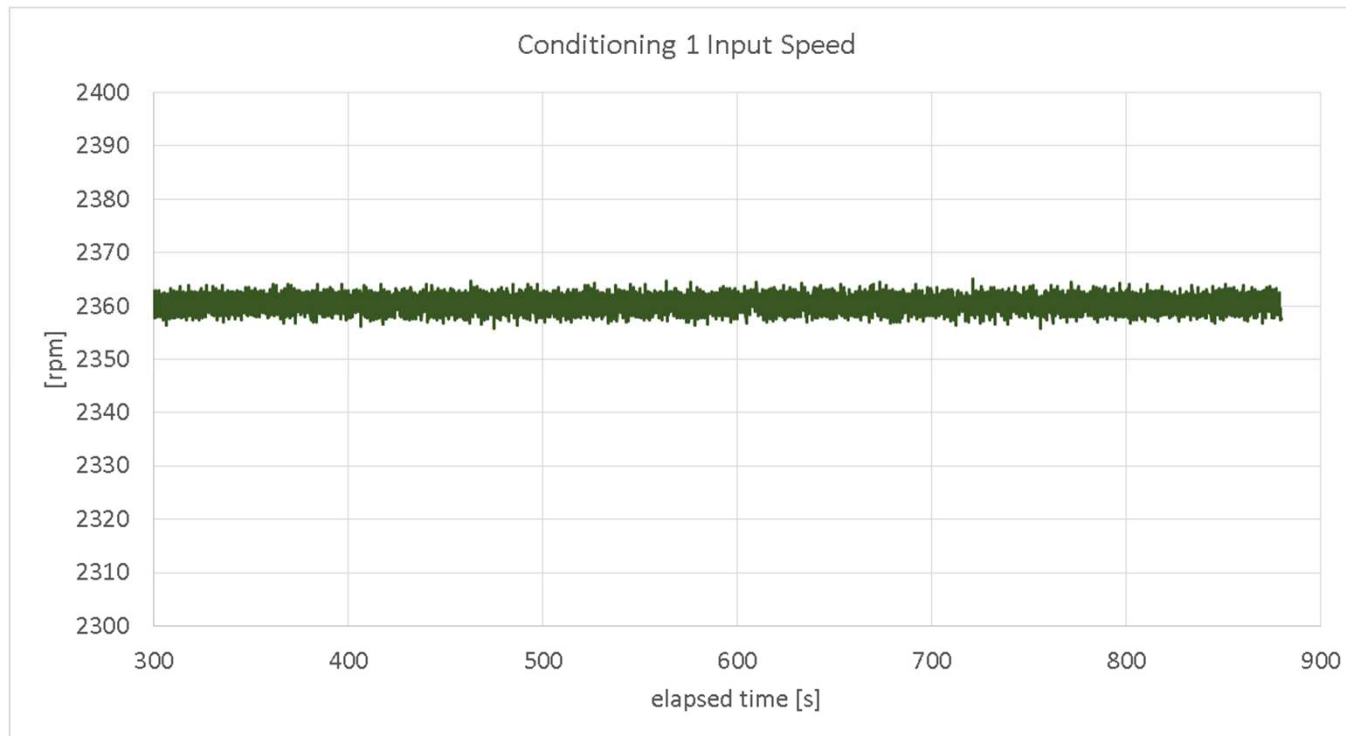
Shock 2				Shock 2			
Peak Input Torque Drive [ft-lb]		Peak Input Torque Coast [ft-lb]		Maximum Input Speed [rpm]		Minimum Input Speed [rpm]	
<i>Target</i>		<i>Target</i>		<i>Target</i>	3083	<i>Target</i>	2178
Avg	225.7	Avg	-223.3	Avg	3075	Avg	2169
Min	224.8	Min	-228.9	Min	3074	Min	2168
Max	228.5	Max	-212.3	Max	3076	Max	2173



# Conditioning I—0 I-0006

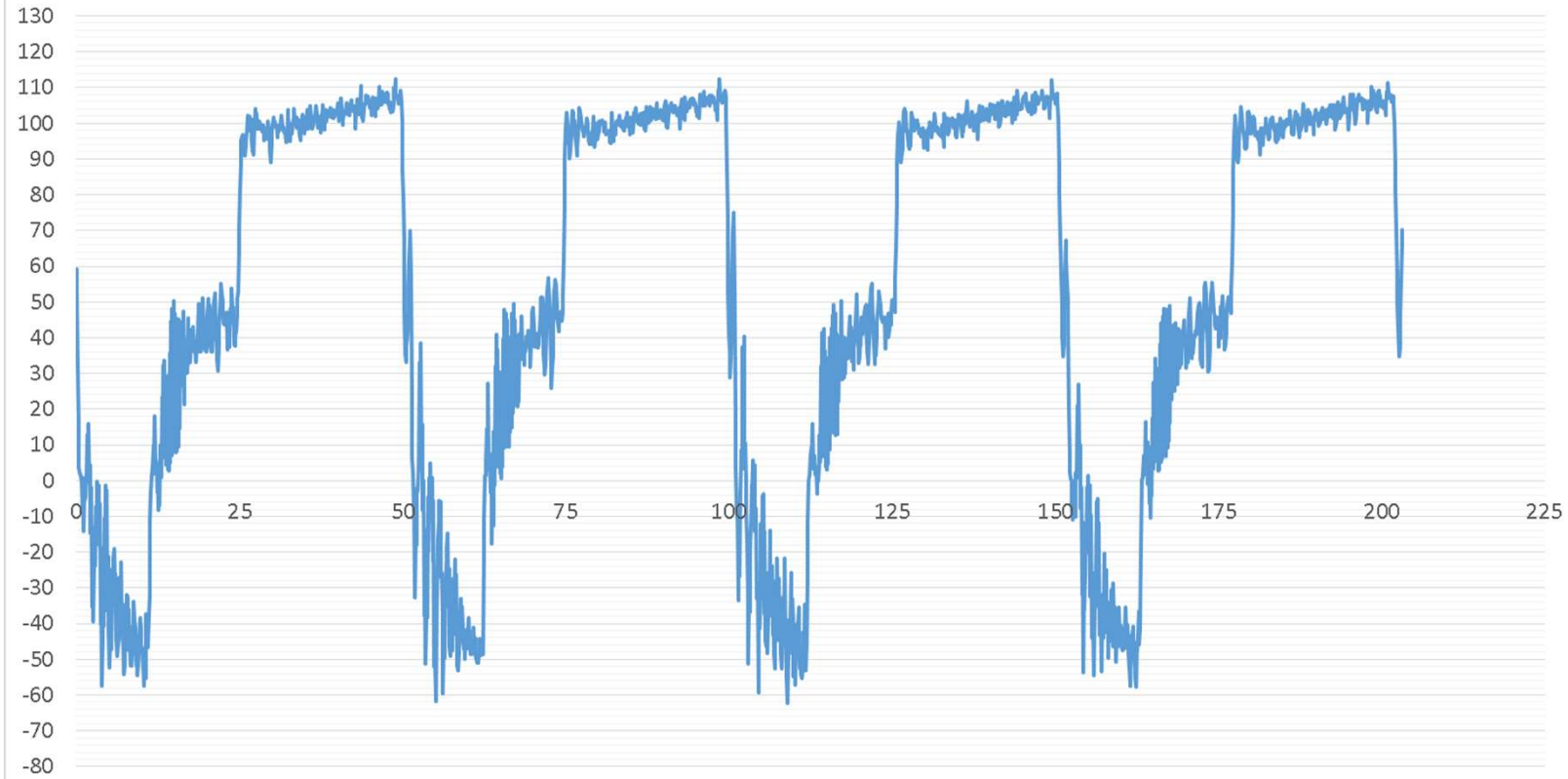


# Conditioning I—0 I-0006

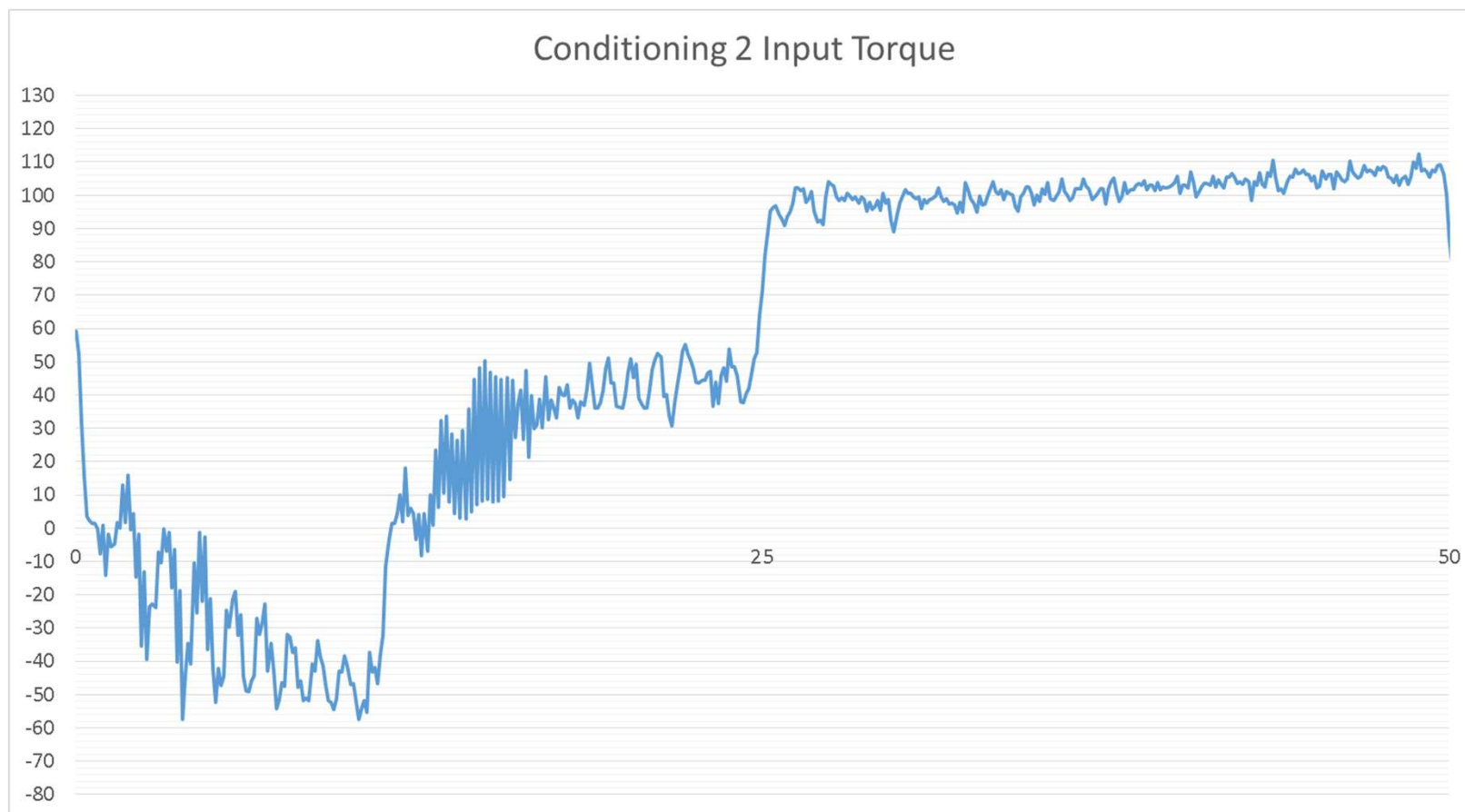


# Conditioning 2—01-0006

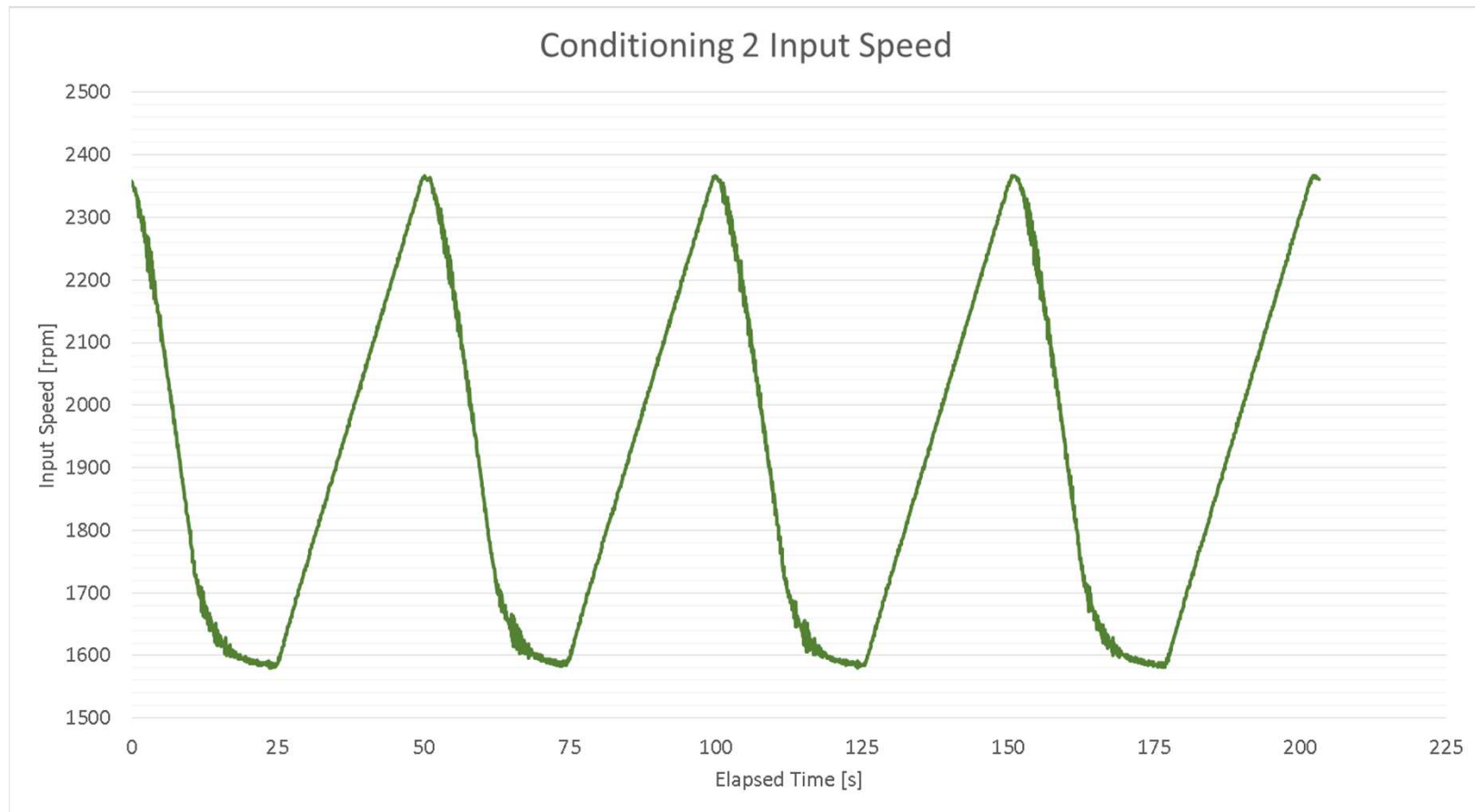
Conditioning 2 Input Torque



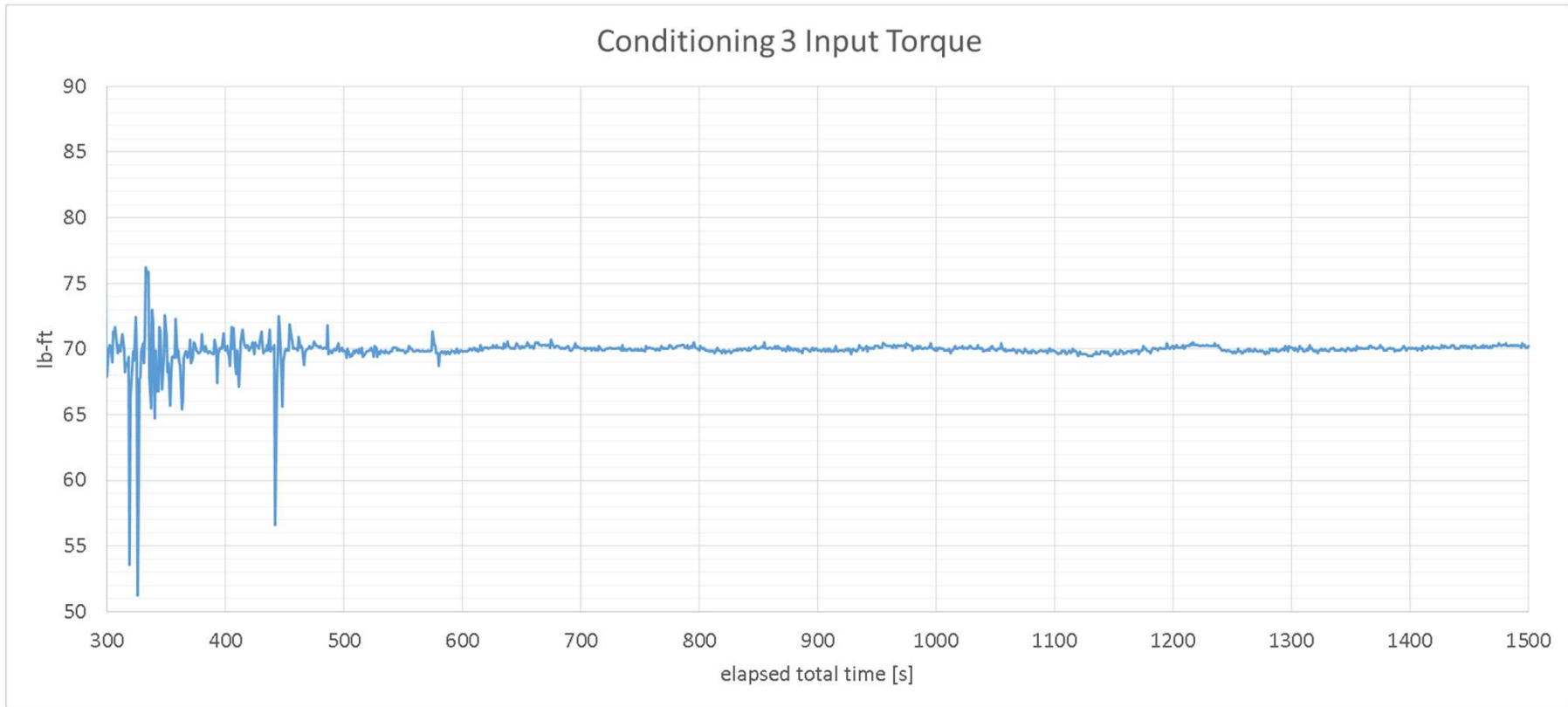
# Conditioning 2—01-0006



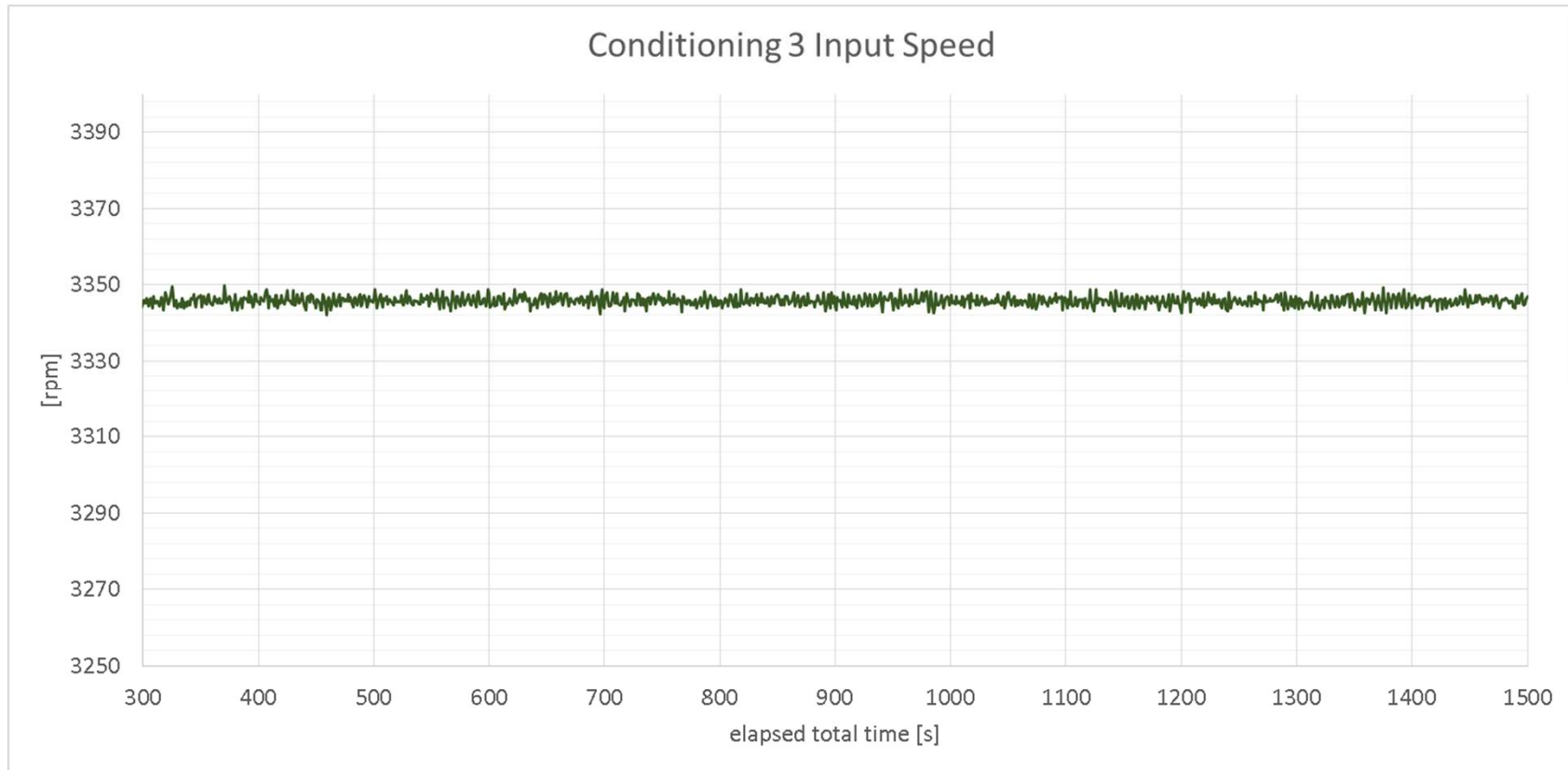
# Conditioning 2—01-0006



# Conditioning 3—01-0006

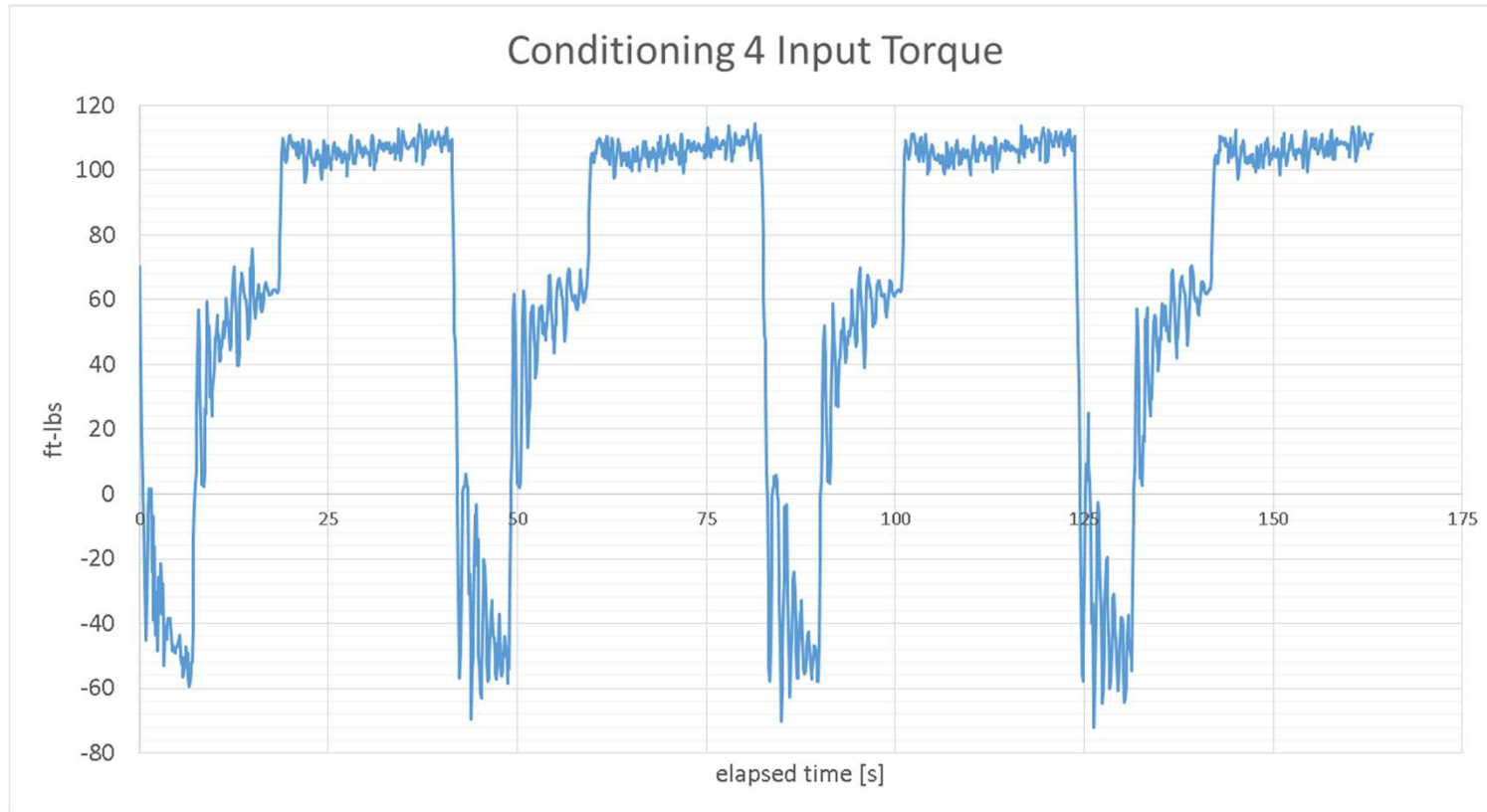


# Conditioning 3—01-0006

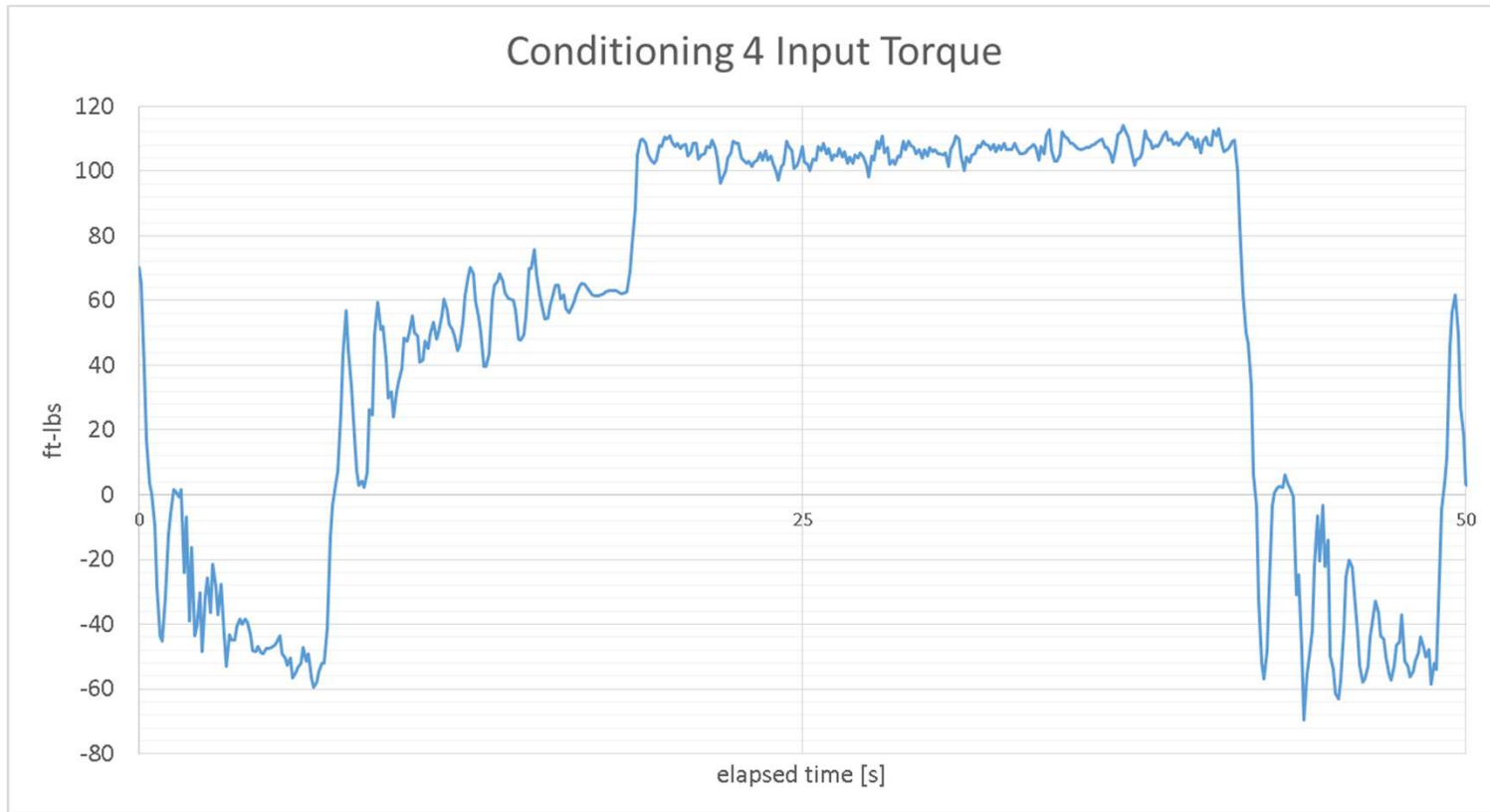




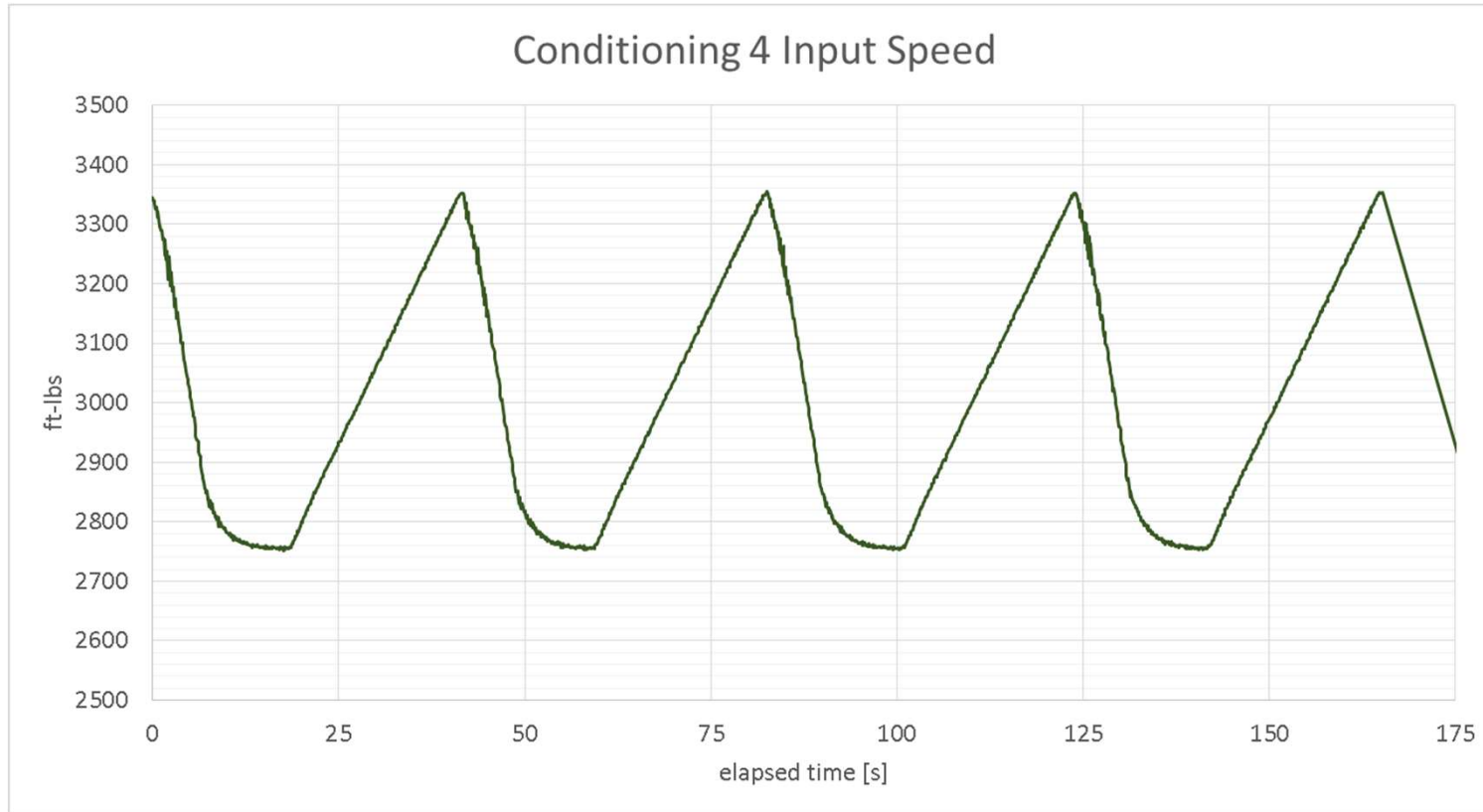
# Conditioning 4—01-0006



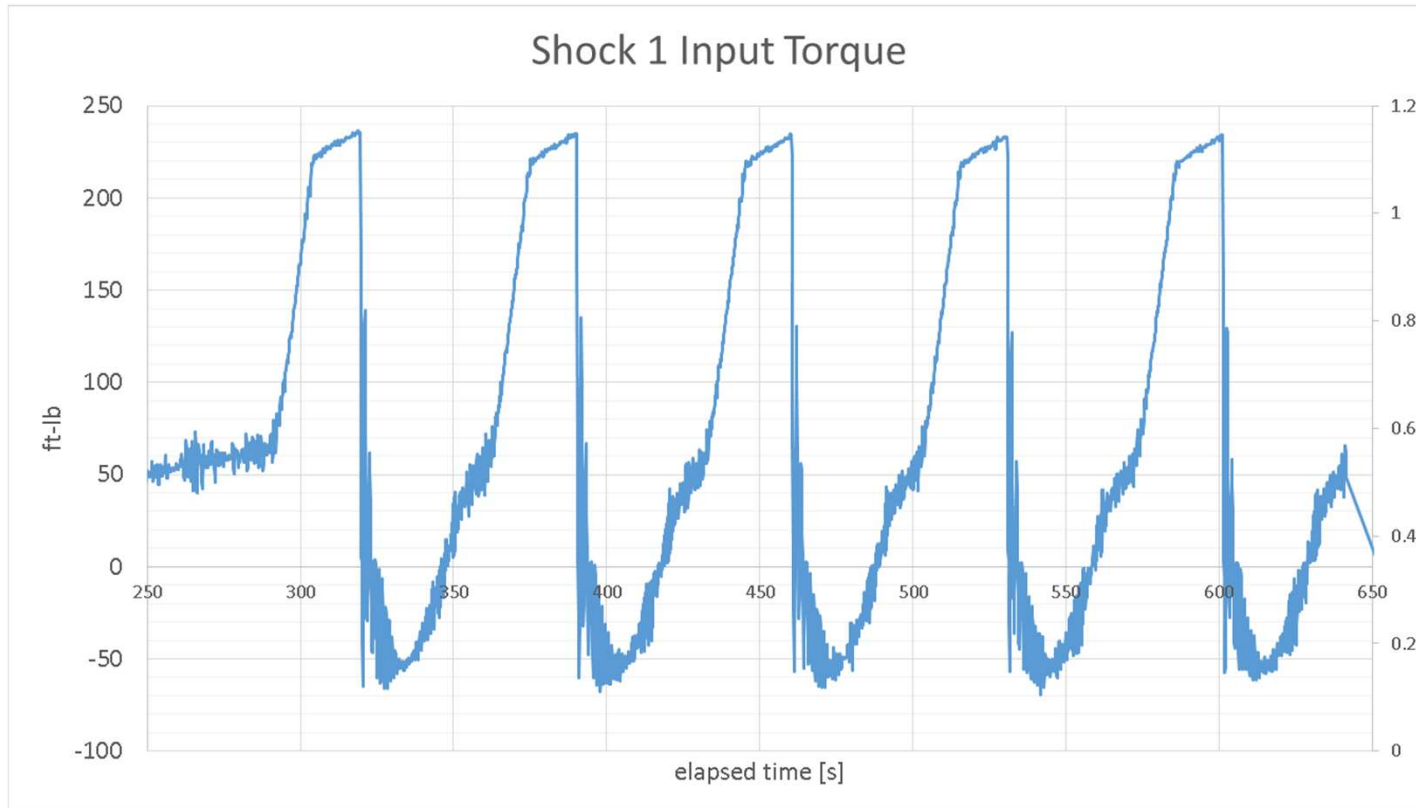
# Conditioning 4—01-0006



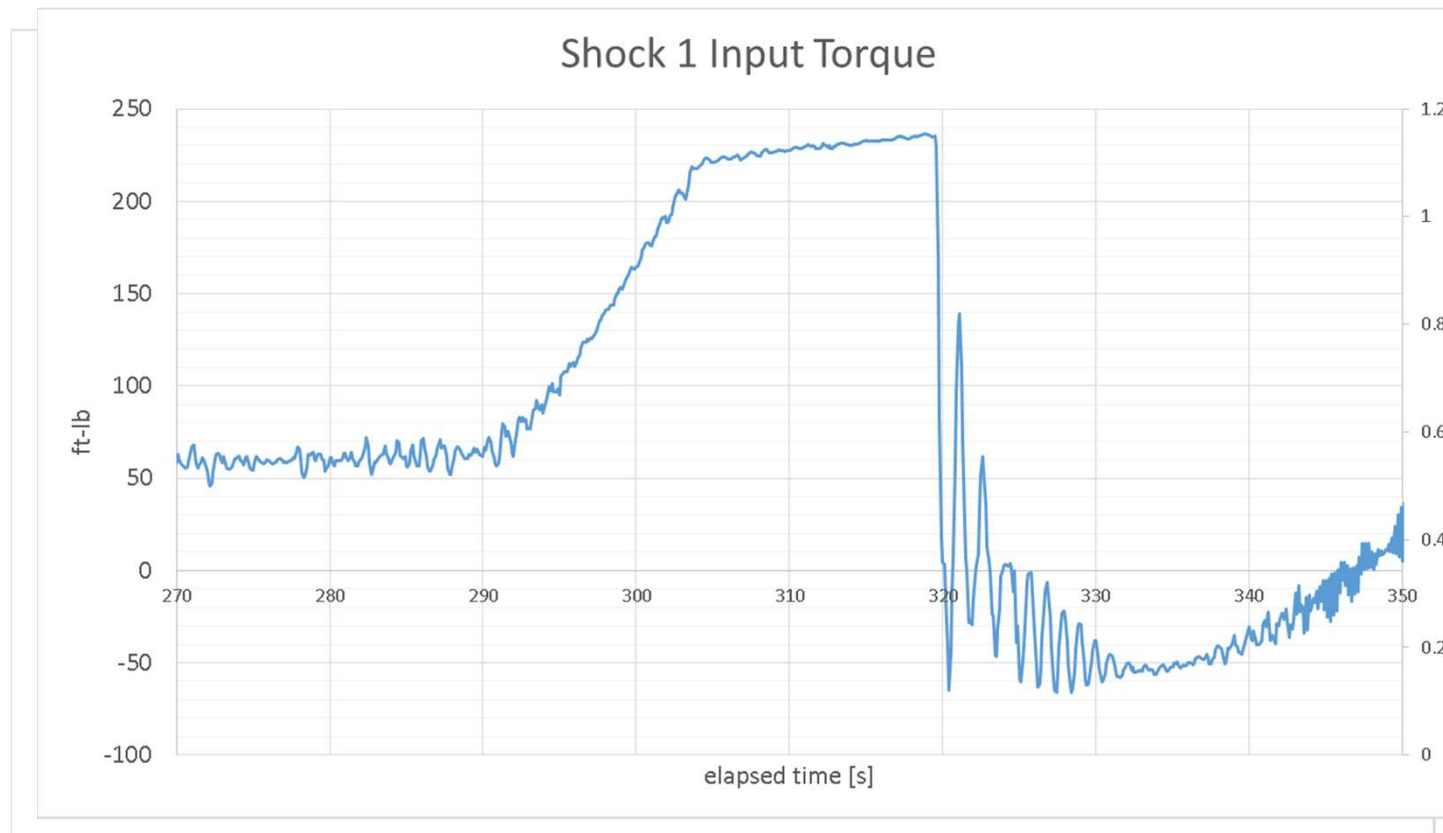
# Conditioning 4—01-0006



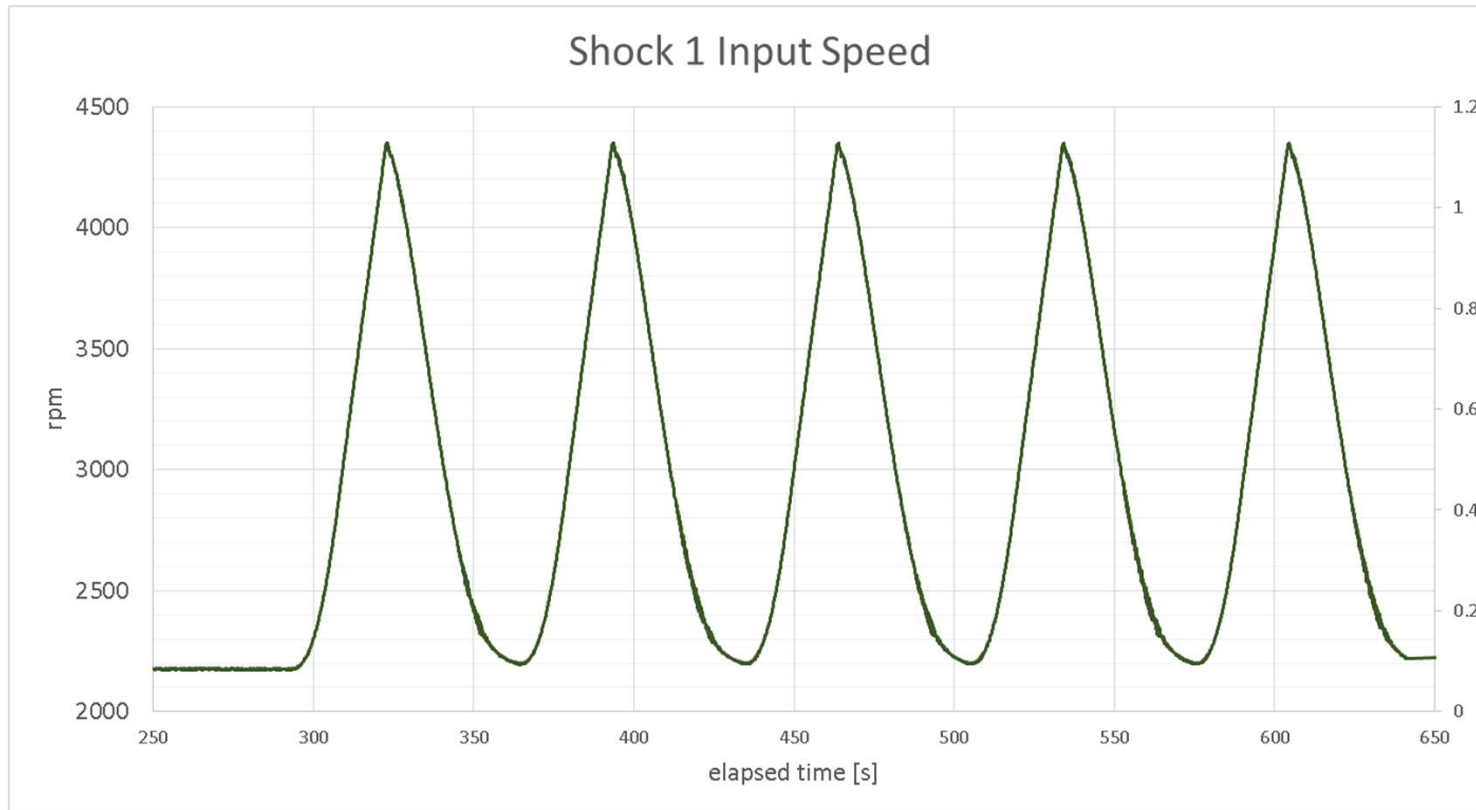
# Shock I—0 I-0006



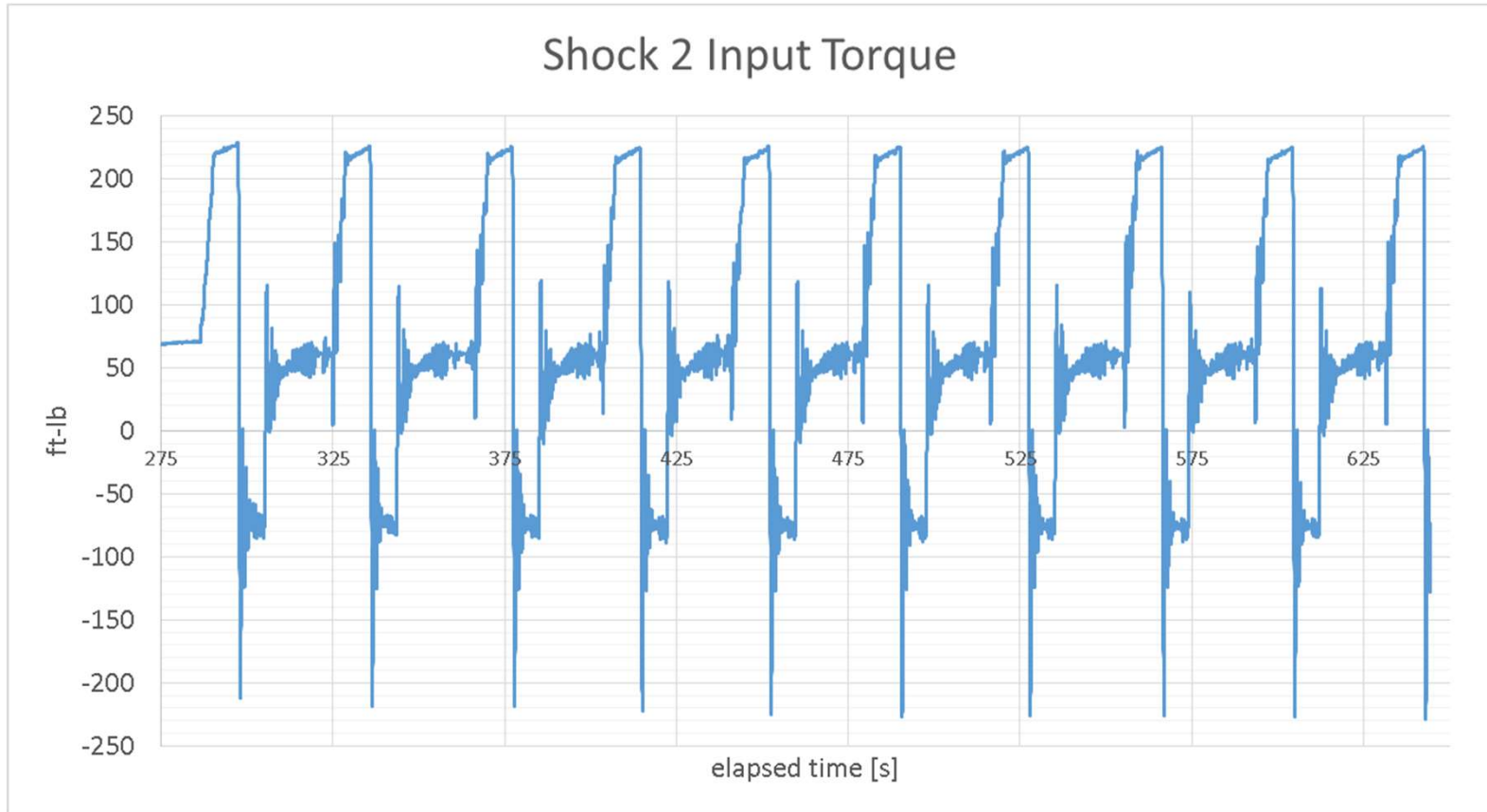
# Shock I—0 I-0006



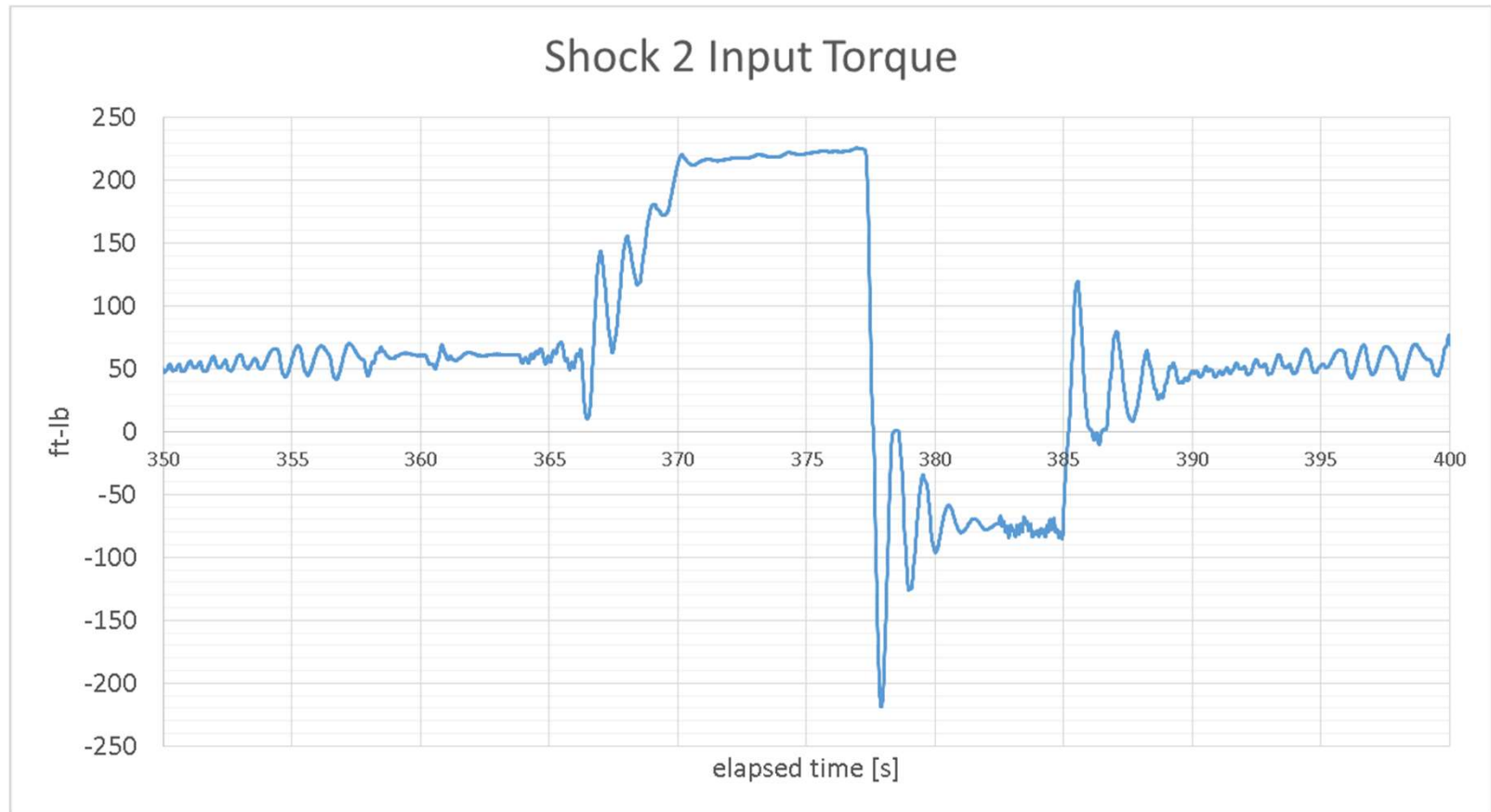
# Shock I—0 I-0006



# Shock 2—01-0006

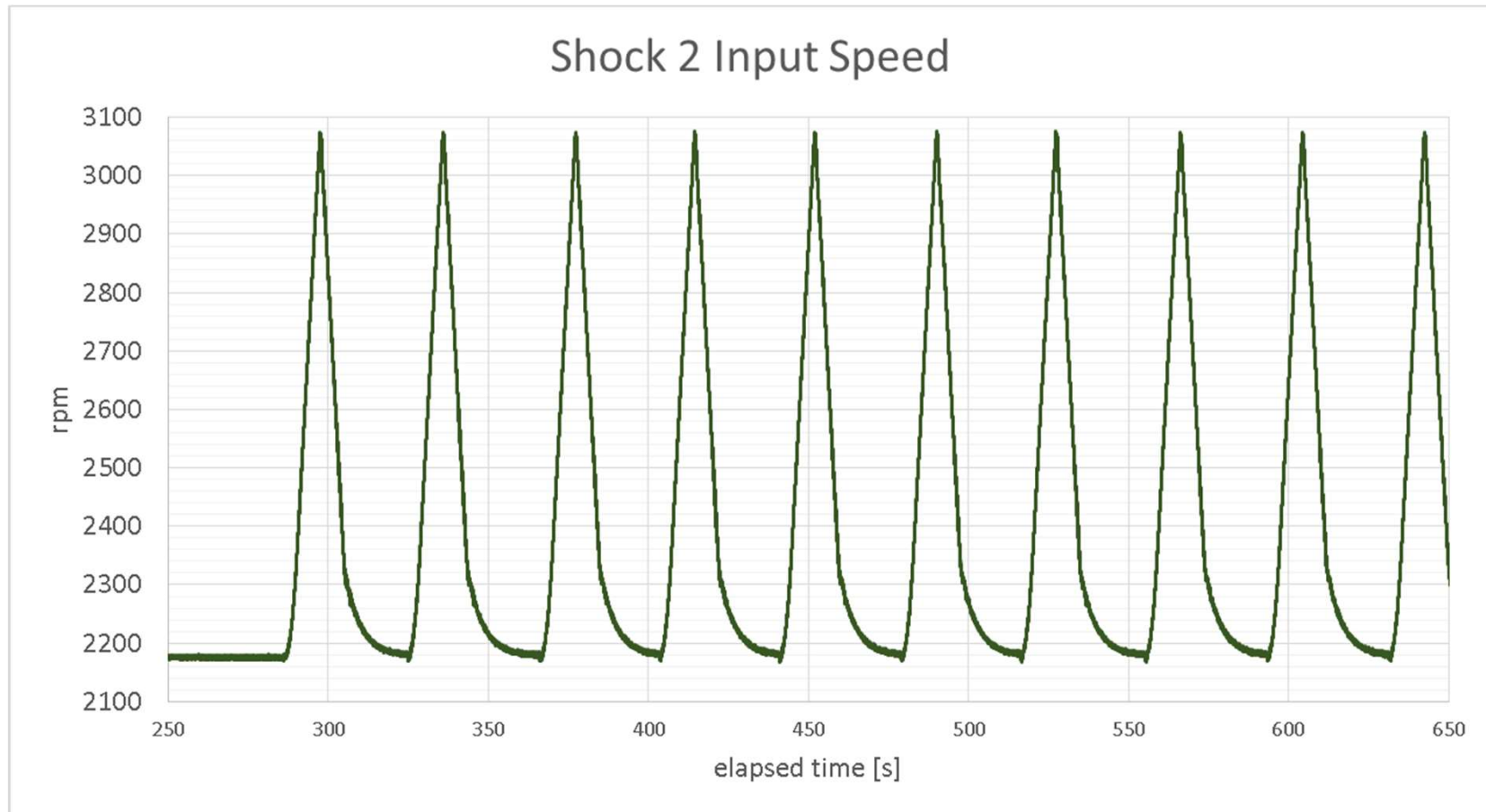


# Shock 2—01-0006

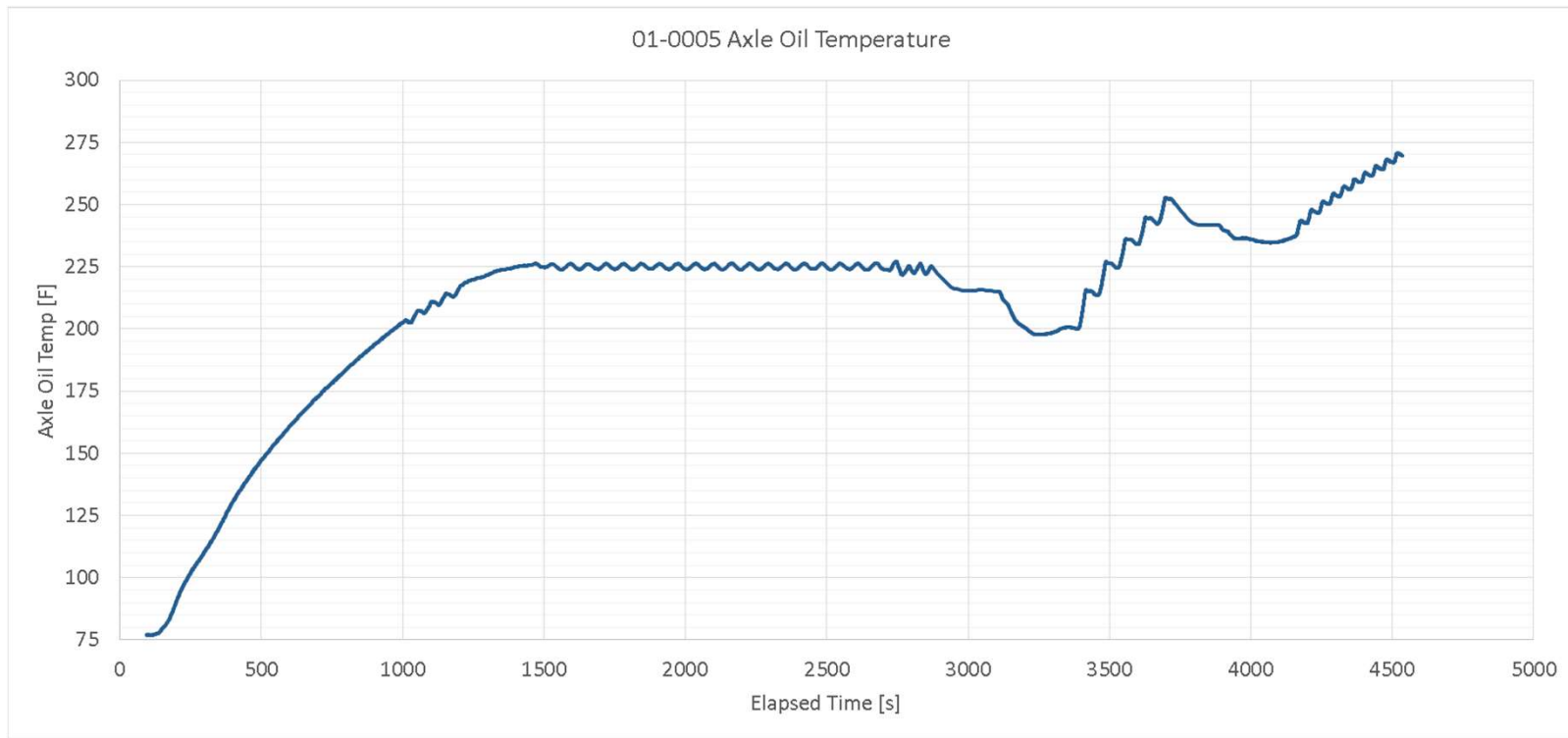




# Shock 2—01-0006



# Temperature Plot—01-0006



Phase	Min Temp	Max Temp
Shock 1	200.0	251.6
Shock 2	242.5	269.7

# Test Number 01-0007, TMC 117 (High Reference Oil)



# Stats—Conditioning 01-0007

Conditioning 1			
Input Torque [ft-lb]		Input Speed [rpm]	
Target	60 ± 5	Target	2363
Avg	59.7	Avg	2360
Min	58.3	Min	2356
Max	61.6	Max	2366

Conditioning 2				Conditioning 2			
Peak Input Torque Drive [ft-lb]		Peak Input Torque Coast [ft-lb]		Maximum Input Speed [rpm]		Minimum Input Speed [rpm]	
Target		Target		Target	2363	Target	1582
Avg	112.3	Avg	-61.7	Avg	2366	Avg	1581
Min	110.9	Min	-66.2	Min	2364	Min	1581
Max	113.1	Max	-57.2	Max	2368	Max	1582

Conditioning 3			
Input Torque [ft-lb]		Input Speed [rpm]	
Target	70 ± 5	Target	3350
Avg	70.0	Avg	3346
Min	49.5	Min	3342.5
Max	89.2	Max	3353

Conditioning 4				Conditioning 4			
Peak Input Torque Drive [ft-lb]		Peak Input Torque Coast [ft-lb]		Maximum Input Speed [rpm]		Minimum Input Speed [rpm]	
Target		Target		Target	3350	Target	2754
Avg	115.1	Avg	-66.0	Avg	3352	Avg	2753
Min	114.1	Min	-70.4	Min	3350	Min	2752
Max	115.7	Max	-62.3	Max	3354	Max	2753



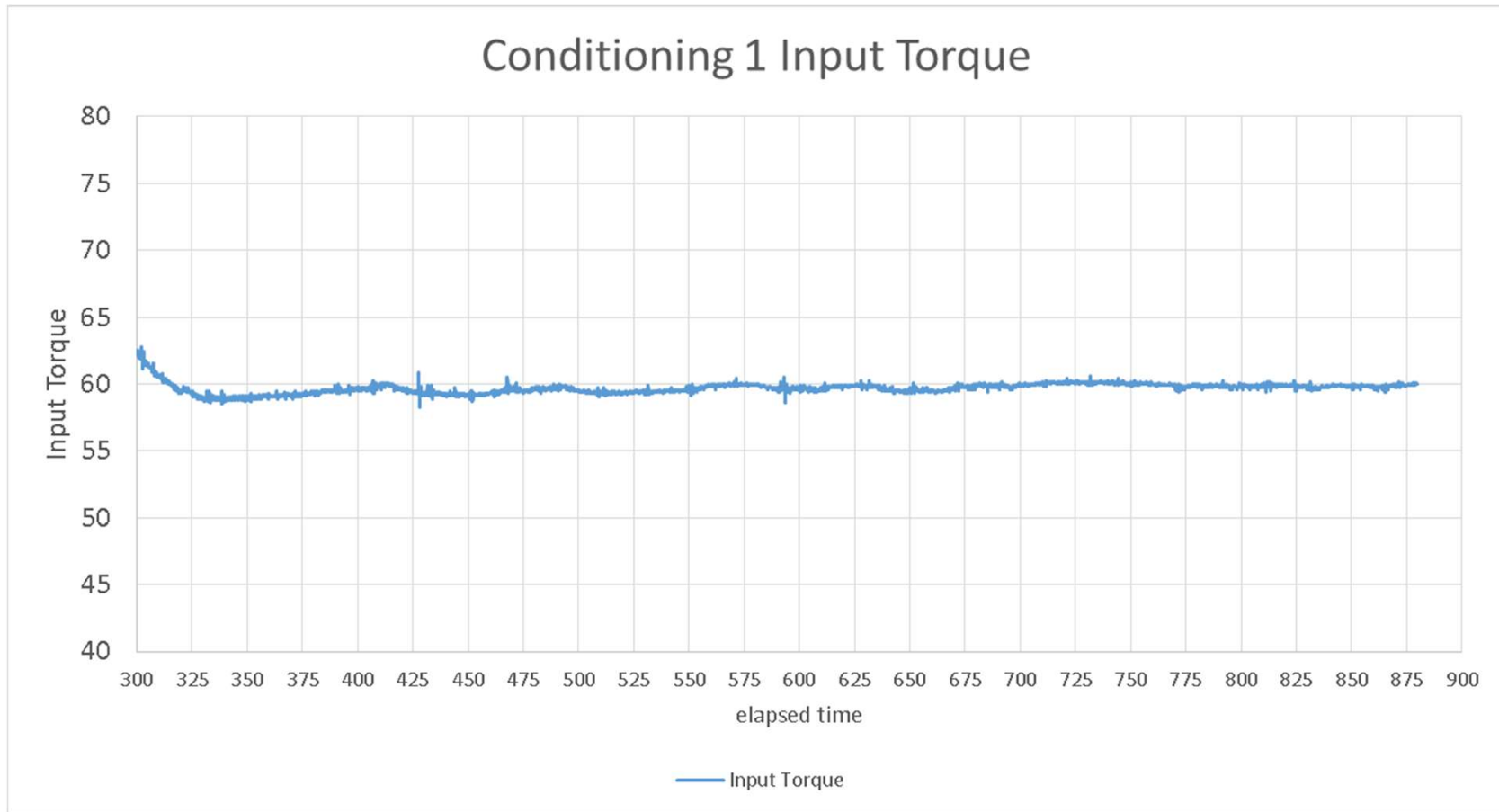
# Stats—Shocks 01-0007

Shock 1				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	235.6	Avg	-58.3	Avg	4349	Avg	2191
Min	234.6	Min	-68.8	Min	4348	Min	2172
Max	236.6	Max	-52.9	Max	4351	Max	2197

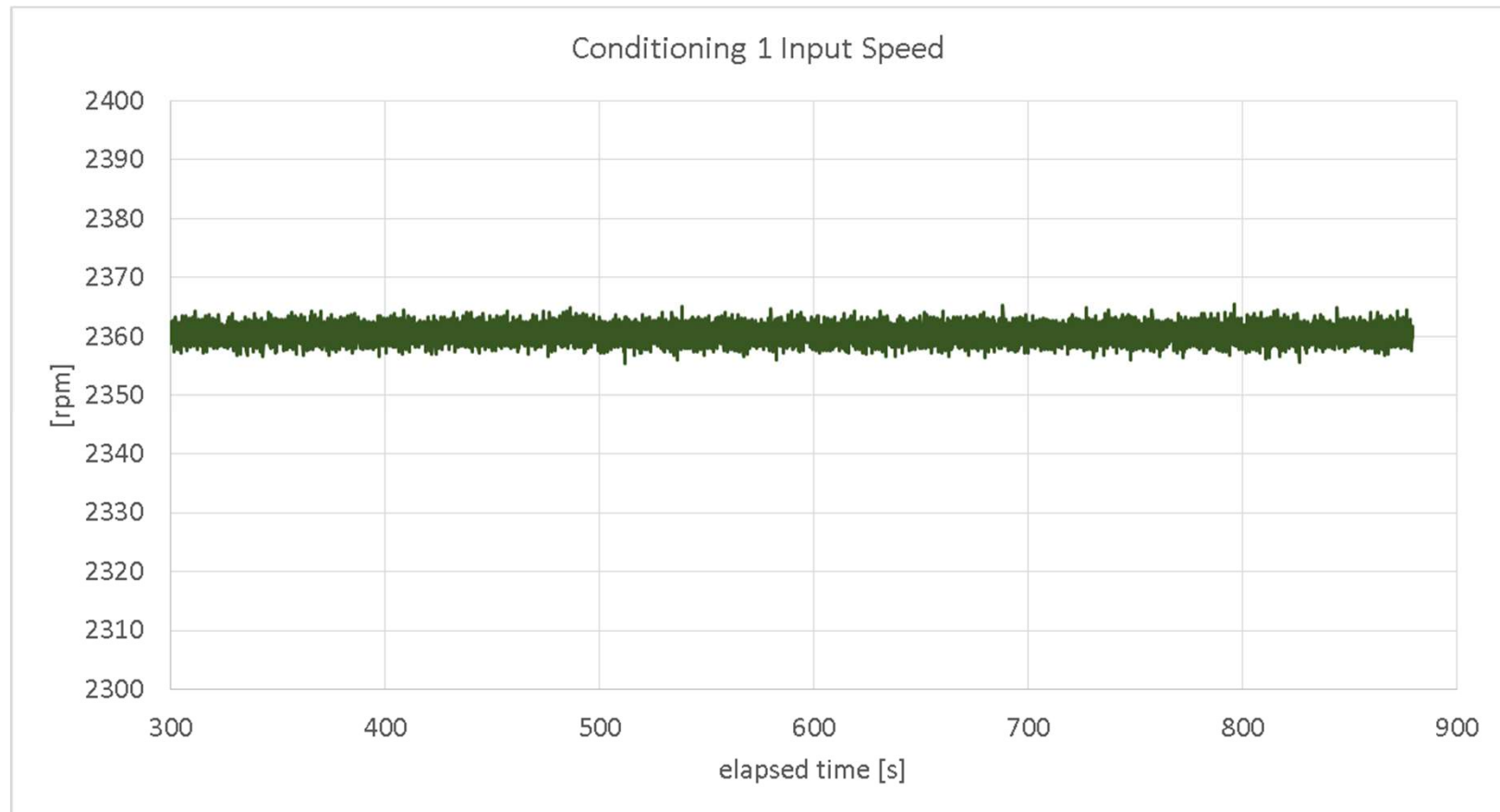
Shock 2				Shock 2			
Peak Input Torque Drive [ft-lb]		Peak Input Torque Coast [ft-lb]		Maximum Input Speed [rpm]		Minimum Input Speed [rpm]	
<i>Target</i>		<i>Target</i>		<i>Target</i>	3083	<i>Target</i>	2178
Avg	225.8	Avg	-227.9	Avg	3065	Avg	2249
Min	224.6	Min	-231.6	Min	2971	Min	2166
Max	227.9	Max	-216.2	Max	3077	Max	2172



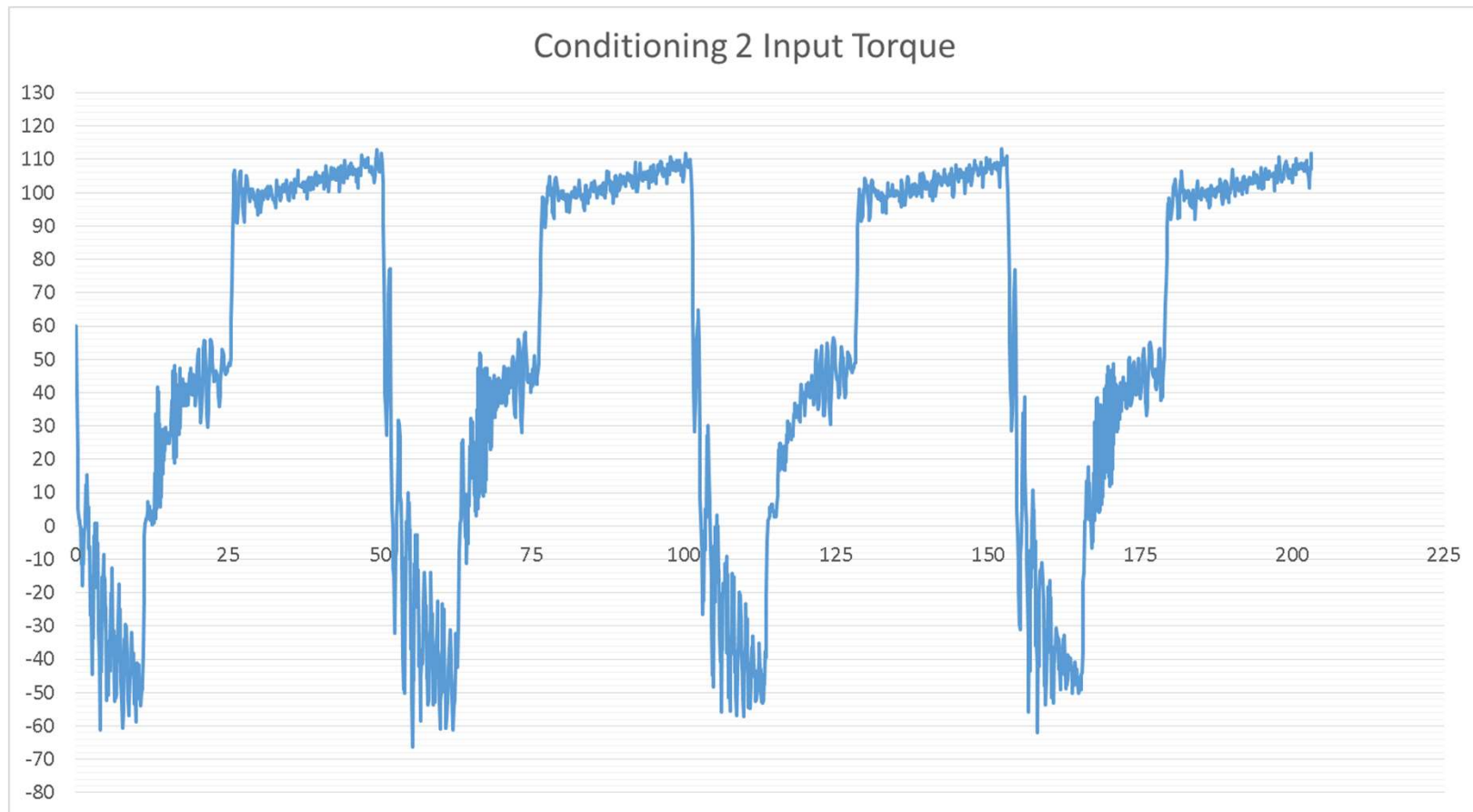
# Conditioning I—0 I-0007



# Conditioning I—0 I-0007

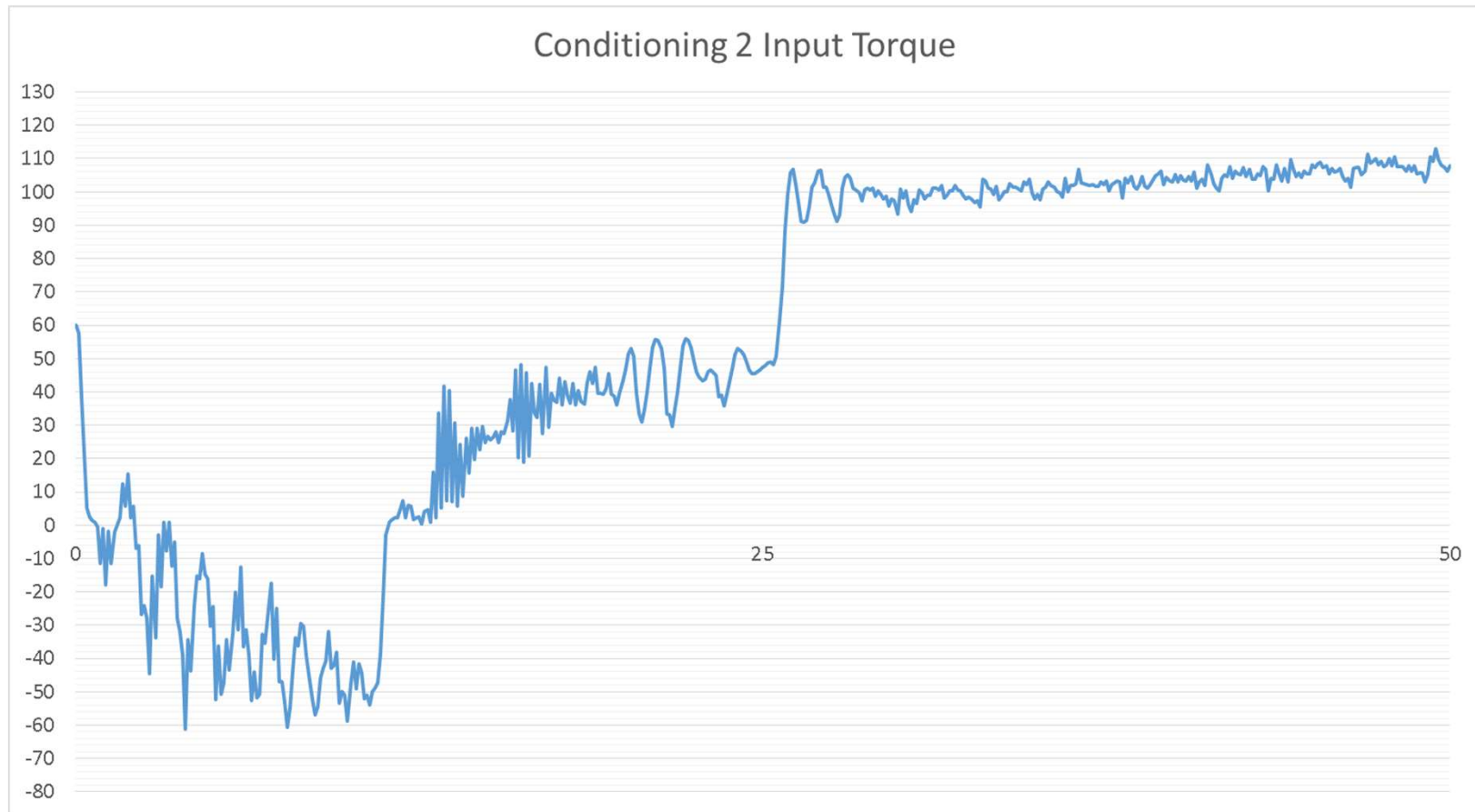


# Conditioning 2—01-0007

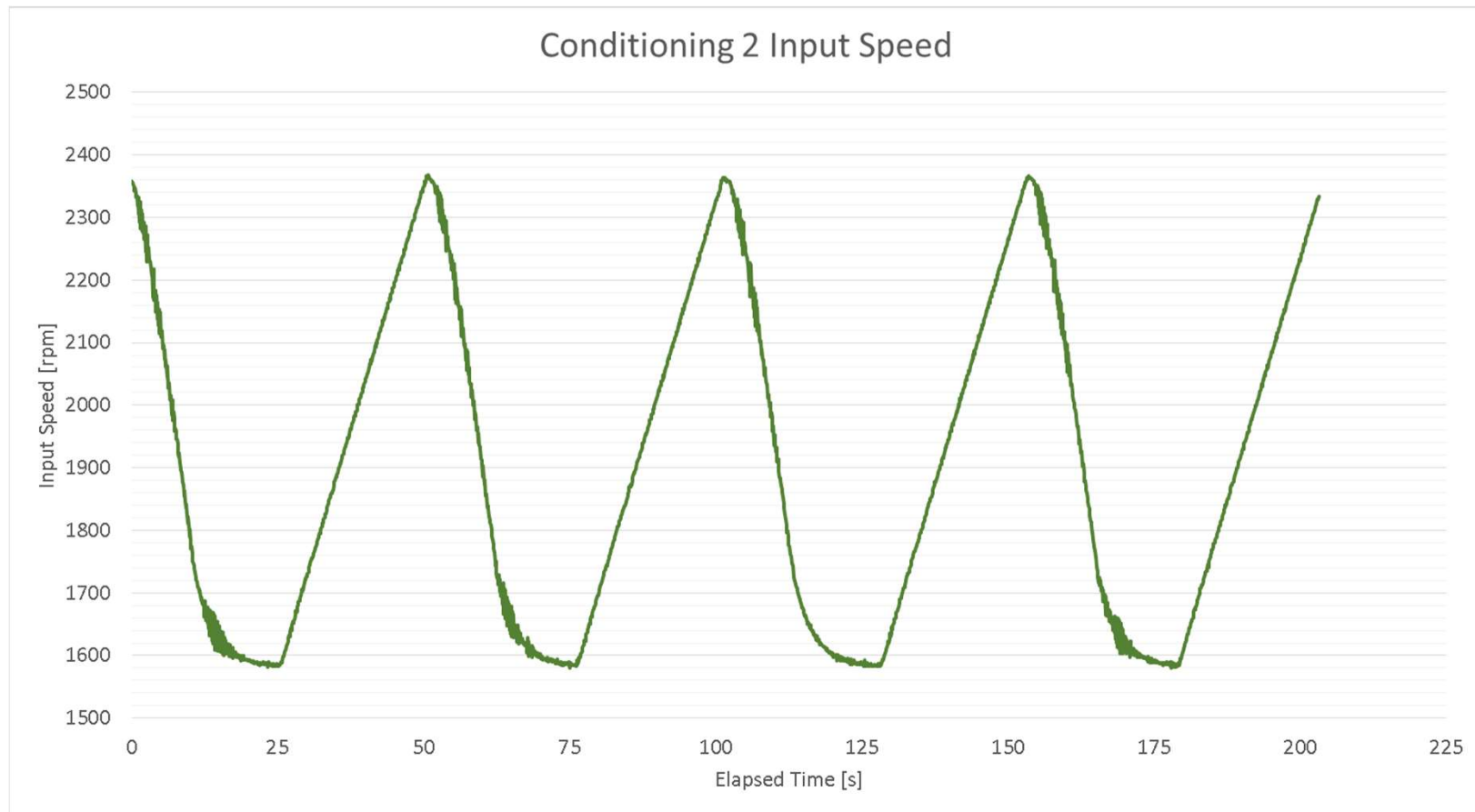




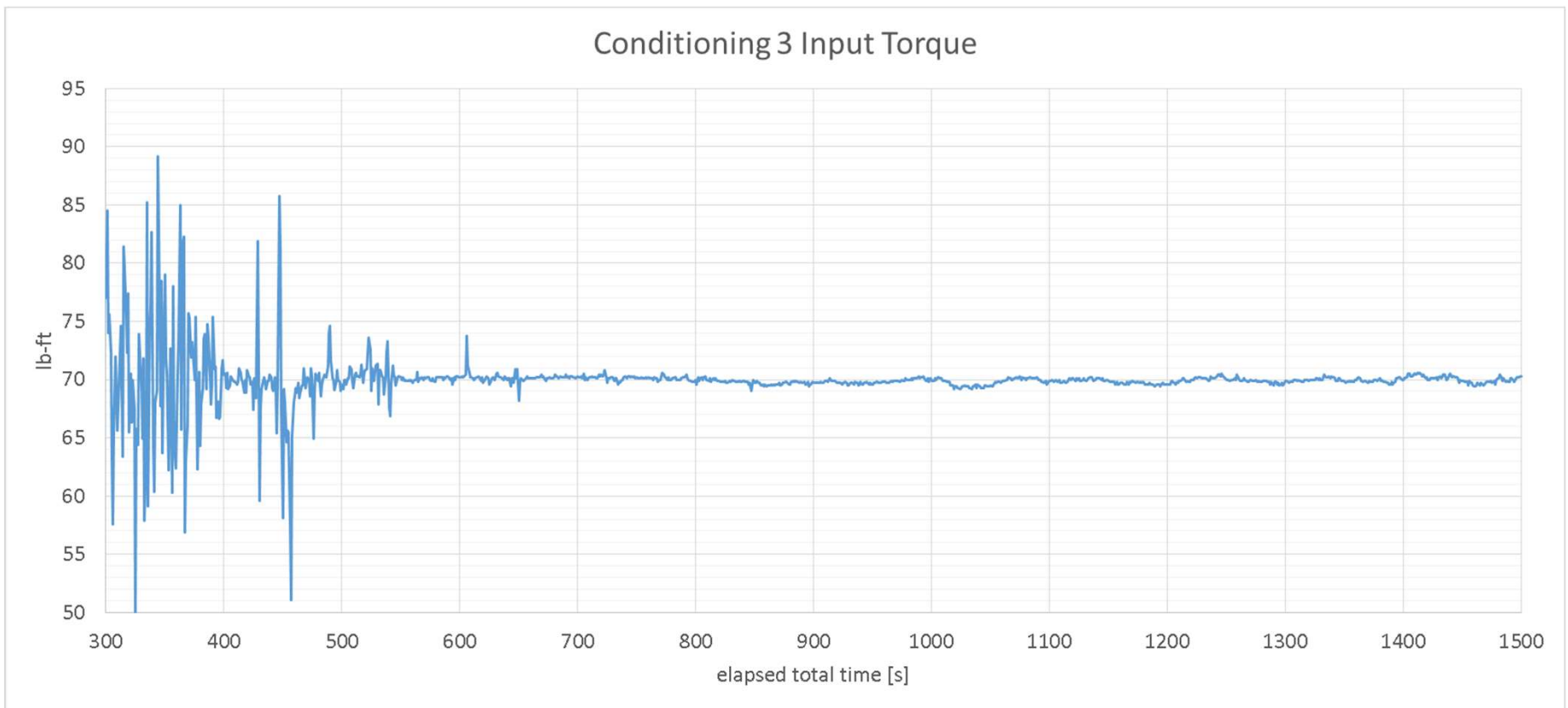
# Conditioning 2—01-0007



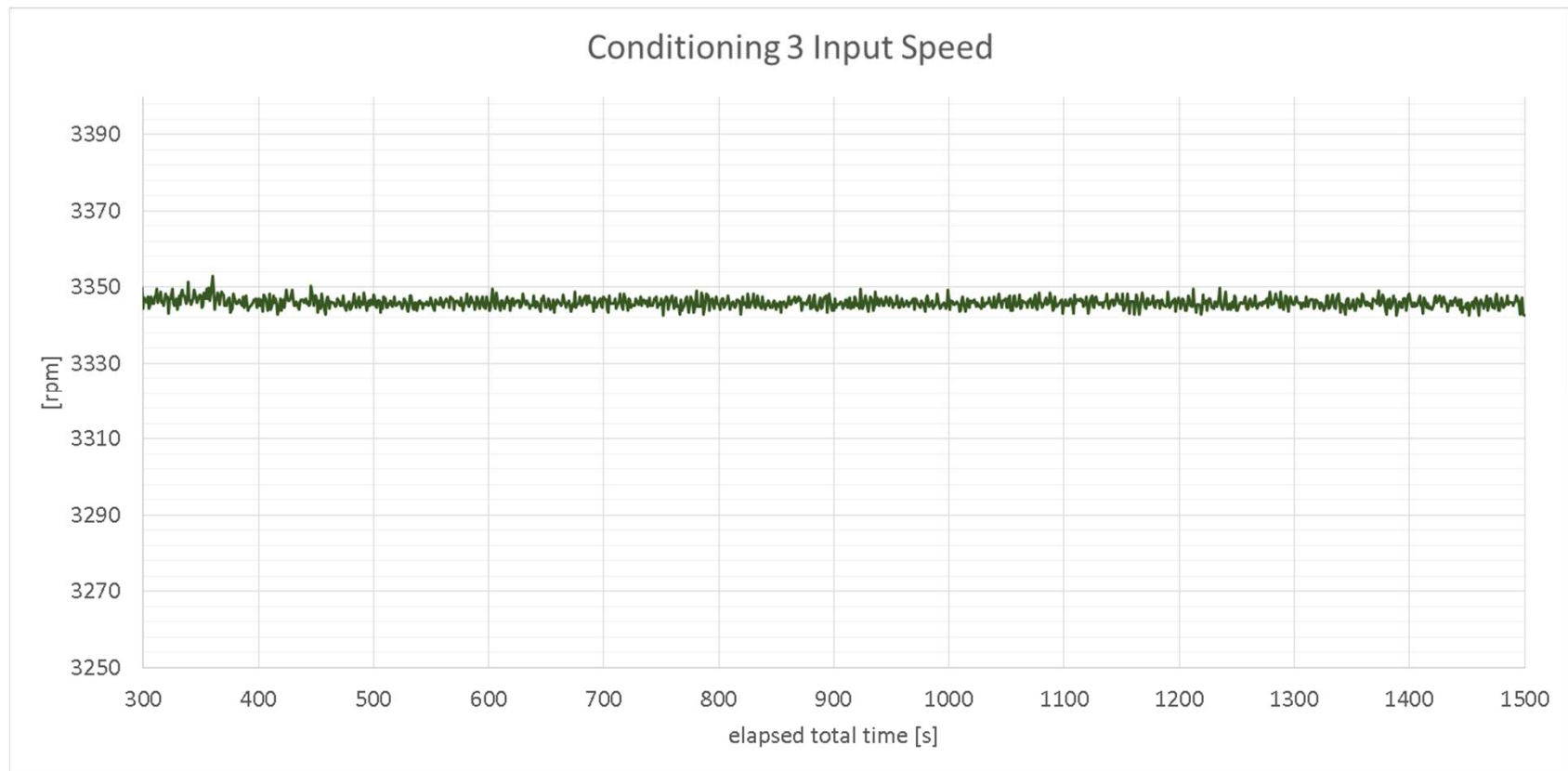
# Conditioning 2—01-0007



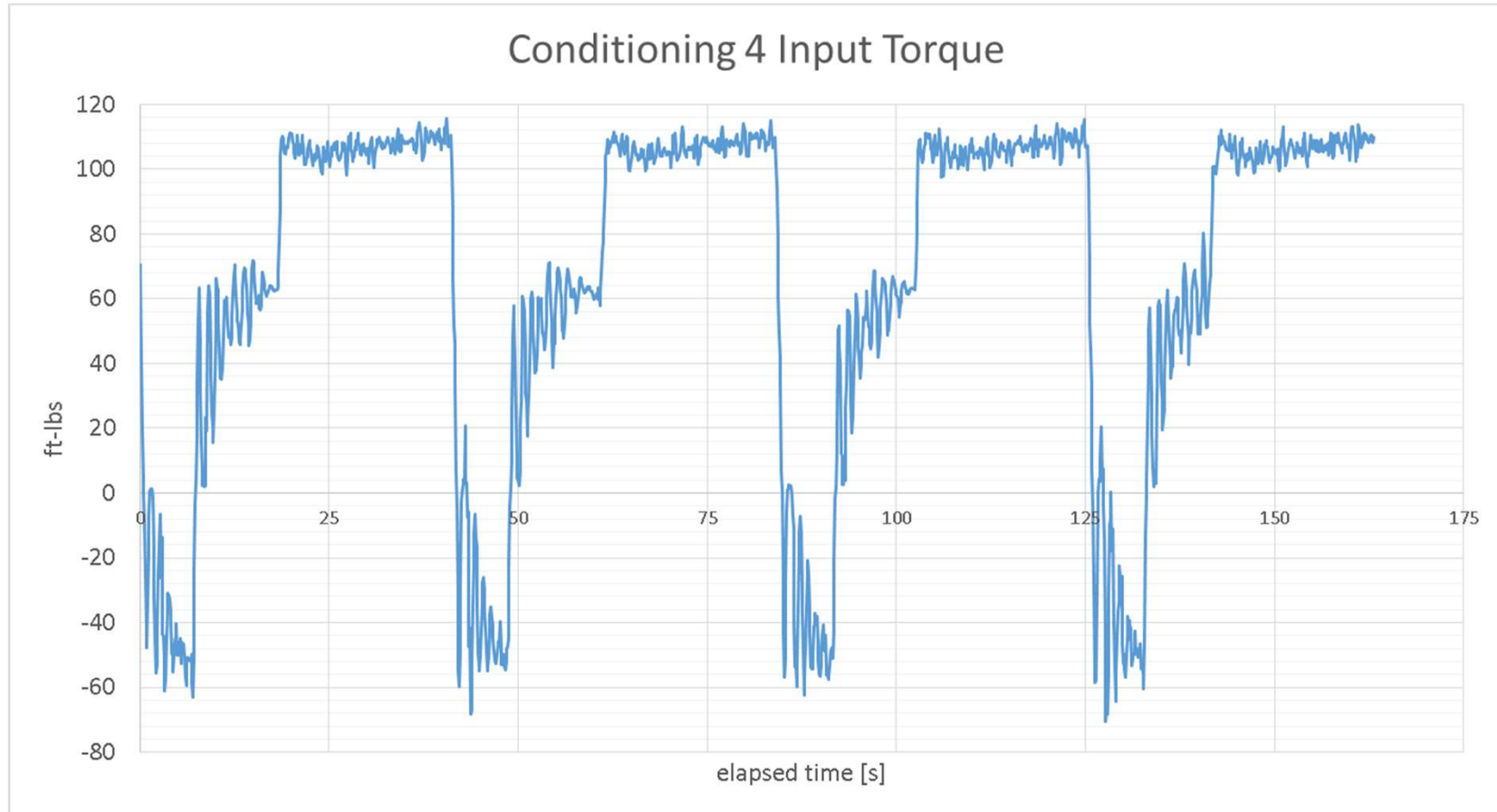
# Conditioning 3—01-0007



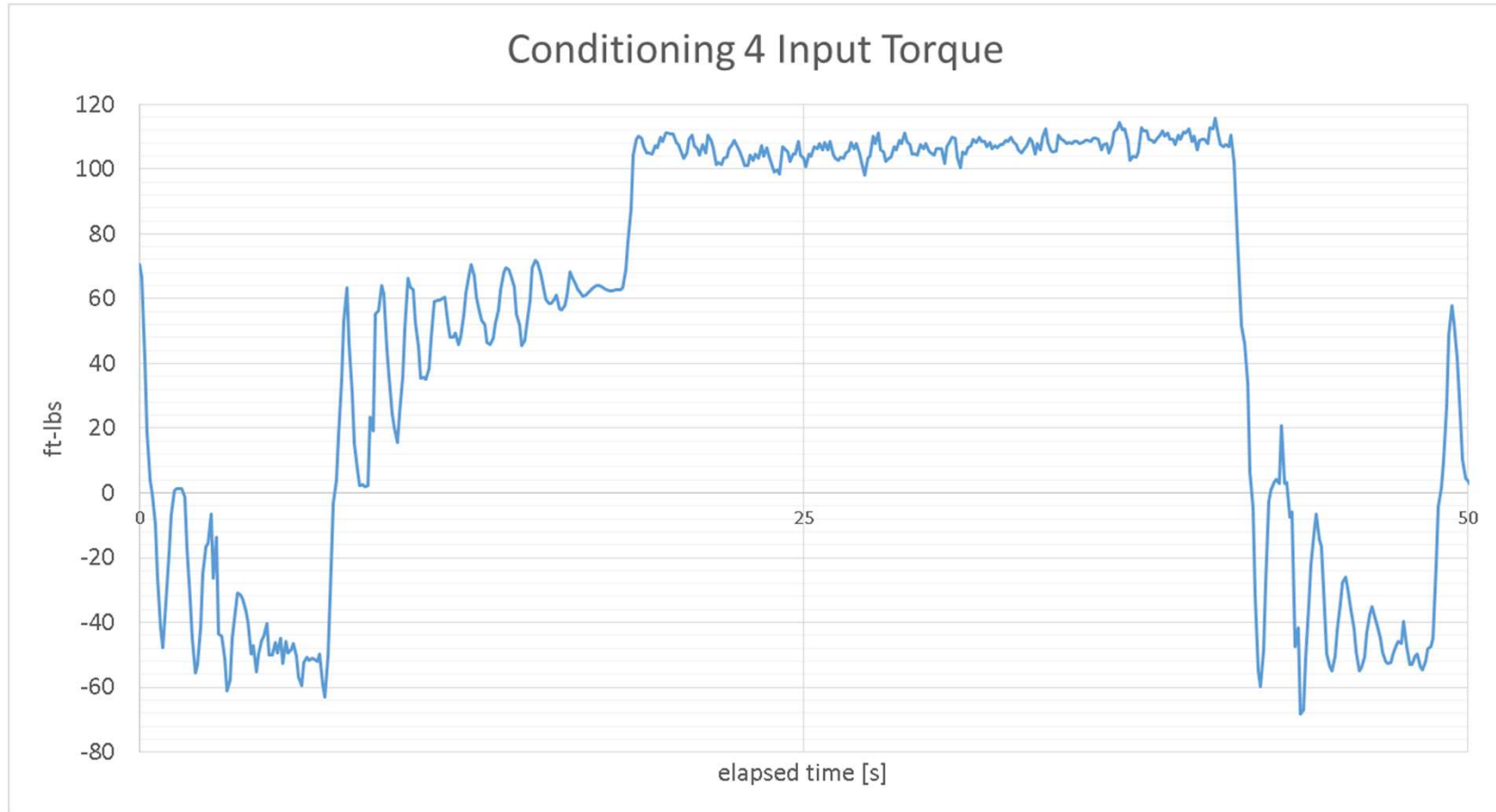
# Conditioning 3—01-0007



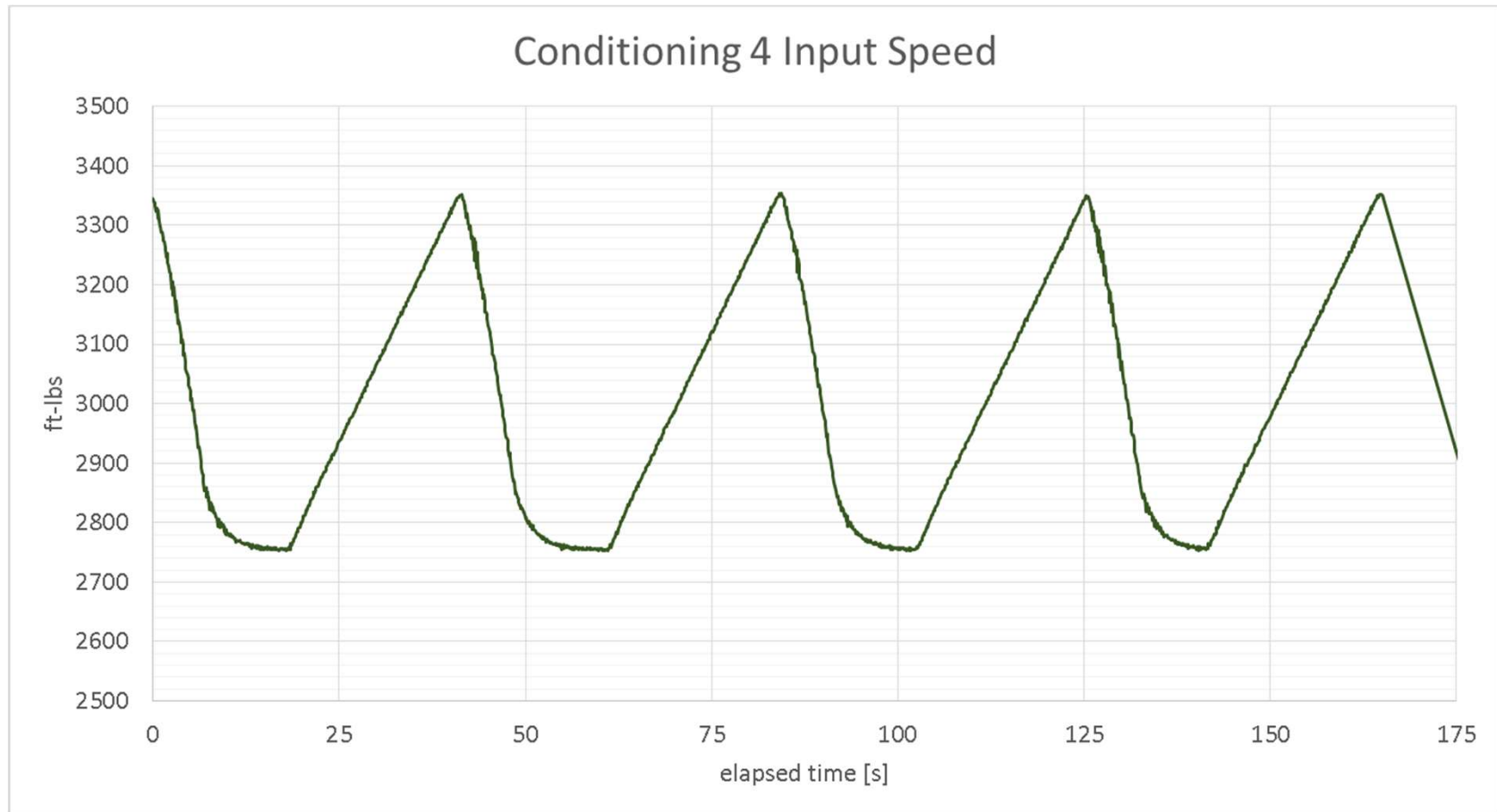
# Conditioning 4—01-0007



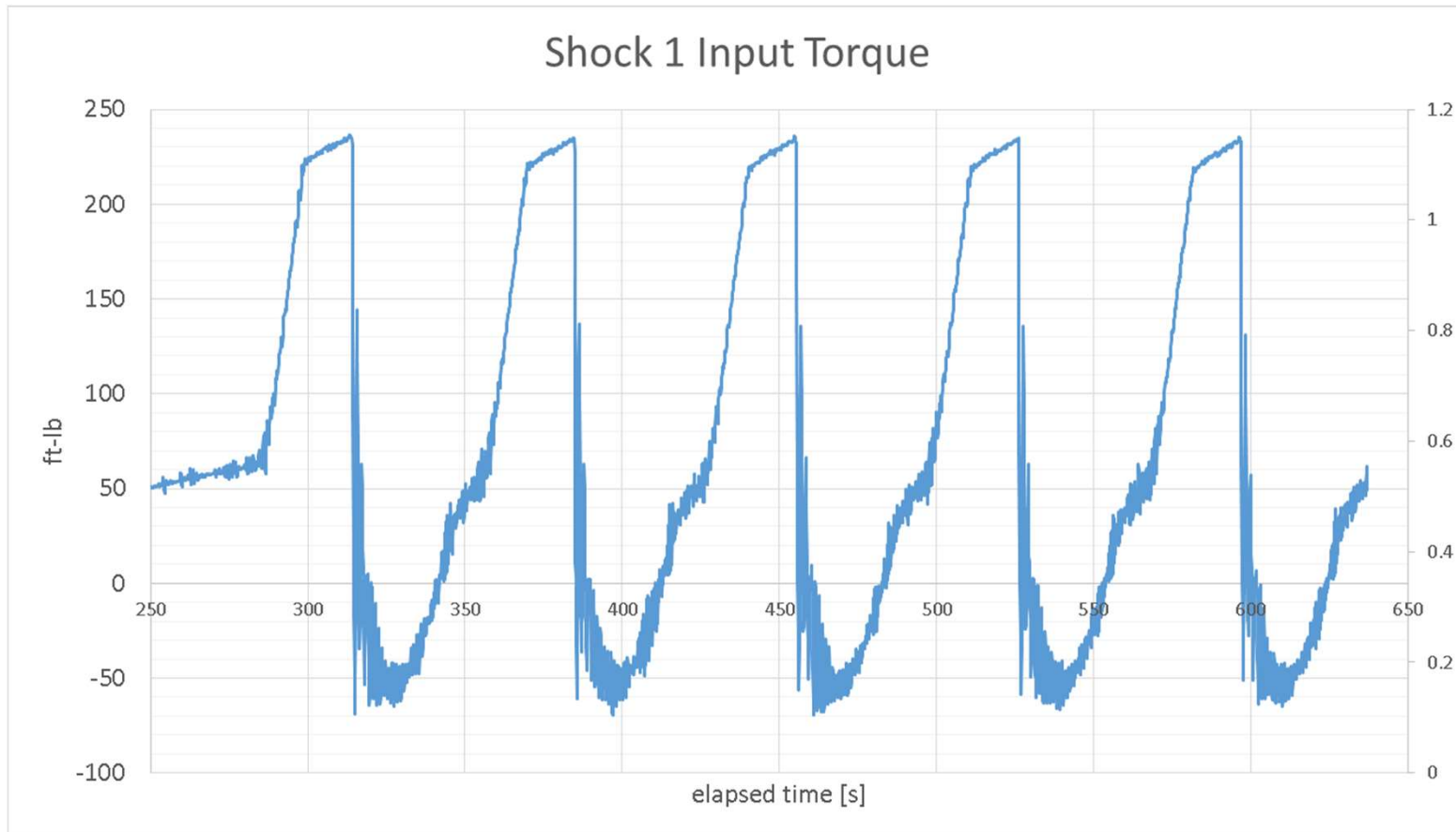
# Conditioning 4—01-0007



# Conditioning 4—01-0007

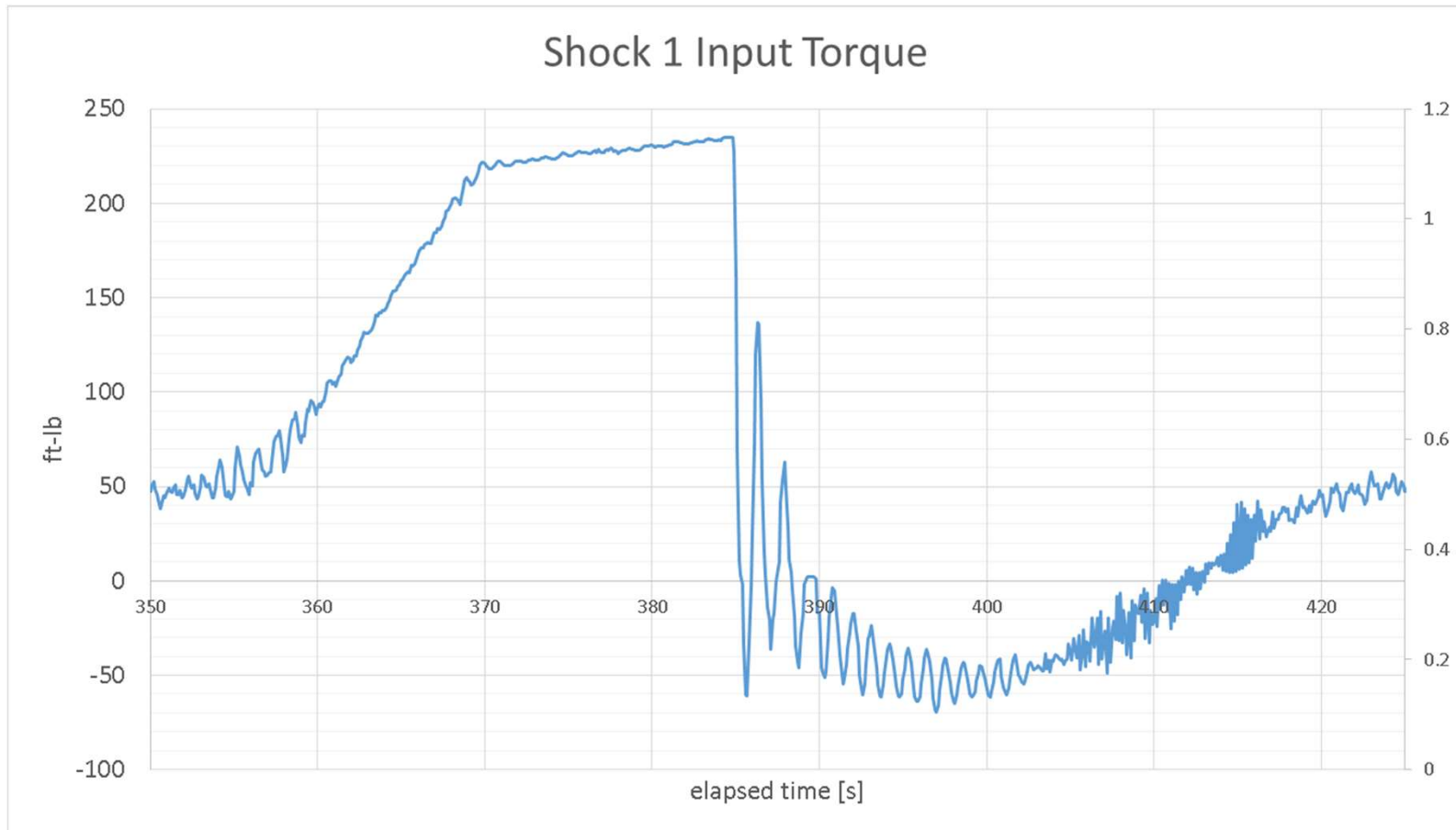


# Shock I—0 I-0007

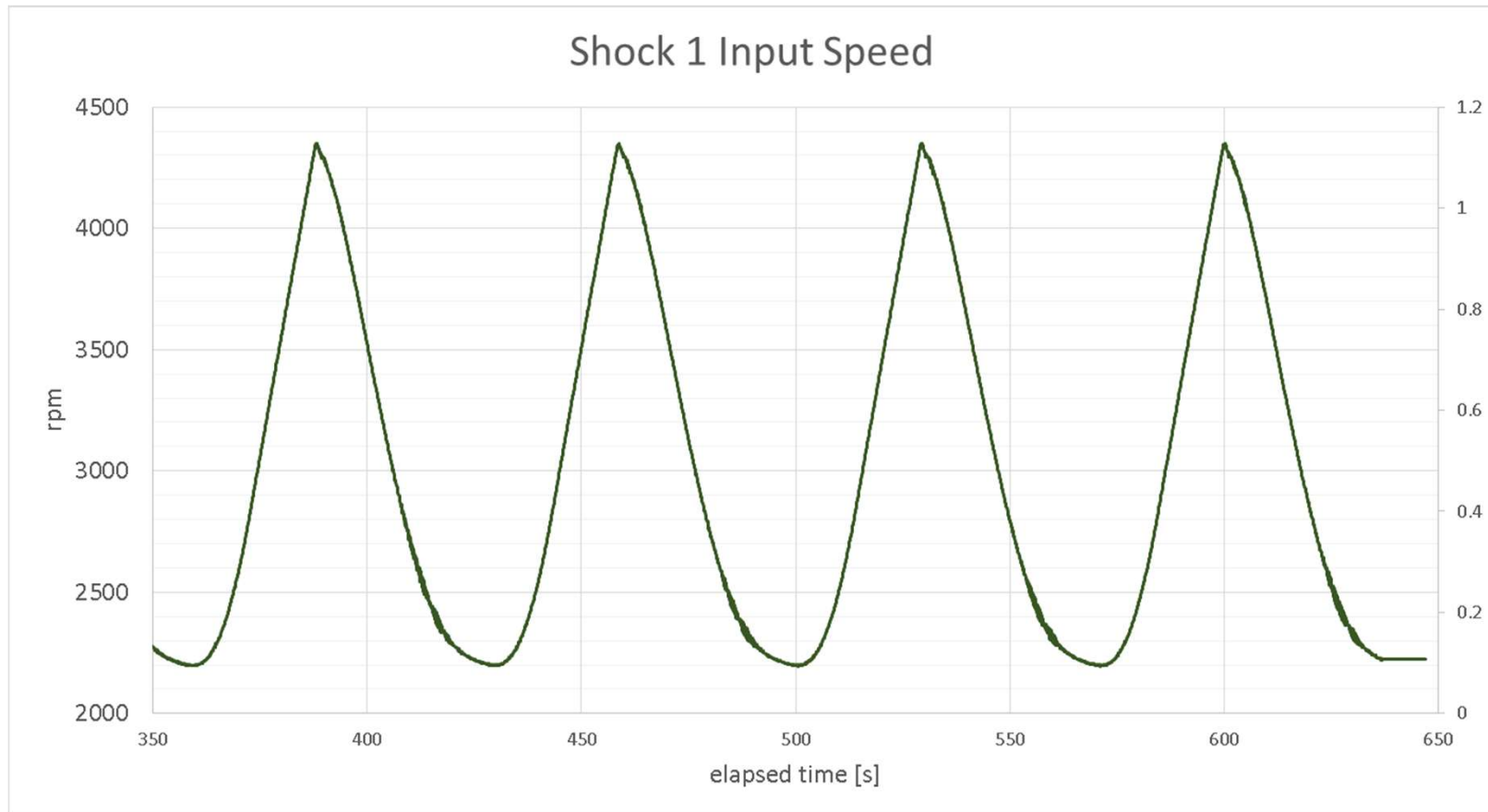




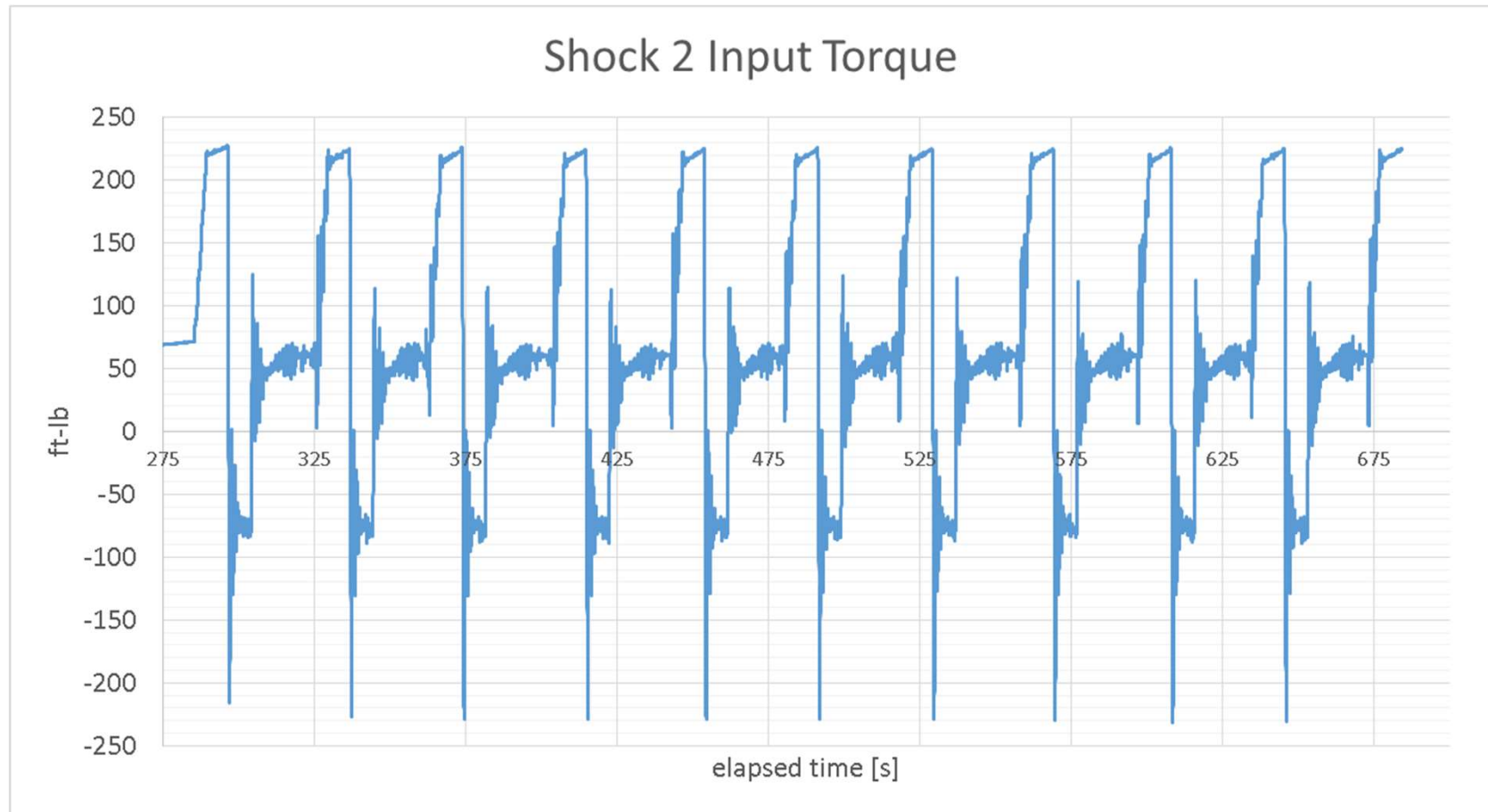
# Shock I—0 I-0007



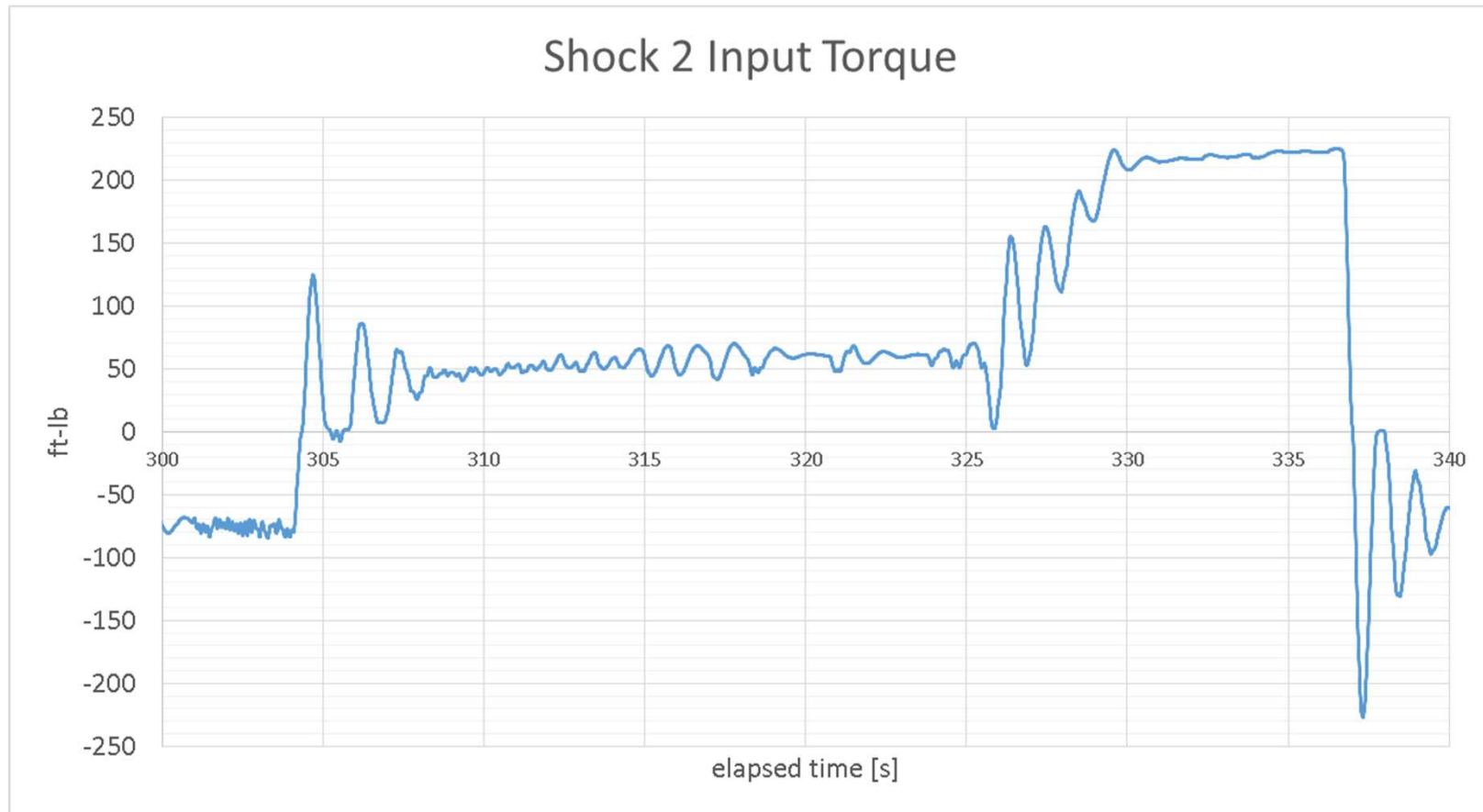
# Shock I—0 I-0007



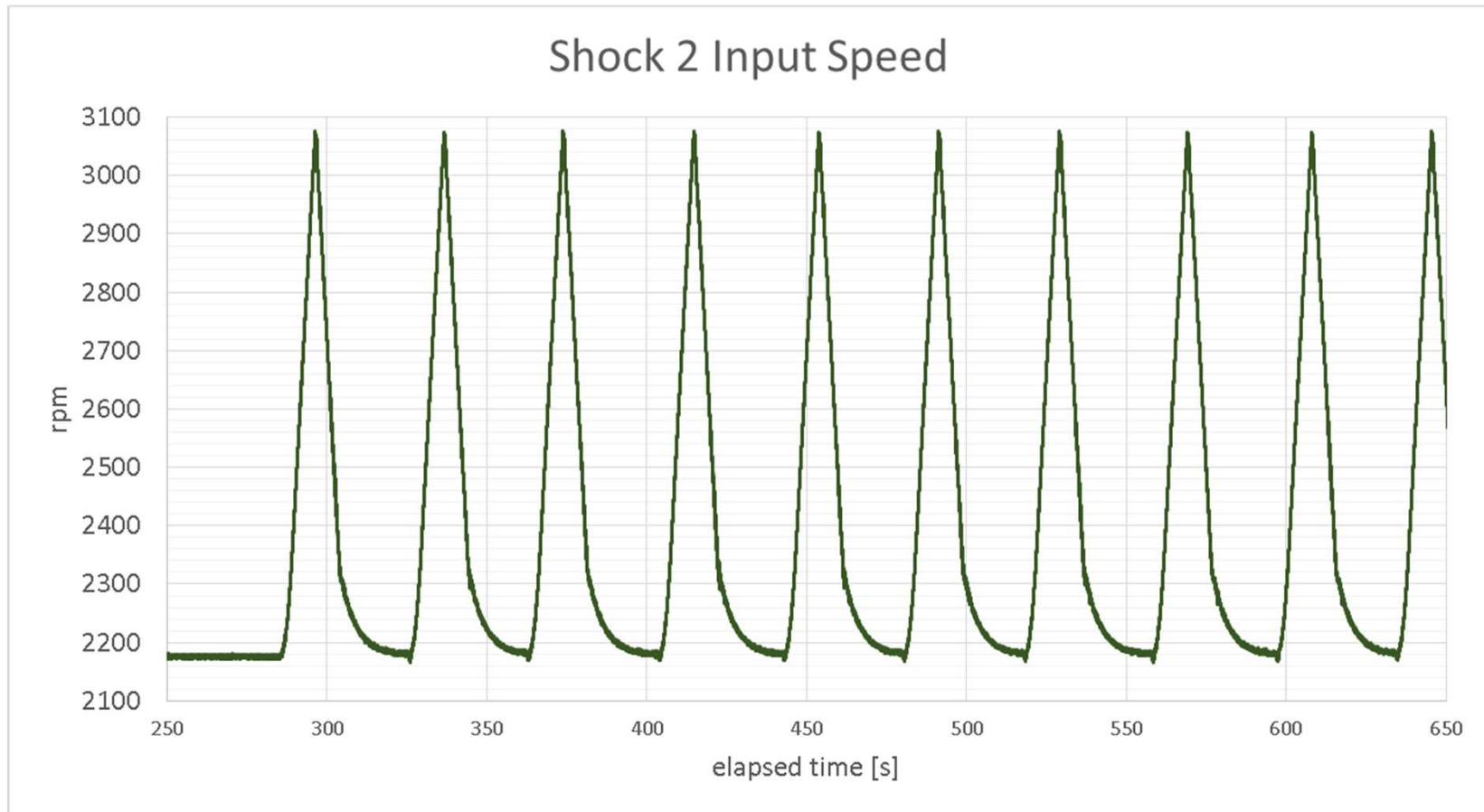
# Shock 2—01-0007



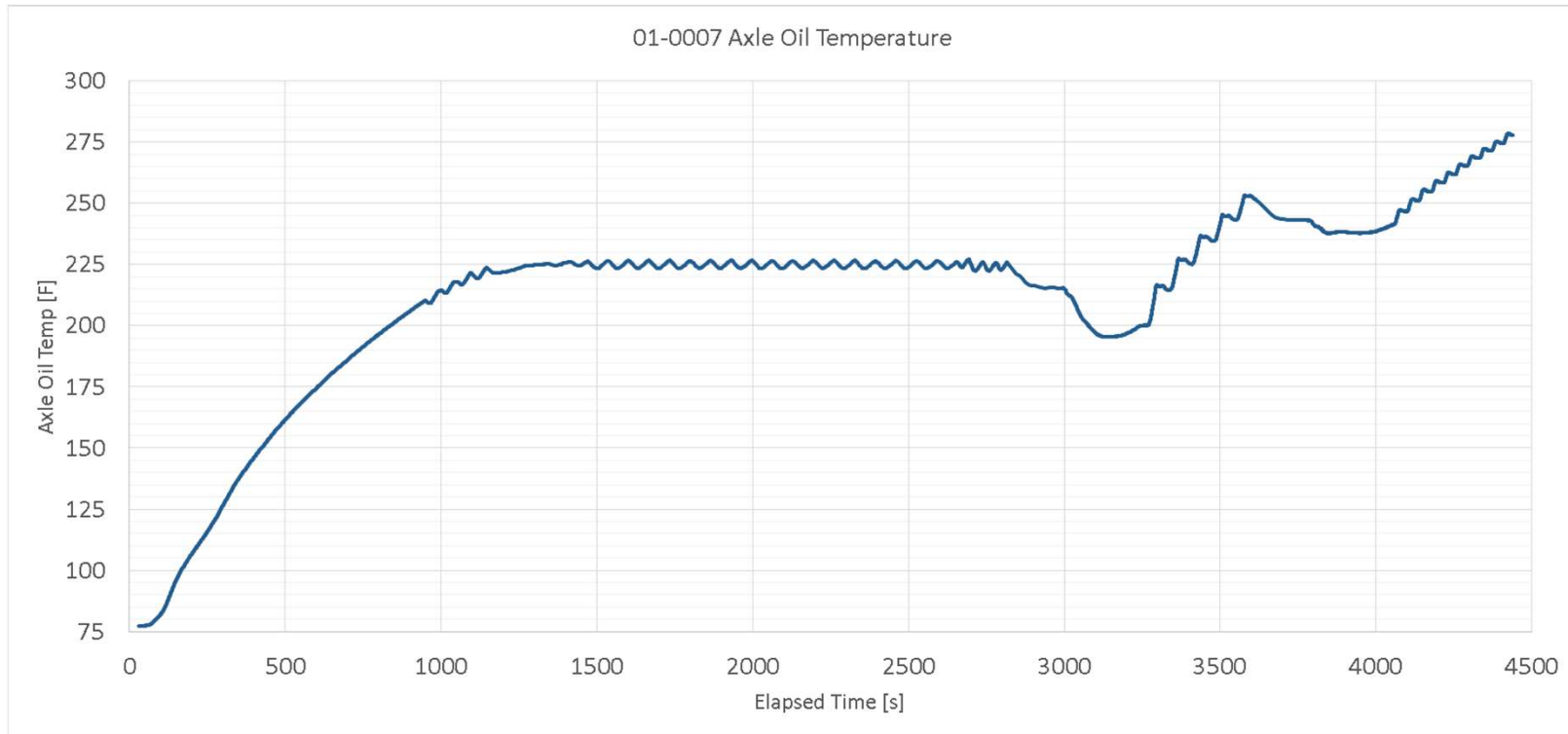
# Shock 2—01-0007



# Shock 2—01-0007



# Temperature Plot—01-0007



Phase	Min Temp	Max Temp
Shock 1	200.5	252.7
Shock 2	243.3	277.9

# Test Number 01-0008, TMC 113 (Discrimination Oil)



# Stats—Conditioning 01-0008

Conditioning 1			
Input Torque [ft-lb]		Input Speed [rpm]	
Target	60 ± 5	Target	2363
Avg	59.7	Avg	2360
Min	58.2	Min	2357
Max	62.7	Max	2364

Conditioning 2				Conditioning 2			
Peak Input Torque Drive [ft-lb]		Peak Input Torque Coast [ft-lb]		Maximum Input Speed [rpm]		Minimum Input Speed [rpm]	
Target		Target		Target	2363	Target	1582
Avg	111.7	Avg	-58.4	Avg	2366	Avg	1580
Min	110.9	Min	-61.5	Min	2365	Min	1579
Max	112.8	Max	-56.7	Max	2368	Max	1582

Conditioning 3			
Input Torque [ft-lb]		Input Speed [rpm]	
Target	70 ± 5	Target	3350
Avg	70.1	Avg	3345
Min	63.1	Min	3342.9
Max	83.6	Max	3348.7

Conditioning 4				Conditioning 4			
Peak Input Torque Drive [ft-lb]		Peak Input Torque Coast [ft-lb]		Maximum Input Speed [rpm]		Minimum Input Speed [rpm]	
Target		Target		Target	3350	Target	2754
Avg	113.8	Avg	-64.3	Avg	3353	Avg	2753
Min	113.4	Min	-69.8	Min	3349	Min	2753
Max	114.3	Max	-58.2	Max	3354	Max	2753





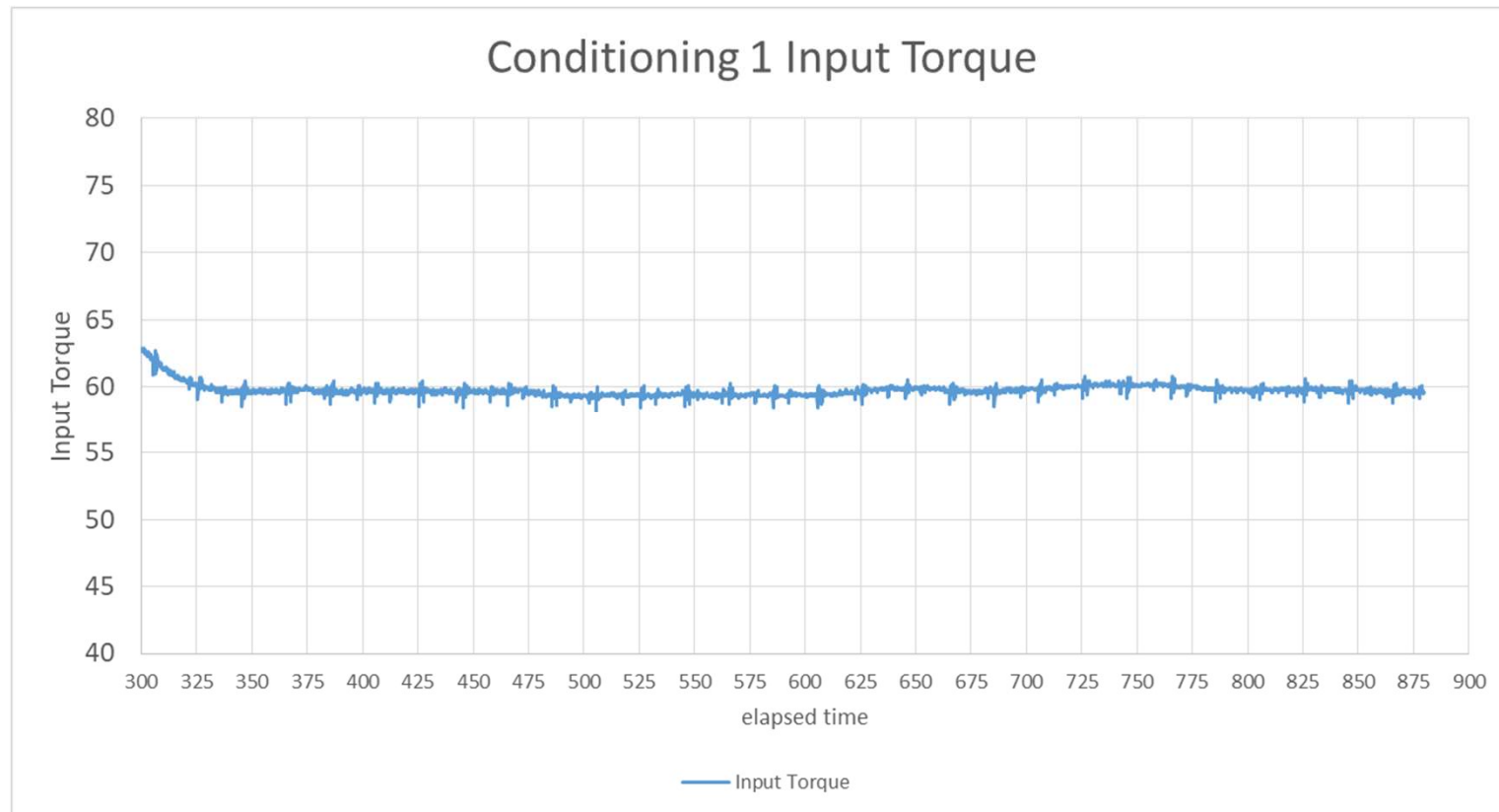
# Stats—Shocks 01-0008

Shock 1				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	235.4	Avg	-61.4	Avg	4351	Avg	2191
Min	234.1	Min	-84.7	Min	4350	Min	2173
Max	237.7	Max	-52.9	Max	4355	Max	2196

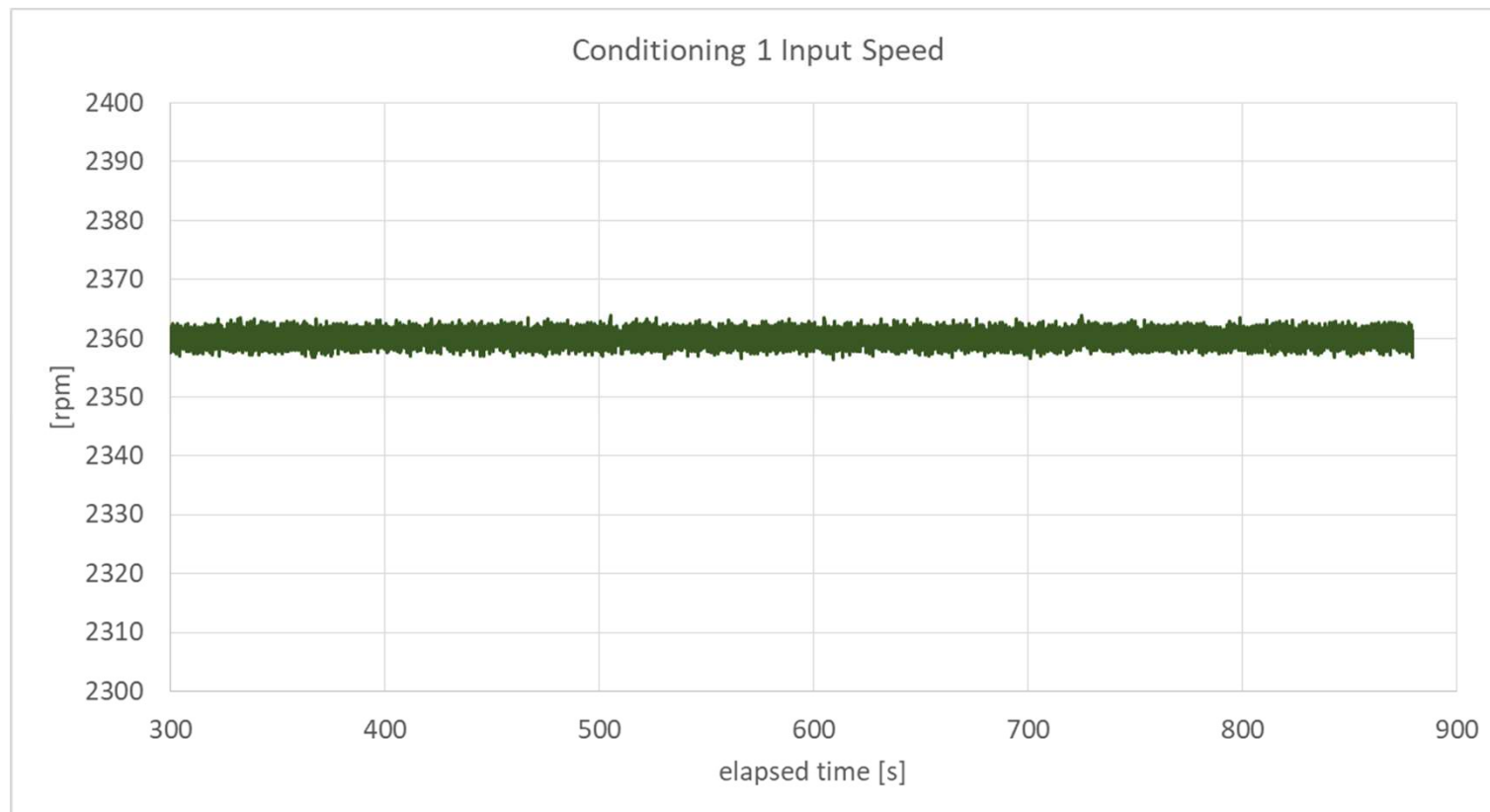
Shock 2				Shock 2			
Peak Input Torque Drive [ft-lb]		Peak Input Torque Coast [ft-lb]		Maximum Input Speed [rpm]		Minimum Input Speed [rpm]	
<i>Target</i>		<i>Target</i>		<i>Target</i>	3083	<i>Target</i>	2178
Avg	228.5	Avg	-219.3	Avg	2983	Avg	2170
Min	227.7	Min	-223.2	Min	3065	Min	2168
Max	230.0	Max	-207.7	Max	3076	Max	2172



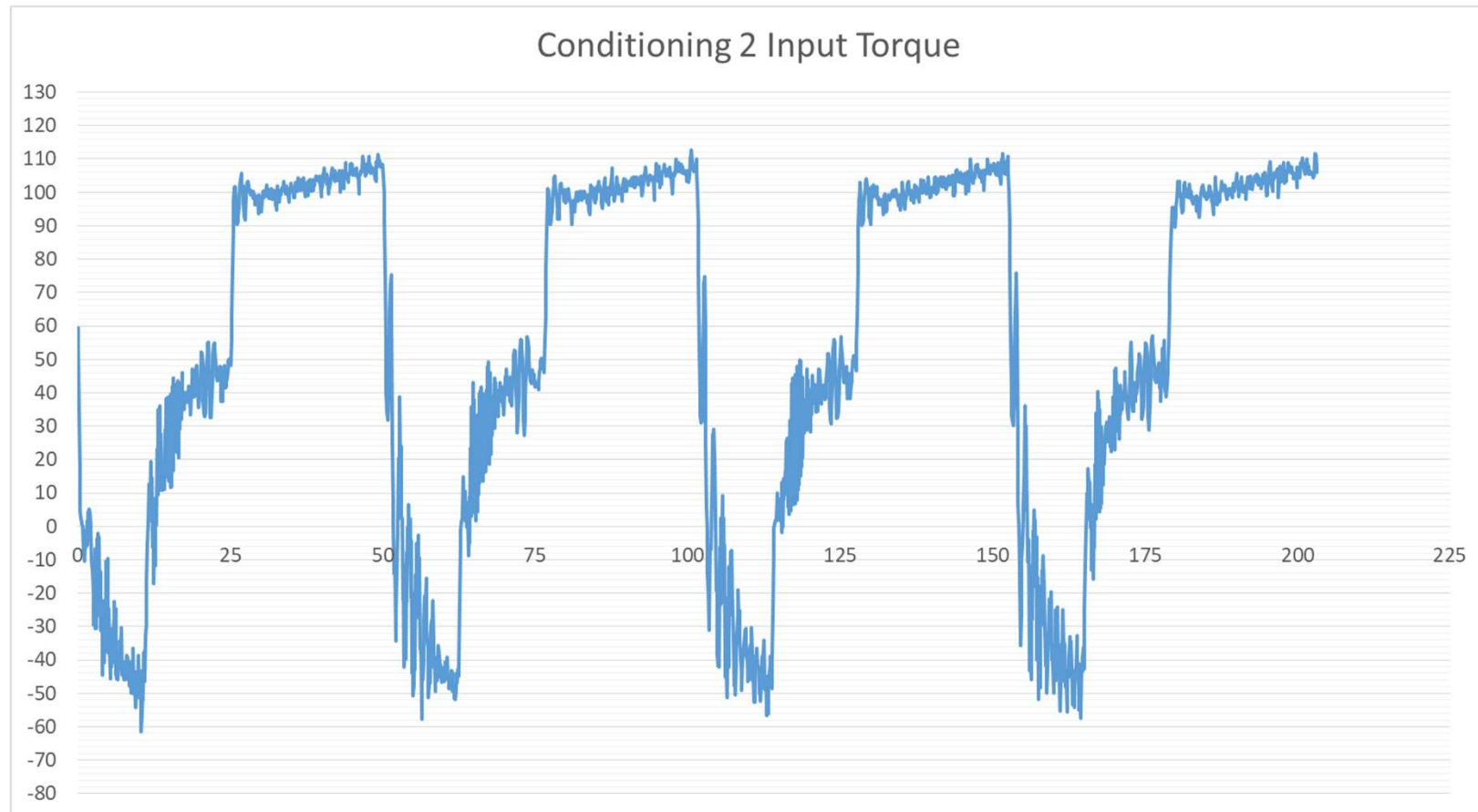
# Conditioning I—0 I-0008



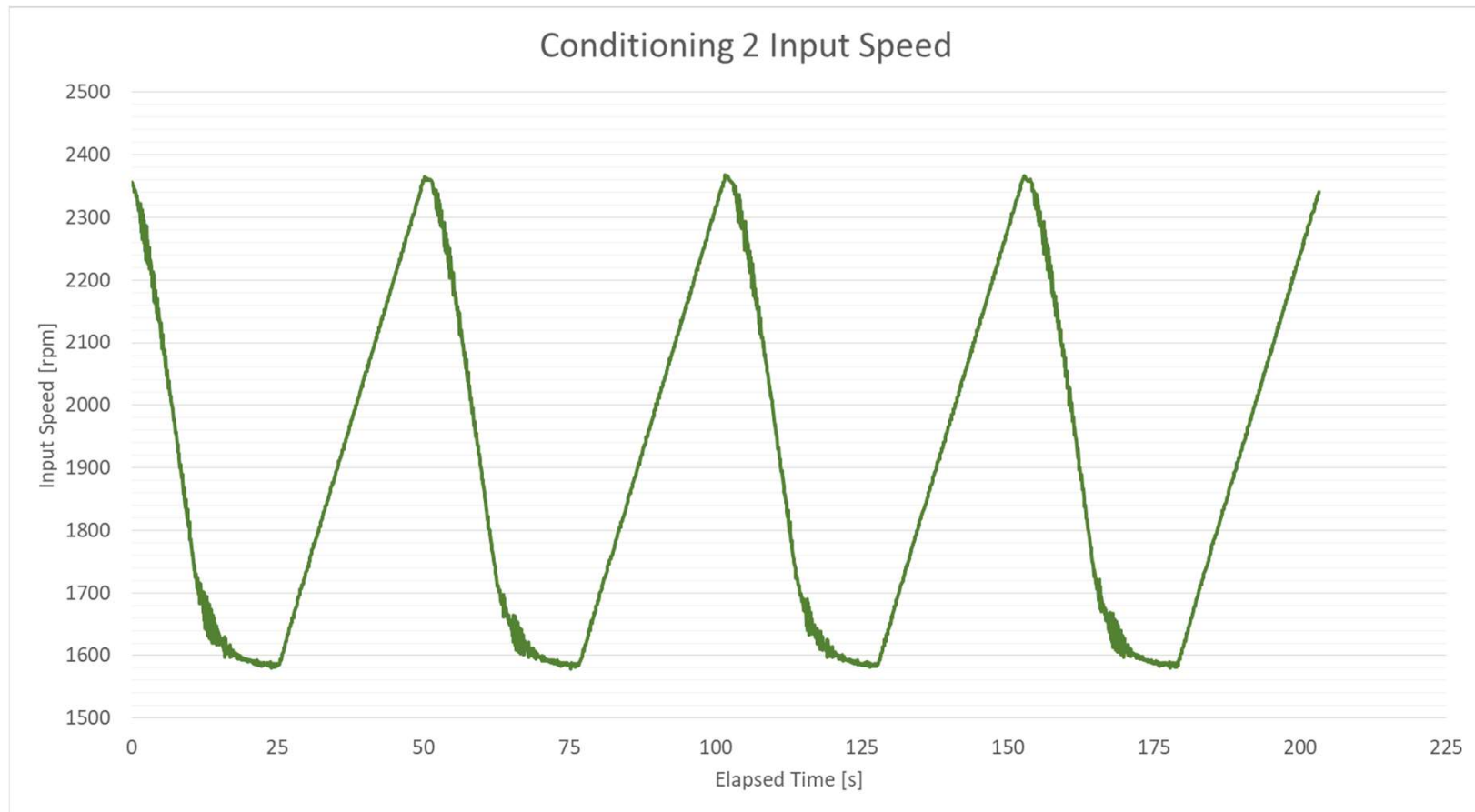
# Conditioning I—0 I-0008



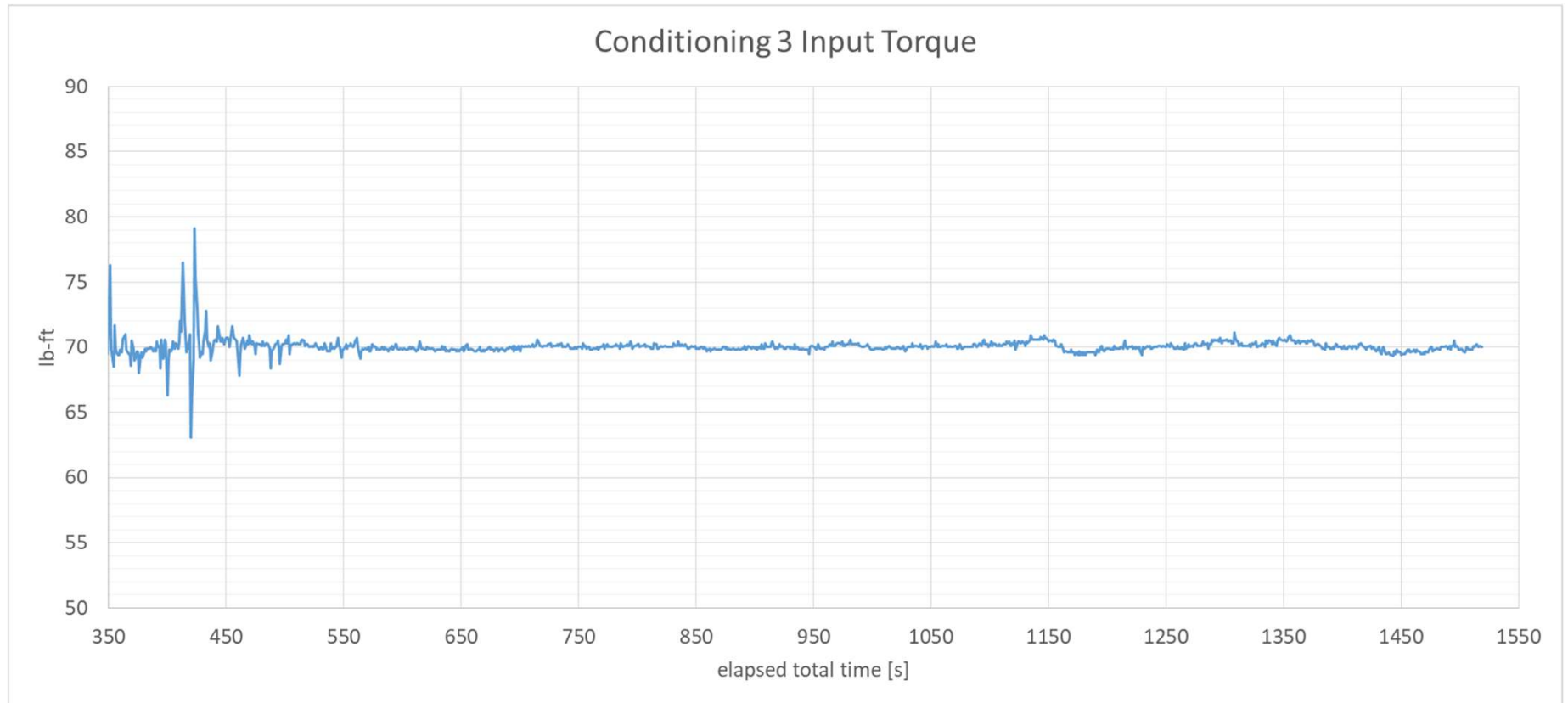
# Conditioning 2—01-0008



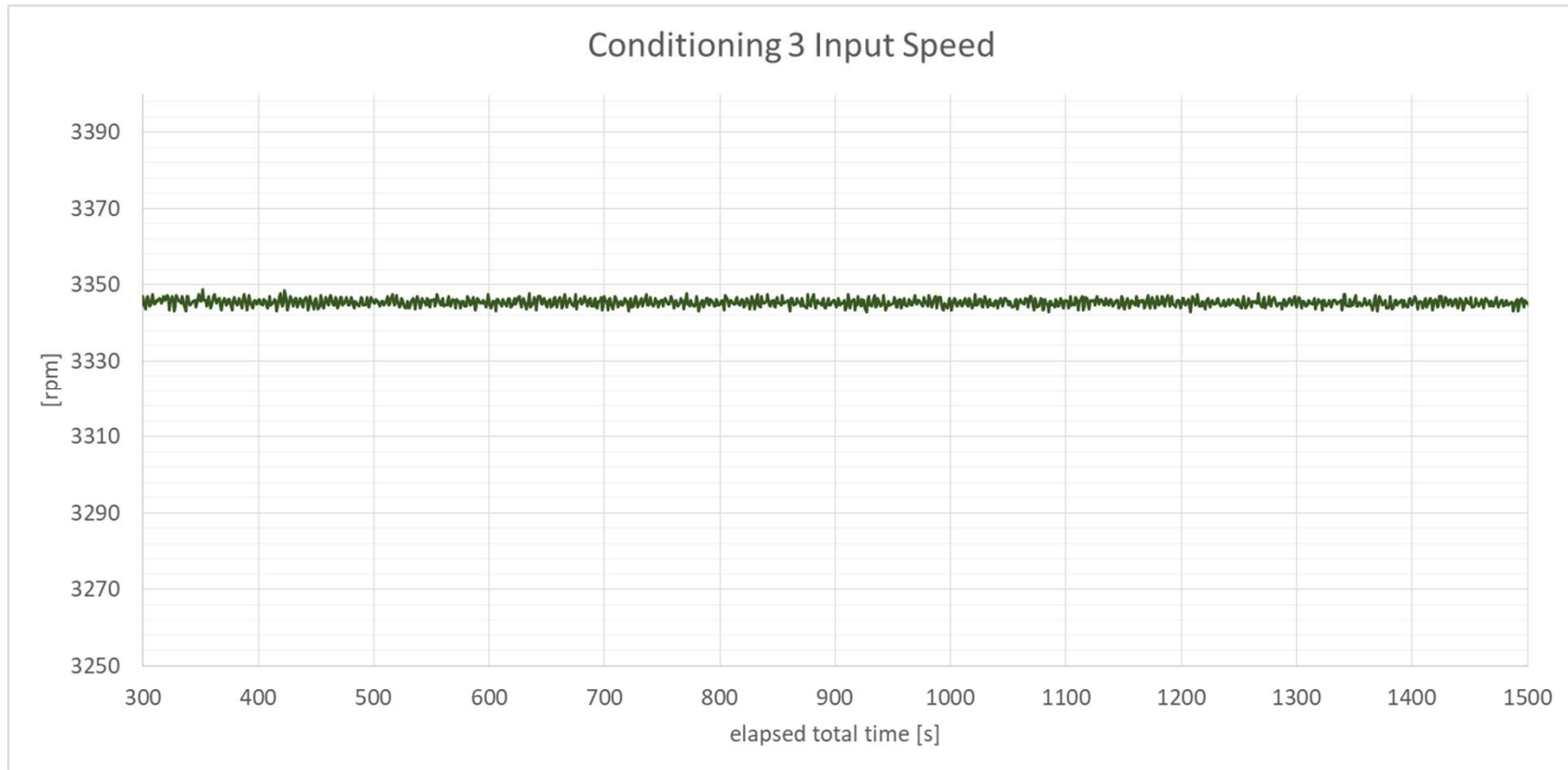
# Conditioning 2—01-0008



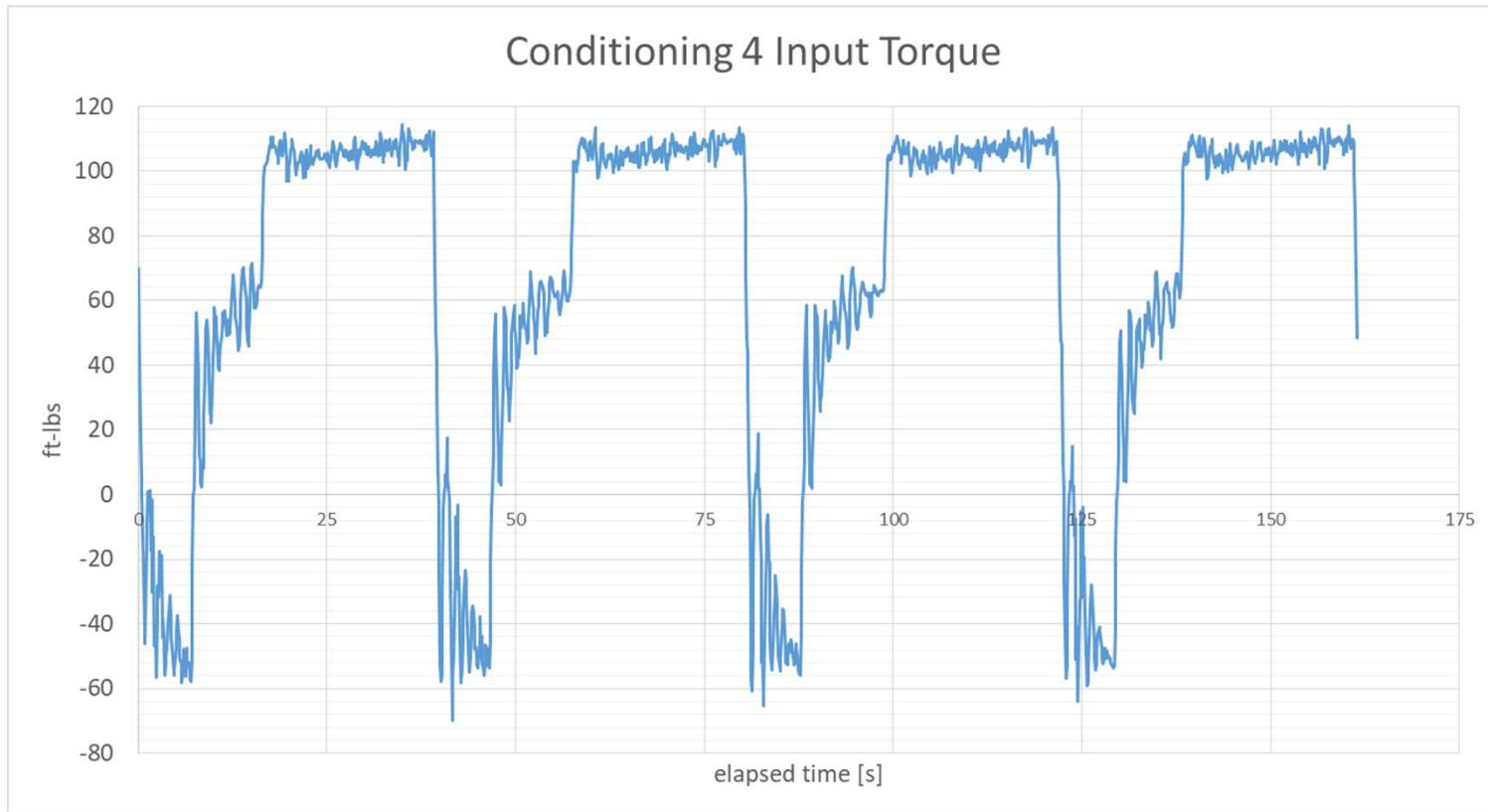
# Conditioning 3—01-0008



# Conditioning 3—01-0008

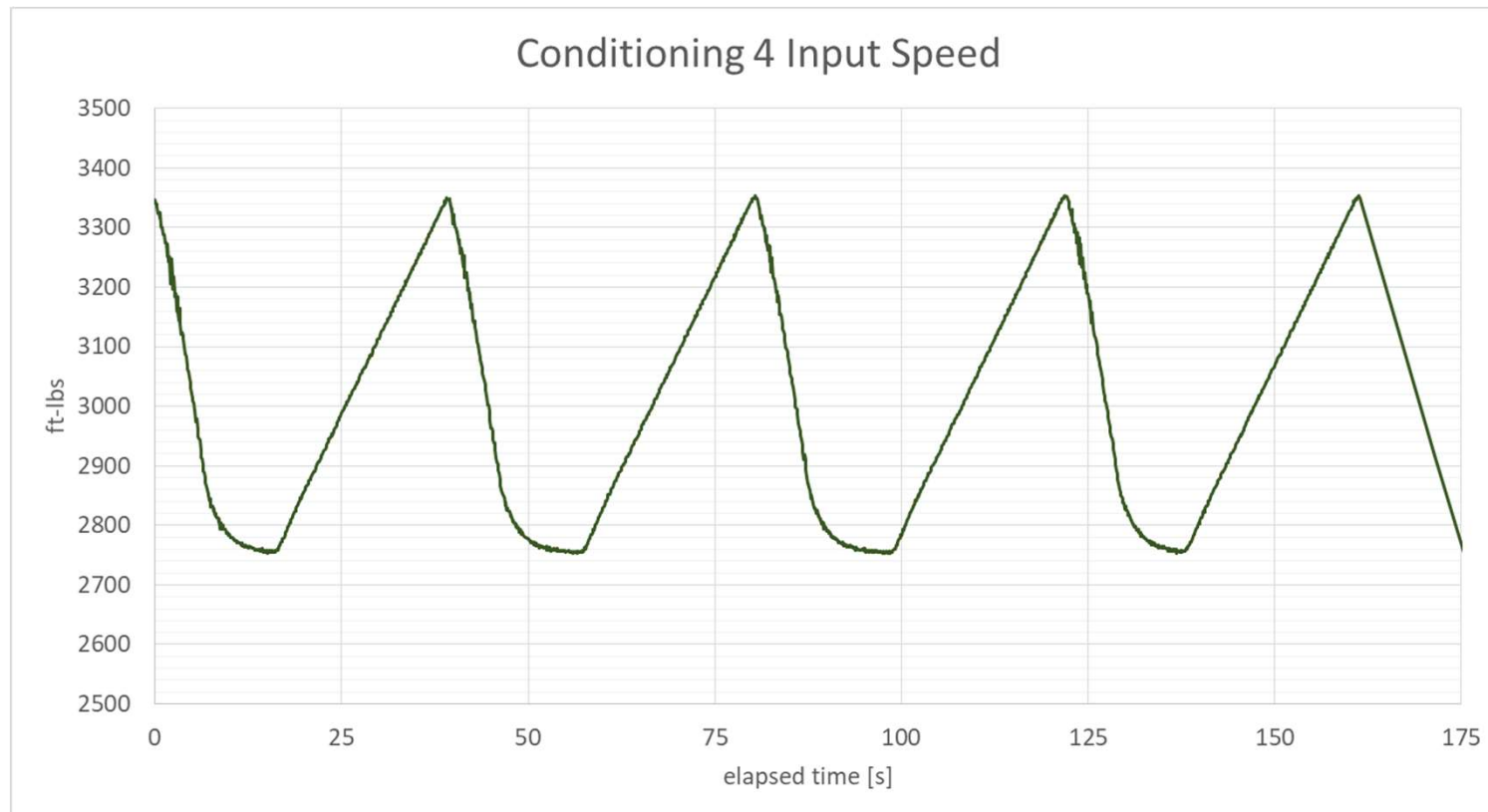


# Conditioning 4—01-0008

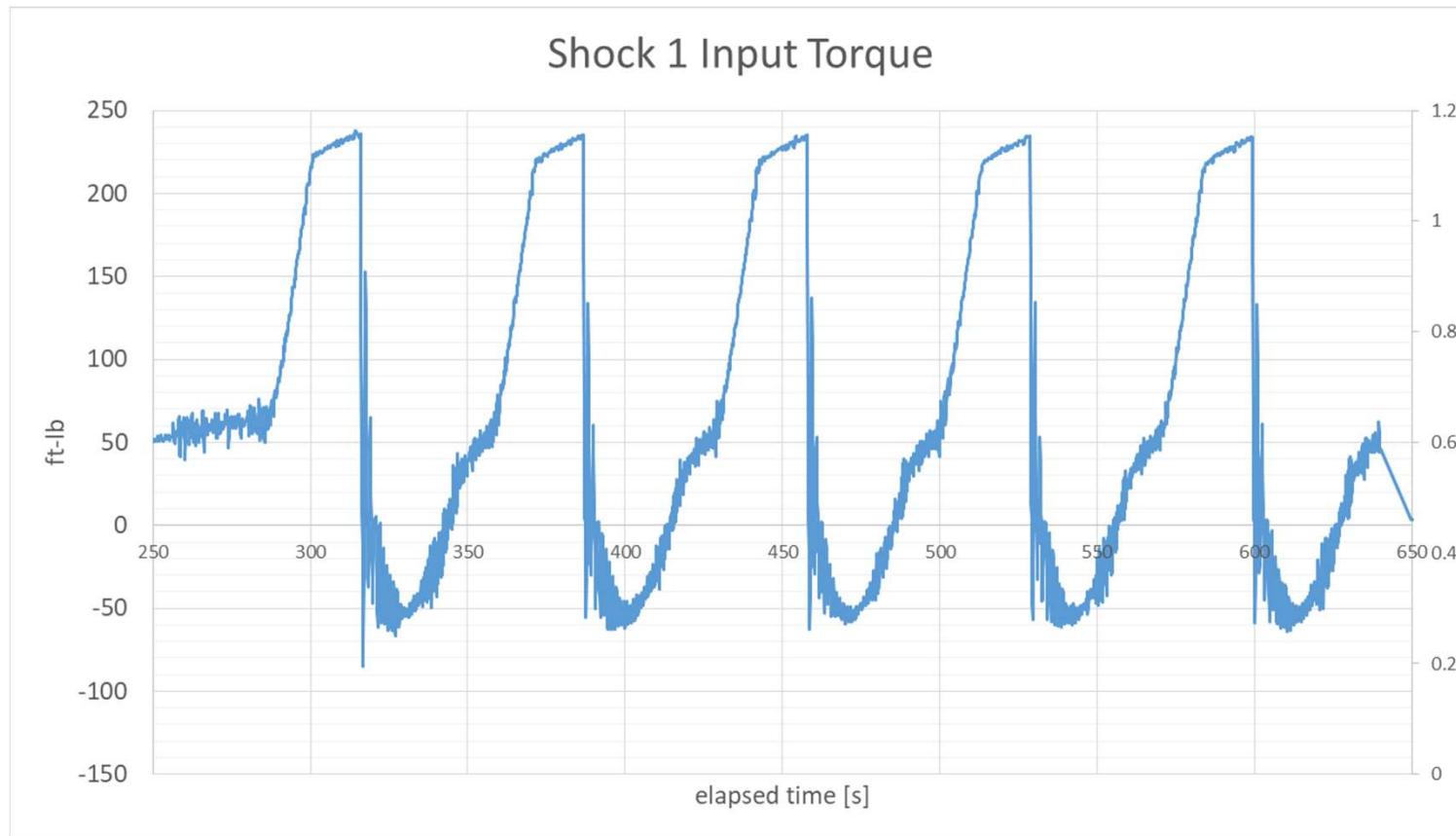




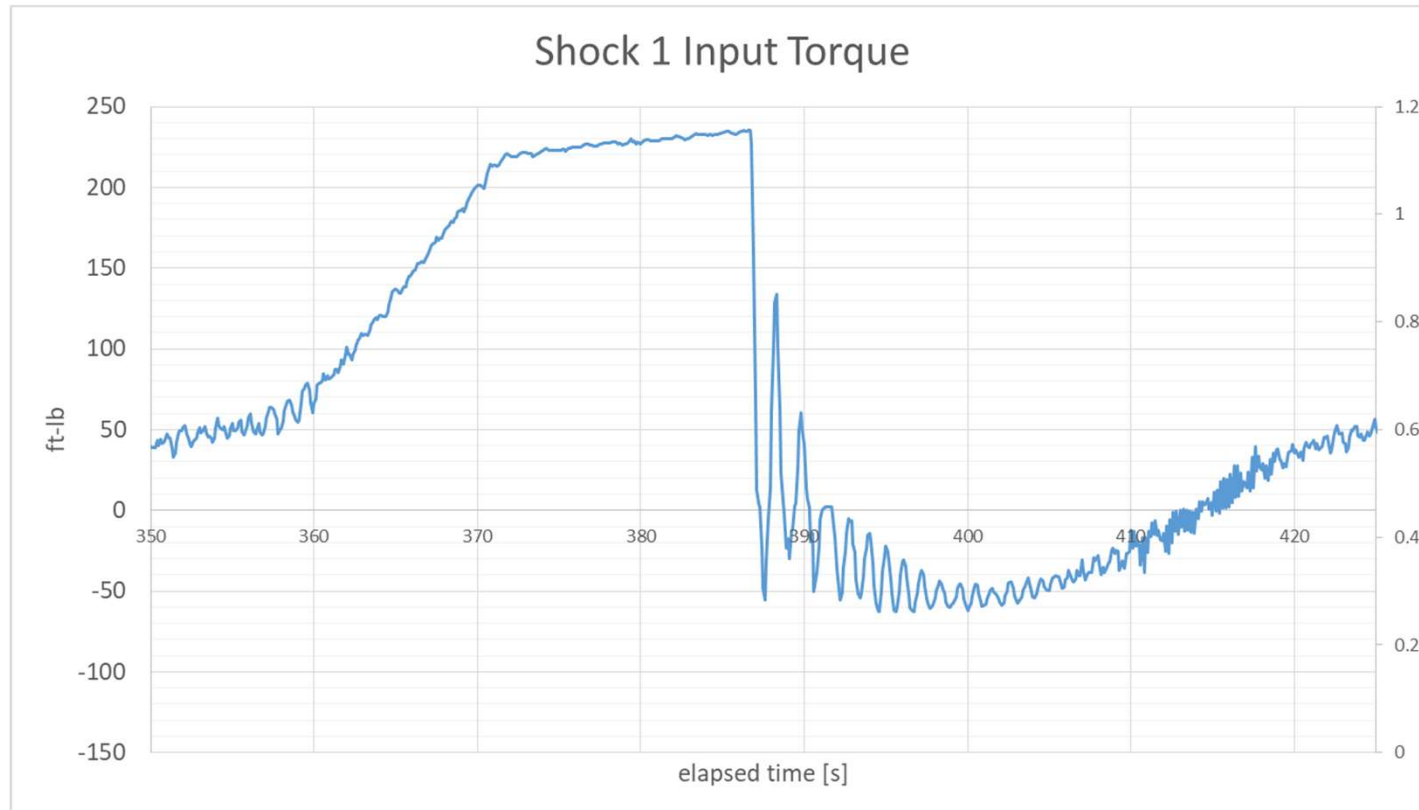
# Conditioning 4—01-0008



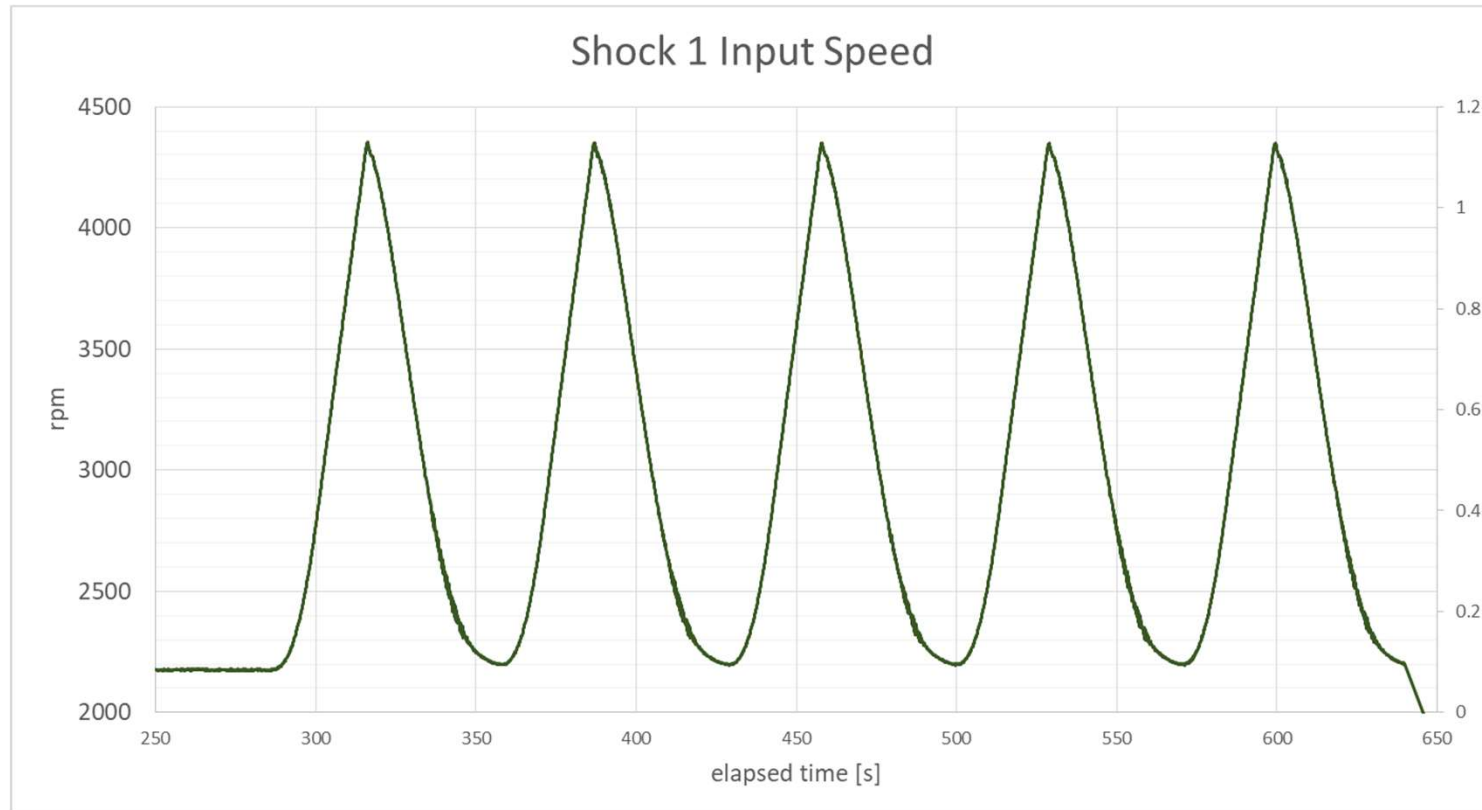
# Shock I—0 I-0008



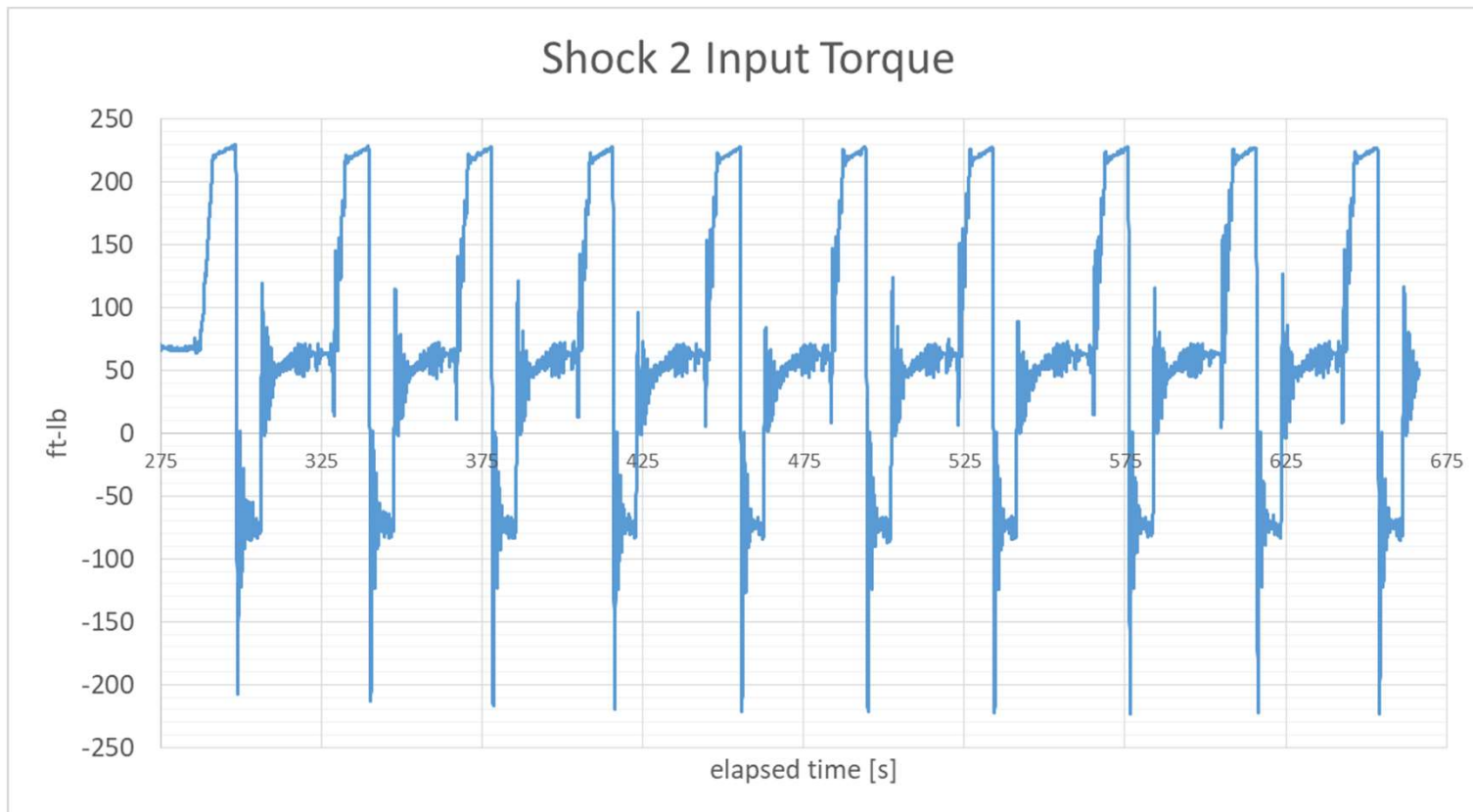
# Shock I—0 I-0008



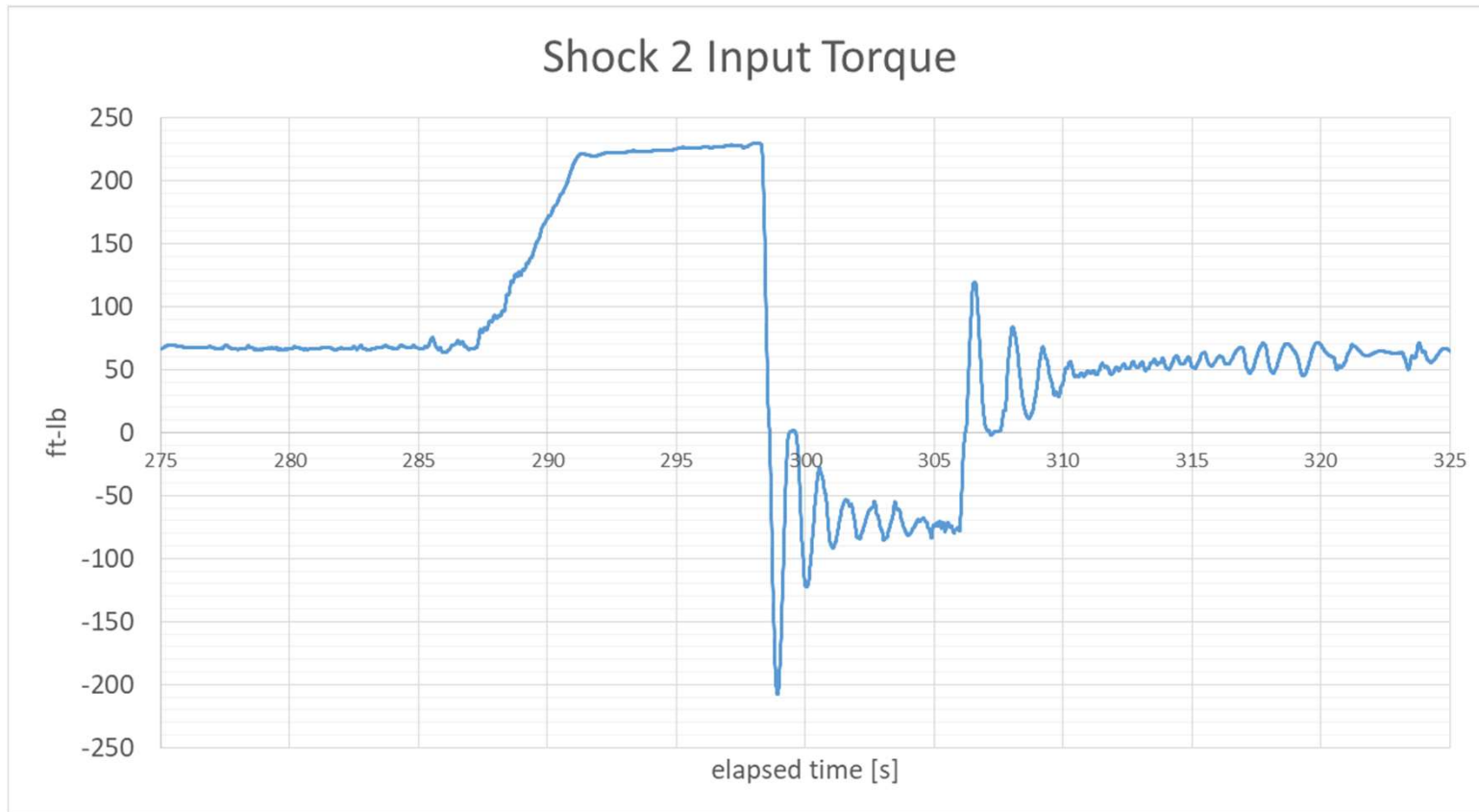
# Shock I—0 I-0008



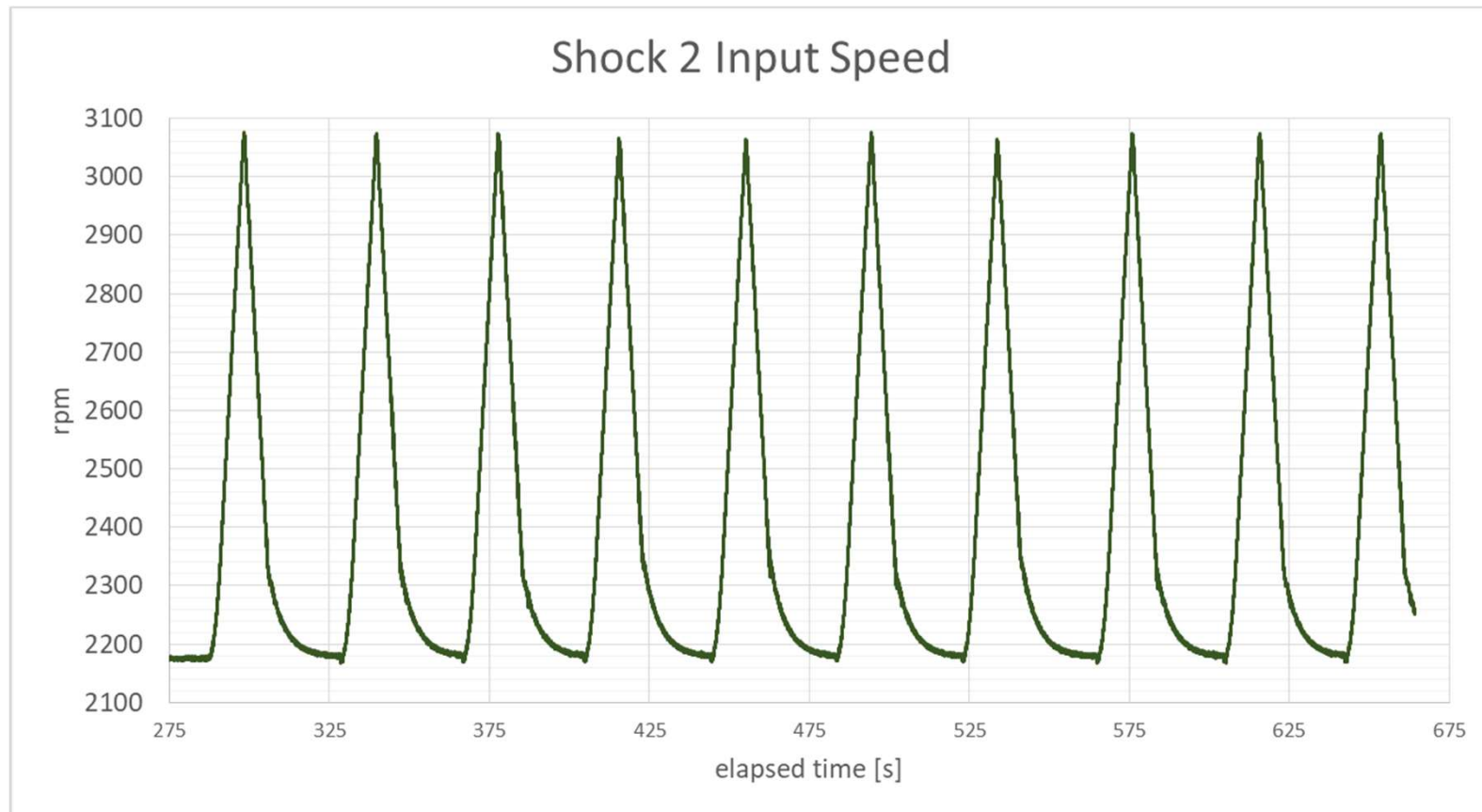
# Shock 2—01-0008



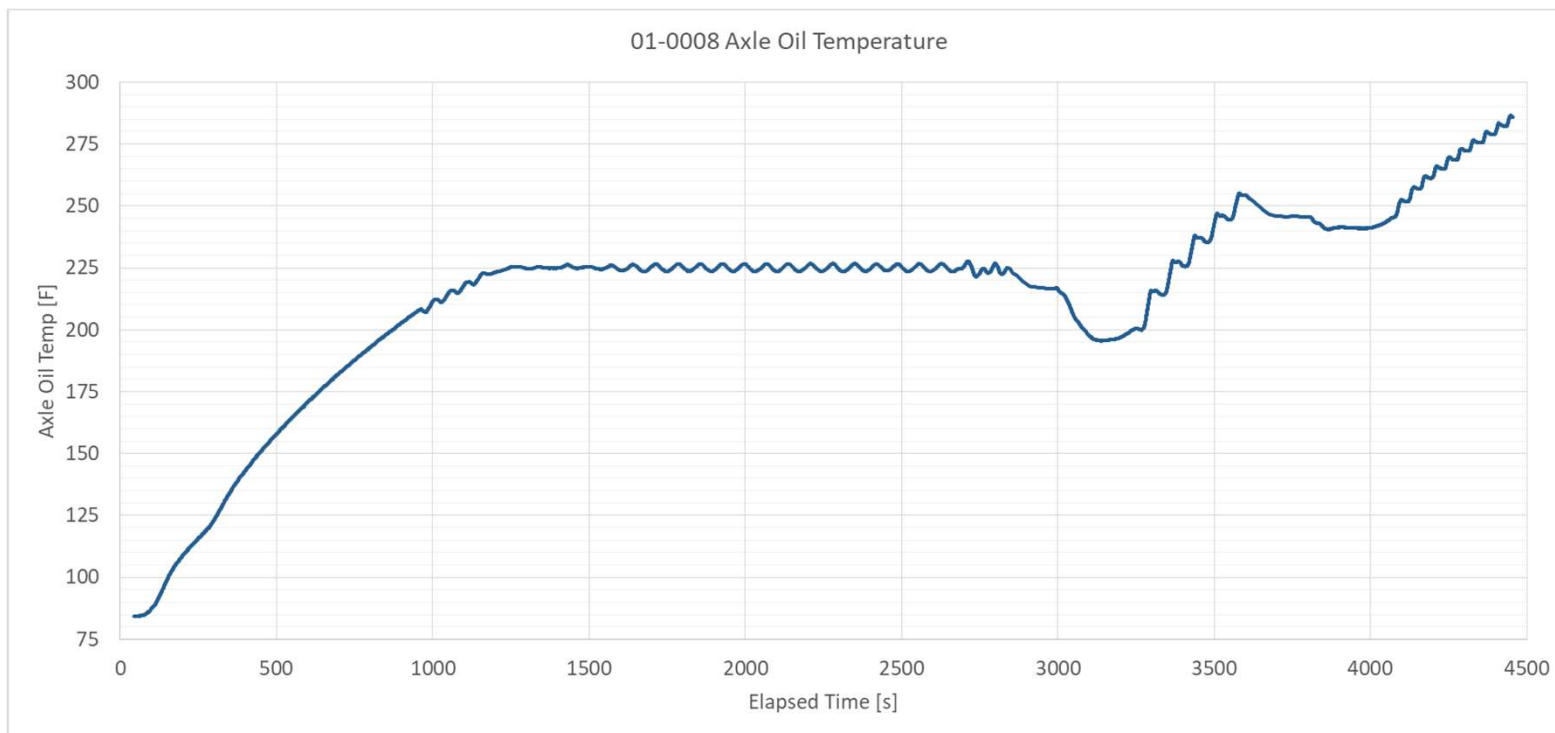
# Shock 2—01-0008



# Shock 2—01-0008



# Temperature Plot—01-0008



Phase	Min Temp	Max Temp
Shock 1	200.0	254.4
Shock 2	246.6	283.1



## L-42-1 Development Hardware Donation

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

📈 Ready for more?

# Hardware Inventory Check

 **When do other labs anticipate they will need more axes?**

# New Issues



Thanks!



*Passion for Solutions™*

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DB	Beck, Dylan	V	ASTM Test Monitoring Center	Phone:	724-355-1854
			203 Armstrong Drive Freeport, PA 16229	E-mail:	<a href="mailto:djb@astmtmc.org">djb@astmtmc.org</a>


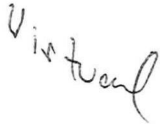
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			6220 Culebra Rd. Antonio, TX 78238	San	E-mail:
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	Comfort, Allen	V	US Army CCDC	Phone:	586-282-4225
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			203 Armstrong Drive Freeport, PA 16229	E-mail:	<a href="mailto:reg@astmtmc.org">reg@astmtmc.org</a>
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Virtual	Kanga, Percy	NV	Exxon Mobil (Retired)	Phone:	
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	Kostan, Travis	NV	Southwest Research Institute	Phone:	210.522.2407
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			100 Park Ave Florham Park, NJ 07932	E-mail:	<a href="mailto:donna.moshier@basf.com">donna.moshier@basf.com</a>
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Mm	Sangpeal, Matt	V/Chair	Afton Chemical	Phone:	804-788-5364
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			29400 Lakeland Boulevard Wickliffe, OH 44092	E-mail:	<a href="mailto:robert.slocum@lubrizol.com">robert.slocum@lubrizol.com</a>
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				Phone:	
				E-mail:	

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				E-mail:	

