

SAFETY COMPLIANCE TESTING FOR FMVSS No. 218 MOTORCYCLE HELMETS

Brand: SIMPSON
Model: SHORTY OTW
Size: XL (60-61 cm)

Prepared By

ACT Lab LLC
3280 East 59th Street,
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13 August 2020

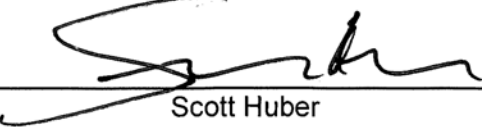
Final Report 218-ACT-20-023

Prepared For

U.S. Department of Transportation
National Highway Traffic Safety Administration
Office of Vehicle Safety Compliance (NEF-220)
1200 New Jersey Ave., S.E.
Washington, DC 20590

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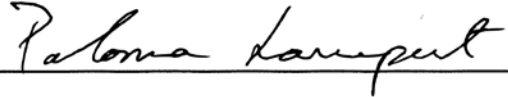
Technician: 
Devon Dahm

Project Manager: 
Scott Huber

Approved By: 
John Bogler

Approval Date: 13 August 2020

FINAL REPORT ACCEPTANCE BY OVSC

Accepted By: 
Paloma Lampert

Acceptance Date: 10/27/2020

HS# 646913

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. 218-ACT-20-023		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Sub-Title FINAL REPORT OF FMVSS NO. 218 COMPLIANCE TESTING OF SIMPSON, MODEL SHORTY OTW, SIZE XL (60-61 cm) MOTORCYCLE HELMET				5. Report Date 13 August 2020	
				6. Performing Organization Code ACT	
7. Author(s) Scott Huber, Program Manager				8. Performing Organization Report No. 52.1123.001	
9. Performing Organization Name and Address ACT Lab LLC 3280 East 59th Street, Long Beach CA 90805				10. Work Unit No.	
				11. Contract or Grant No. 693JJ918D000022	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Vehicle Safety Compliance (NEF-220) 1200 New Jersey Avenue, S.E. Washington, D.C. 20590				13. Type of Report and Period Covered Final Test Report	
				14. Sponsoring Agency Code NEF-220	
16. Abstract Compliance tests were conducted on the subject model motorcycle helmet in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-218-07. Test failures identified were as follows: S5.2 Penetration. The striker contacted the surface of the test headform on the ambient sample. S5.3 Retention System. The retention system on the ambient sample separated. S5.6.1 Labeling. The manufacturer's name, month and year of manufacture and the instructions to the purchaser labels do not appear to be permanent. S5.6.1 Labeling. The instructions to the purchaser labels are not visible to the user without moving any part of the helmet. S5.6.1 Labeling. The manufacturer's name label is incomplete.					
17. Key Words Helmet Compliance Testing Safety Engineering FMVSS No. 218			18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division (NPO-120) 1200 New Jersey Avenue, S.E. Washington, D.C. 20590		
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Form DOT F1700.7 (8-69)

Contract File No.: 52.1123

Test File: 001

Control Document; Official ACT NHTSA FMVSS No.218/Report Template TP-07/USA 30 July 2020/Rev.23
SharePoint/GlobalResourceLibrary/Reporting/ReportTemplates/Helmets/FMVSS No.218

Technician: Devon Dahm

Test Date: 13 August 2020

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PURPOSE OF COMPLIANCE TEST

1. PURPOSE OF COMPLIANCE TEST

This testing was conducted as part of the Department of Transportation, National Highway Traffic Safety Administration's Federal Motor Vehicle Safety Standard (FMVSS) No. 218, "Motorcycle Helmets"¹ Compliance Program. The purpose of the test was to determine if the production helmets supplied by the Office of Vehicle Safety Compliance satisfy the requirements of TP-218-07², as governed by the contract.

2. TEST PROCEDURE

The ACT Lab Helmet Testing Manual, Part I – Motorcycle Helmets³ submitted to the Office of Vehicle Safety Compliance, National Highway Traffic Safety Administration, contains the specific procedures used to conduct this test. The ACT Lab Helmet Testing Manual, Part I – Motorcycle Helmets as modified by Project-Specific notations is in accordance with TP-218-07.

The test procedure shall not be in conflict with any portion of FMVSS No. 218 nor amendments in effect as noted in the applicable contract.

¹ NHTSA, FMVSS No. 218, Motorcycle Helmets, 49 CFR Chapter V Section 571.218, August 20, 1973 as last amended FR 28132 Vol. 76, No. 93, May 13, 2011.

² NHTSA, TP-218-07, Laboratory Test Procedure for FMVSS 218, Motorcycle Helmets, 13 May 2011.

³ ACT Lab Helmet Test Manual, Version 4.2 – Motorcycle Helmets in accordance with FMVSS No. 218, 22 July 2013.

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HELMET DATA

HELMET BRAND NAME: SIMPSON

HELMET MODEL DESIGNATION: SHORTY OTW

HELMET MANUFACTURER: SIMPSON HELMETS INC

HELMET SIZE: XL (60-61 cm)

HELMET COVERAGE: Partial: X Full: _____ Complete: _____

HELMET POSITIONING INDEX: 67 cm

SHELL MATERIAL: Fiberglass and Polyester Resin

LINER MATERIAL: Expanded Polystyrene

BUCKLE DESCRIPTION: ITW Nexus/A

HELMET	A Ambient	B Low Temp	C High Temp	D Water Immersed	E Spare
SHELL COLOR/PATTERN	White	White	White	White	White
WEIGHT (grams)	926	938	934	912	946
MONTH & YEAR OF MANUFACTURE	01/2019	01/2019	01/2019	01/2019	01/2019

COMMENTS:

1. All helmets were received in undamaged condition and were appropriate for testing.
2. Weights listed above for helmets A-D are as tested with visor removed.
3. Weight for helmet E is complete with all components in place.
4. NHTSA provided the HPI based on information obtained from the manufacturer.

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SUMMARY OF TEST RESULTS

INDICATE Pass or Fail

HELMET	A	B	C	D
TEST	AMBIENT	LOW TEMP	HIGH TEMP	WATER IMMERSSED
IMPACT	Pass	Pass	Pass	Pass
PENETRATION	Fail	Pass	Pass	Pass
RETENTION	Fail	Pass	Pass	Pass

INDICATE Pass or Fail

TEST	PASS/FAIL
PERIPHERAL VISION	Pass
LABELING	Fail

COMMENTS:

1. S5.2 Penetration. The striker contacted the surface of the test headform at the right rear location on the ambient sample.
2. S5.3.1 Retention System. (a) The retention system on the ambient sample separated while loaded.
3. S5.6.1 Labeling. The manufacturer's name, month and year of manufacture and the instructions to the purchaser labels do not appear to be permanent.
4. S5.6.1 Labeling. The instructions to the purchaser labels are not visible to the user without moving any part of the helmet.
5. S5.6.1 Labeling. As of the date of this report, the entity listed on the interior label, "SIMPSON HELMETS INC", has not filed in accordance with Part 566, Manufacturer Identification, and therefore cannot be verified as a recognized manufacturer.

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SELECTION OF APPROPRIATE HEADFORM

Paragraph S6.1 - If the helmet size designation falls into more than one of three size ranges, it shall be tested on each appropriate headform.

HELMET SIZE DESIGNATION	HEADFORM SIZE
Less than or equal to 6-3/4 (European Size 54)	SMALL
Greater than 6-3/4, but less than or equal to 7-1/2 (European Size 60)	MEDIUM
Greater than 7-1/2 (European 60)	LARGE

COMMENTS:

The manufacturer marked the helmet with its corresponding discrete size: XL (60-61 cm), Headform Size: DOT Large.

CONDITIONING FOR TESTING — Paragraph S6.4 — The protective headgear shall be conditioned for not less than 4 hours and no more than 24 hours, in the specified environmental condition shown below, prior to test.

Ambient Conditions	16°C to 26°C (61°F to 79°F); 30% to 70% Relative Humidity
Low Temperature	-15°C to -5°C (5°F to 23°F)
High Temperature	45°C to 55°C (113°F to 131°F)
Water Immersion	16°C to 26°C (61°F to 79°F)

The maximum time during which the protective headgear may be out of the conditioning environment shall not exceed 4 minutes. It must then be returned to the conditioned environment for a minimum of 3 minutes for each minute or portion of a minute in excess of 4 minutes out of the conditioning environment or 12 hours, whichever is less, prior to resumption of testing.

AVERAGE LAB TEMPERATURE : 23.4 °C ; AVERAGE LAB HUMIDITY : 52.3 %

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IMPACT ATTENUATION

SYSTEMS CHECK	TRIAL DROP	DROP (meters)	VEL. (m/s)	PEAK (g)	DWELL TIME (ms)		TEST RECORD	HEADFORM POSITION
					150 g	200 g		
PRETEST	1	1.25	4.79	384.7	2.4	2.0	Pre 1	Crown
	2	1.25	4.83	385.2	2.4	2.0	Pre 2	Crown
	3	1.25	4.81	386.7	2.4	2.0	Pre 3	Crown
PRETEST AVERAGE		XXXX	XXXX	385.5	XXX	XXX	XXXX	XXXX
POSTTEST	1	1.25	4.85	390.0	2.4	2.1	Post 1	Crown
	2	1.25	4.82	392.7	2.4	2.0	Post 2	Crown
	3	1.25	4.79	384.0	2.4	2.1	Post 3	Crown
POSTTEST AVERAGE		XXXX	XXXX	388.9	XXX	XXX	XXXX	XXXX
DIFFERENCE BETWEEN PRE-TEST AND POST-TEST AVERAGES				3.4	DIFFERENCE NOT TO EXCEED 15 g			

Helmet Designation	Helmet Condition	Impact Location	Front		Left		Right		Rear	
			1	2	1	2	1	2	1	2
A	Ambient	Impact Number	1	2	3	4	5	6	7	8
		Anvil	Hemi		Hemi		Flat		Flat	
		Test Record No.	1	2	3	4	5	6	7	8
		Peak g	101	189	97	299	154	218	168	198
		ms @ 150	0.0	1.0	0.0	1.5	0.7	3.0	2.5	3.1
		ms @ 200	0.0	0.0	0.0	1.1	0.0	1.1	0.0	0.0
B	Low Temperature	Velocity m/s	5.21	5.23	5.29	5.32	6.17	6.14	6.08	6.10
		Anvil	Hemi		Hemi		Flat		Flat	
		Test Record No.	9	10	11	12	13	14	15	16
		Peak g	99	131	95	253	161	191	178	206
		ms @ 150	0.0	0.0	0.0	1.6	1.2	2.6	2.8	2.9
		ms @ 200	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.7
C	High Temperature	Velocity m/s	5.21	5.21	5.31	5.31	6.11	6.11	6.12	6.10
		Anvil	Hemi		Hemi		Flat		Flat	
		Test Record No.	17	18	19	20	21	22	23	24
		Peak g	94	174	95	321	152	212	163	193
		ms @ 150	0.0	0.9	0.0	1.5	0.5	2.3	1.8	2.9
		ms @ 200	0.0	0.0	0.0	1.0	0.0	0.9	0.0	0.0
D	Water Immersed	Velocity m/s	5.22	5.13	5.28	5.30	6.14	6.12	6.07	6.11
		Anvil	Hemi		Hemi		Flat		Flat	
		Test Record No.	25	26	27	28	29	30	31	32
		Peak g	93	145	98	299	143	196	163	211
		ms @ 150	0.0	0.0	0.0	1.6	0.0	2.5	2.1	2.9
		ms @ 200	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.9
		Velocity m/s	5.14	5.15	5.28	*MD	6.15	6.12	6.09	6.08

COMMENTS: 1. The actual drop heights were: flat anvil 200 cm, hemi anvil 151 cm.
 2. Values reported in the above tables are rounded.
 3. *MD = missing data

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PENETRATION

Paragraph S5.2 and S7.2

WEIGHT OF STRIKER: 2.95 to 3.06 kg (6 pounds, 8 ounces to 6 pounds, 12 ounces)

POINT OF STRIKER: Radius = 0.5 ± 0.1 mm (0.02 ± 0.004 in.), included angle of $60^\circ \pm 0.5^\circ$, hardness minimum of 60 Rockwell "C" Scale and a cone height of not less than 3.8 ± 0.038 cm (1.5 ± 0.015 in.).

HEIGHT OF FALL: $300 \text{ cm} \pm 1.5 \text{ cm}$, measured from the tip of the striker point to the outer surface of the mounted protective headgear.

FAILURE CRITERION: When tested, the protective headgear shall be failed if the penetrator has made an indentation in the headform.

TEST	HELMET	TEST LOCATION	PASS	FAIL	CONDITIONS
1	A	Crown	X		AMBIENT
2	A	Rear Right		X	AMBIENT
3	B	Crown	X		LOW TEMPERATURE
4	B	Rear Right	X		LOW TEMPERATURE
5	C	Crown	X		HIGH TEMPERATURE
6	C	Rear Right	X		HIGH TEMPERATURE
7	D	Crown	X		WATER IMMERSED
8	D	Rear Right	X		WATER IMMERSED

COMMENT: Photographs of penetration test locations are found in Appendix C.

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RETENTION SYSTEM

Paragraph S5.3 and S7.3

REQUIREMENTS:

READING	APPLIED LOAD
INITIAL	22.68 kg, + 4.54 kg, - 0 kg (50.0 Lbs, + 10 Lbs, - 0 Lbs)
FINAL	136 kg, + 0 kg, - 2.3 kg (300.0 Lbs, + 0 Lbs, - 5 Lbs)

ELONGATION NOT TO EXCEED 2.5 cm (1.0 INCH) AFTER LOAD INCREASE

HELMET	CONDITIONS	INITIAL READING (cm)	FINAL READING (cm)	ELONGATION (cm)
A	AMBIENT	0.57	---	---
B	LOW TEMPERATURE	0.29	2.11	1.82
C	HIGH TEMPERATURE	0.32	2.32	2.00
D	WATER IMMERSED	0.31	2.31	2.00

CONFIGURATION - Paragraph S5.4 - Helmet shall provide a minimum peripheral vision of 105° to each side of the midsagittal plane. The brow opening shall be at least 2.54 cm (1 inch) above all points in the basic plane that are within the angles of peripheral vision.

	REQUIREMENTS	TEST RESULTS
PERIPHERAL VISION	> 105°	Pass
BROW OPENING	> 2.5 cm (1 inch)	Pass

COMMENT: Values in the above tables are rounded.

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LABELING

S5.6.1 *Labeling* - Each helmet shall be permanently and legibly labeled, in a manner such that the label(s) can be easily read without removing padding or any other permanent part, with the following:

Required Information	Content/Format	Permanent
Manufacturer's name	Fail	Fail
Discrete size	Pass	Pass
Month and year of manufacture	Pass	Fail
Instructions to the purchaser as follows:	-----	-----
“Shell and liner constructed of (identify type(s) of materials).”	Pass	Fail
“Helmet can be seriously damaged by some common substances without damage being visible to the user.”	Pass	Fail
“Apply only the following: (Recommended cleaning agents, paints, adhesives, etc., as appropriate.”	Pass	Fail
“Make no modifications.”	Pass	Fail
“Fasten helmet securely.”	Pass	Fail
“If helmet experiences a severe blow, return it to the manufacturer for inspection, or destroy it and replace it.”	Pass	Fail

COMMENTS:

1. S5.6.1 Labeling. The manufacturer's name, month and year of manufacture and the instructions to the purchaser labels do not appear to be permanent.
2. S5.6.1 Labeling. The instructions to the purchaser labels are not visible to the user without moving any part of the helmet.
3. S5.6.1 Labeling. As of the date of this report, the entity listed on the interior label, “SIMPSON HELMETS INC”, has not filed in accordance with Part 566, Manufacturer Identification, and therefore cannot be verified as a recognized manufacturer.

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LABELING

S5.6.2 Certification. Each helmet shall be labeled permanently and legibly with a label, constituting the manufacturer’s certification that the helmet conforms to the applicable Federal motor vehicle safety standards, that is separate from the label(s) used to comply with S5.6.1, and complies with paragraphs (a) through (c) of this section.(a) Content, format, and appearance. The label required by paragraph S5.6.2 shall have the following content, format, and appearance:

Required Certification Information	Content/ Format	Permanent
The symbol “DOT,” horizontally centered on the label, in letters not less than 0.38 inch (1.0 cm) high.	Pass	Pass
The term “FMVSS No. 218,” horizontally centered beneath the symbol DOT, in letters not less than 0.09 inches (0.23 cm) high.	Pass	
The word “CERTIFIED,” horizontally centered beneath the term “FMVSS No. 218,” in letters not less than 0.09 inches (0.23 cm) high.	Pass	
The precise model designation horizontally centered above the symbol DOT, in letters and/or numerals not less than 0.09 inch (0.23 cm) high.	Pass	
The manufacturer’s name and/or brand, horizontally centered above the model designation, in letters and/or numerals not less than 0.09 inch (0.23 cm) high.	Pass	
All symbols, letters and numerals shall be in a color that contrasts with the background of the label.	Pass	
No information, other than the information specified in subparagraph (a), shall appear on the label.	Pass	
The label shall appear on the outer surface of the helmet and be placed so that it is centered laterally with the horizontal centerline of the DOT symbol located a minimum of 1 inch (2.5 cm) and a maximum of 3 inches (7.6 cm) from the bottom edge of the posterior portion of the helmet.	Pass	

COMMENT:

1. Labels were determined to be both easily read and permanent based on the TP-218-07, Section 12.5.4.

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TEST DATA

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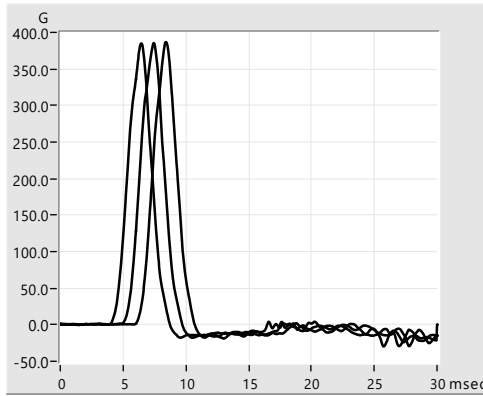
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Uni-Axial System-Check

Helmet Manufacturer : NHTSA
 Address : 1200 New Jersey Ave, S.E. Washington,
 DC 20590



Testing Laboratory : ACT LAB LLC

Address : 3280 East 59th Street
 Long Beach, CA
 90805

Laboratory Technician name : Devon Dahm

M.E.P. Pad Model : H0171

Laboratory Temperature : 23 deg C

Laboratory Humidity : 53 %

Selected Filter Frequency : CFC1000 # 1650 Hz

Acc. sensitivity (axis Z) : 10.47 mV/G

Acc. sensitivity (axis X) : 10.00 mV/G

Acc. sensitivity (axis Y) : 10.00 mV/G

Drop Device : **D.O.T Size D (Uni-Axial)** 24

Drop mass assembly : 6.096 kg Time gate flag height : 25.40 mm

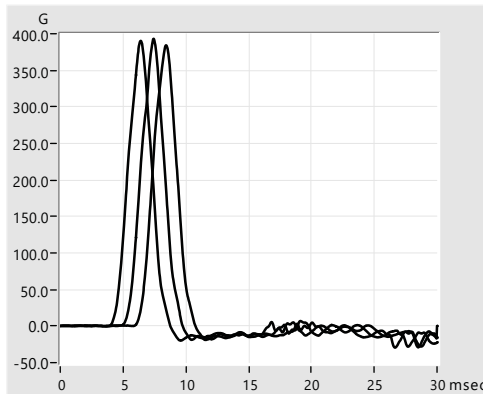
Calibration peak : 400.0 G +/- 20.00 G

Impact #	Drop Height (cm)	Energy (Joules)	Friction (%)	Time Gate (msec)	Velocity IN (m/sec)	Peak Acc.(G)	Delta T 150G (msec)	Delta T 200G (msec)	HIC	SI	Test Time	Test Date	PASS or FAIL
1	125.0	69.9	3.3	5.30	4.7893	382.1	2.41	2.03	2792	3907	12:01:54	2020-08-13	Pass
2	125.0	68.8	4.1	5.35	4.7503	389.2	2.43	2.04	2814	3921	12:02:52	2020-08-13	Pass
3	125.0	71.1	2.5	5.26	4.8294	387.3	2.42	2.04	2821	3955	12:03:51	2020-08-13	Pass
4	125.0	70.0	3.2	5.30	4.7912	384.7	2.42	2.03	2813	3923	12:04:48	2020-08-13	Pass
5	125.0	71.0	2.5	5.26	4.8281	385.2	2.43	2.03	2877	3984	12:05:45	2020-08-13	Pass
6	125.0	70.7	2.8	5.28	4.8148	386.7	2.42	2.04	2829	3943	12:06:42	2020-08-13	Pass
Last 3#	125.00	70.57	2.83	5.28	4.81	385.53	2.42	2.03	2839.67	3950.00	12.00	2020.00	0.00

Curve impact #2 : shift of 1msec ; Curve impact #3 : shift of 2msec

Uni-Axial System-Check

Helmet Manufacturer : NHTSA
 Address : 1200 New Jersey Ave, S.E. Washington,
 DC 20590



Testing Laboratory : ACT LAB LLC

Address : 3280 East 59th Street
 Long Beach, CA
 90805

Laboratory Technician name : Devon Dahm

M.E.P. Pad Model : H0171

Laboratory Temperature : 23 deg C

Laboratory Humidity : 53 %

Selected Filter Frequency : CFC1000 # 1650 Hz

Acc. sensitivity (axis Z) : 10.47 mV/G

Acc. sensitivity (axis X) : 10.00 mV/G

Acc. sensitivity (axis Y) : 10.00 mV/G

Drop Device : **D.O.T Size D (Uni-Axial)** 24

Drop mass assembly : 6.096 kg Time gate flag height : 25.40 mm

Calibration peak : 400.0 G +/- 20.00 G

Impact #	Drop Height (cm)	Energy (Joules)	Friction (%)	Time Gate (msec)	Velocity IN (m/sec)	Peak Acc.(G)	Delta T 150G (msec)	Delta T 200G (msec)	HIC	SI	Test Time	Test Date	PASS or FAIL
1	126.0	71.3	2.7	5.25	4.8367	388.5	2.43	2.05	2850	3972	16:28:16	2020-08-13	Pass
2	126.0	71.8	2.4	5.23	4.8533	384.8	2.43	2.04	2836	3942	16:29:23	2020-08-13	Pass
3	126.0	69.9	3.7	5.30	4.7887	386.8	2.43	2.05	2831	3950	16:31:45	2020-08-13	Pass
4	126.0	71.8	2.4	5.23	4.8522	390.0	2.44	2.06	2858	3994	16:33:15	2020-08-13	Pass
5	126.0	70.9	3.0	5.27	4.8242	392.7	2.43	2.04	2835	3950	16:34:40	2020-08-13	Pass
6	126.0	70.0	3.6	5.30	4.7919	384.0	2.43	2.05	2846	3938	16:36:22	2020-08-13	Pass
Last 3#	126.00	70.90	3.00	5.27	4.82	388.90	2.43	2.05	2846.33	3960.67	16.00	2020.00	0.00

Curve impact #2 : shift of 1msec ; Curve impact #3 : shift of 2msec

Impact Uni-Axial

Testing Laboratory : ACT LAB LLC

Address : 3280 East 59th Street
Long Beach, CA
90805

Helmet Manufacturer : NHTSA

Address : 1200 New Jersey Ave, S.E.
Washington, DC 20590

SystemCheckFile#: N/A

Laboratory Technician name : Devon Dahm

Batch Number :

Ref. P.O. Number : 2020

Model : SIMPSON SHORTY

Color : Black

Size : XL (60-61 cm)

Weight : 926.00 g

Manufacturing Date : 01/2019

Standard Request : FMVSS No.218

Identification Code : 521123001-A

Headform Model : D.O.T.

Headform Size : D D.O.T

Conditioning : Ambient

Laboratory Temperature : 23 deg C

Laboratory Humidity : 53 % (moto)

Selected Filter Frequency : CFC1000 # 1650402

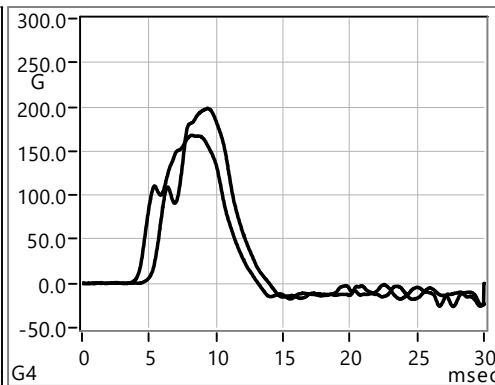
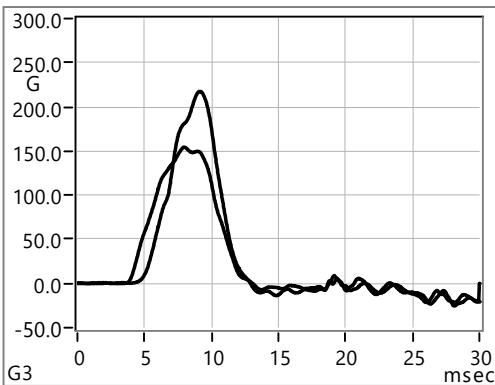
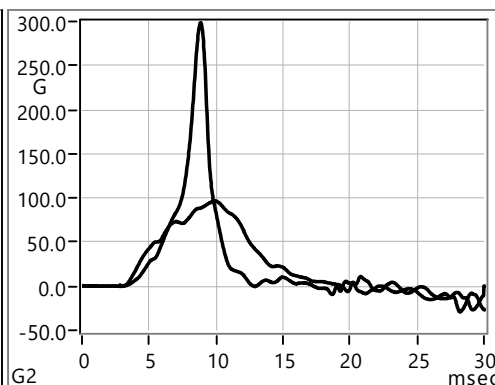
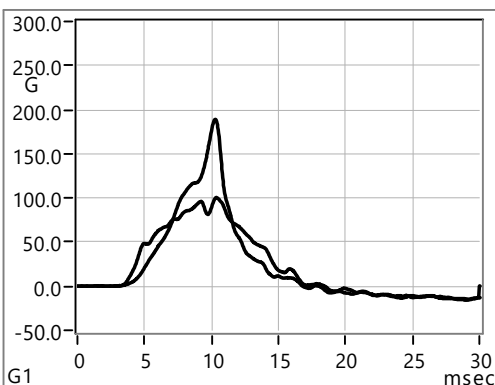
Maximum Peak G's authorized : 400 G

Maximum Peak m/s² authorized : 3923 m/s²

Drop mass assembly : 6.096 kg

Time gate flag height : 25.40 mm

Acc. sensibility (axis Z) : 10.47



Impact #	Position	Anvil type	Drop Height (cm)	Energy (Joules)	Friction (%)	Time Gate (msec)	Velocity IN (m/sec)	Peak Acc.(G)	Delta T 150G (msec)	Delta T 200G (msec)	HIC	SI	Test Time	Test Date	PASS or FAIL
1	Front	Hemi	151.0	82.8	4.2	4.87	5.2111	100.5	0.00	0.00	400	457	12:23:41	2020-08-13	Pass
2	Front	Hemi	151.0	83.4	3.9	4.86	5.2301	189.2	1.01	0.00	749	920	12:24:49	2020-08-13	Pass
3	Left	Hemi	151.0	85.4	2.7	4.80	5.2924	96.8	0.00	0.00	359	417	14:01:59	2020-08-13	Pass
4	Left	Hemi	151.0	86.2	2.3	4.77	5.3195	298.6	1.51	1.07	1165	1647	14:03:13	2020-08-13	Pass
5	Right	Flat	201.0	116.2	1.7	4.11	6.1740	154.1	0.68	0.00	939	1063	14:18:32	2020-08-13	Pass
6	Right	Flat	201.0	115.0	2.2	4.13	6.1428	217.6	2.96	1.13	1485	1794	14:19:35	2020-08-13	Pass
7	Rear	Flat	200.0	112.7	2.9	4.18	6.0807	167.7	2.50	0.00	1186	1386	15:32:16	2020-08-13	Pass
8	Rear	Flat	200.0	113.4	2.6	4.16	6.0998	198.3	3.06	0.00	1498	1769	15:33:19	2020-08-13	Pass

Impact Uni-Axial

Testing Laboratory : ACT LAB LLC

Address : 3280 East 59th Street
Long Beach, CA
90805

Helmet Manufacturer : NHTSA

Address : 1200 New Jersey Ave, S.E.
Washington, DC 20590

SystemCheckFile#: N/A

Laboratory Technician name : Devon Dahm

Batch Number :

Ref. P.O. Number : 2020

Model : SIMPSON SHORTY

Color : Black

Size : XL (60-61 cm)

Weight : 938.00 g

Manufacturing Date : 01/2019

Standard Request : FMVSS No.218

Identification Code : 521123001-B

Headform Model : D.O.T.

Headform Size : D D.O.T

Conditioning : Cold

Laboratory Temperature : 23 deg C

Laboratory Humidity : 53 % (moto)

Selected Filter Frequency : CFC1000 # 1650402

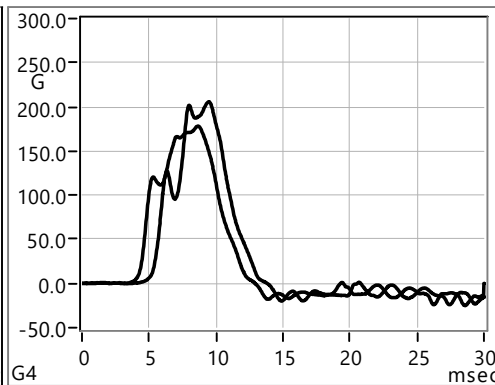
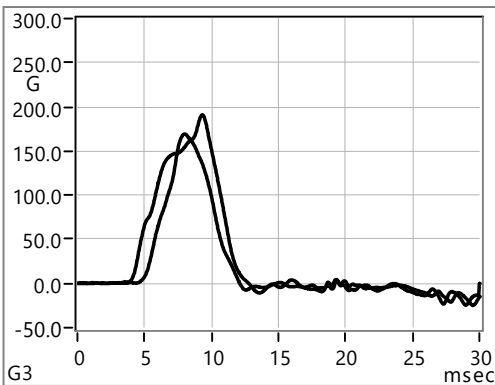
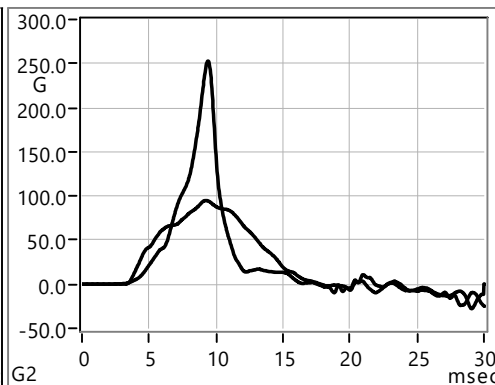
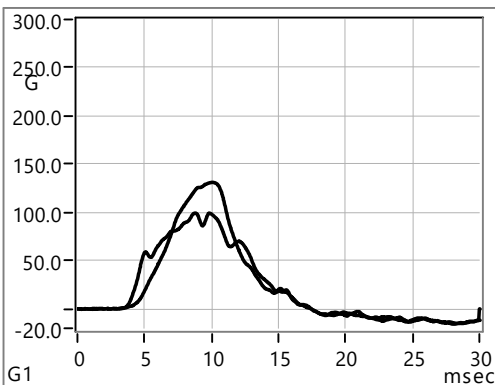
Maximum Peak G's authorized : 400 G

Maximum Peak m/s² authorized : 3923 m/s²

Drop mass assembly : 6.096 kg

Time gate flag height : 25.40 mm

Acc. sensibility (axis Z) : 10.47



Impact #	Position	Anvil type	Drop Height (cm)	Energy (Joules)	Friction (%)	Time Gate (msec)	Velocity IN (m/sec)	Peak Acc.(G)	Delta T 150G (msec)	Delta T 200G (msec)	HIC	SI	Test Time	Test Date	PASS or FAIL
1	Front	Hemi	151.0	82.6	4.3	4.88	5.2054	99.4	0.00	0.00	427	477	12:26:36	2020-08-13	Pass
2	Front	Hemi	151.0	82.6	4.3	4.88	5.2057	131.3	0.00	0.00	622	732	12:27:48	2020-08-13	Pass
3	Left	Hemi	151.0	86.1	2.4	4.78	5.3136	94.8	0.00	0.00	373	424	14:05:13	2020-08-13	Pass
4	Left	Hemi	151.0	86.0	2.4	4.78	5.3107	252.9	1.60	0.93	990	1369	14:06:15	2020-08-13	Pass
5	Right	Flat	201.0	114.0	2.6	4.15	6.1153	161.2	1.17	0.00	957	1086	14:21:04	2020-08-13	Pass
6	Right	Flat	201.0	113.9	2.7	4.16	6.1121	190.9	2.55	0.00	1093	1312	14:22:09	2020-08-13	Pass
7	Rear	Flat	200.0	114.0	2.4	4.15	6.1158	178.3	2.78	0.00	1305	1497	15:34:19	2020-08-13	Pass
8	Rear	Flat	200.0	113.4	2.6	4.16	6.1008	205.6	2.90	0.68	1483	1814	15:35:27	2020-08-13	Pass

Impact Uni-Axial

Testing Laboratory : ACT LAB LLC

Address : 3280 East 59th Street
Long Beach, CA
90805

Helmet Manufacturer : NHTSA

Address : 1200 New Jersey Ave, S.E.
Washington, DC 20590

SystemCheckFile#: N/A

Laboratory Technician name : Devon Dahm

Batch Number :

Ref. P.O. Number : 2020

Model : SIMPSON SHORTY

Color : Black

Size : XL (60-61 cm)

Weight : 934.00 g

Manufacturing Date : 01/2019

Standard Request : FMVSS No.218

Identification Code : 521123001-C

Headform Model : D.O.T.

Headform Size : D D.O.T

Conditioning : Hot

Laboratory Temperature : 23 deg C

Laboratory Humidity : 53 % (moto)

Selected Filter Frequency : CFC1000 # 1650402

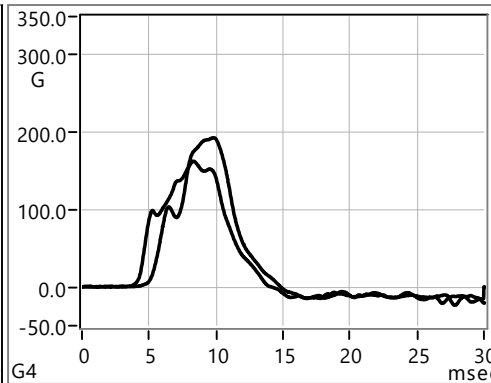
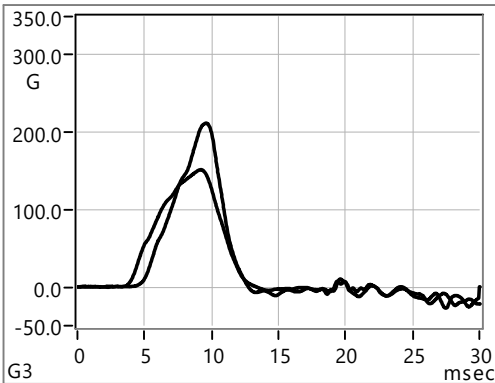
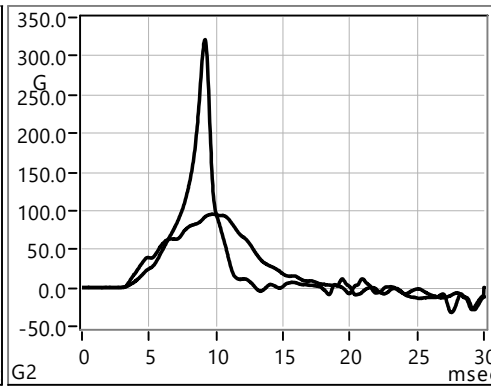
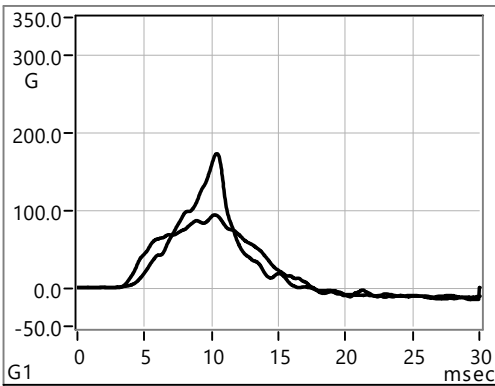
Maximum Peak G's authorized : 400 G

Maximum Peak m/s² authorized : 3923 m/s²

Drop mass assembly : 6.096 kg

Time gate flag height : 25.40 mm

Acc. sensibility (axis Z) : 10.47



Impact #	Position	Anvil type	Drop Height (cm)	Energy (Joules)	Friction (%)	Time Gate (msec)	Velocity IN (m/sec)	Peak Acc.(G)	Delta T 150G (msec)	Delta T 200G (msec)	HIC	SI	Test Time	Test Date	PASS or FAIL
1	Front	Hemi	151.0	83.0	4.1	4.87	5.2197	94.3	0.00	0.00	372	420	12:31:00	2020-08-13	Pass
2	Front	Hemi	151.0	80.1	5.8	4.95	5.1279	173.6	0.92	0.00	661	823	12:33:05	2020-08-13	Pass
3	Left	Hemi	151.0	85.1	2.9	4.81	5.2847	95.4	0.00	0.00	353	410	14:07:18	2020-08-13	Pass
4	Left	Hemi	151.0	85.5	2.7	4.80	5.2964	321.0	1.52	1.02	1253	1767	14:08:24	2020-08-13	Pass
5	Right	Flat	201.0	114.7	2.3	4.14	6.1351	151.7	0.47	0.00	841	976	14:24:05	2020-08-13	Pass
6	Right	Flat	201.0	114.1	2.5	4.15	6.1194	211.8	2.29	0.92	1297	1547	14:25:23	2020-08-13	Pass
7	Rear	Flat	200.0	112.1	3.2	4.19	6.0658	162.6	1.81	0.00	1046	1244	15:37:07	2020-08-13	Pass
8	Rear	Flat	200.0	113.8	2.5	4.16	6.1093	193.1	2.86	0.00	1366	1633	15:38:12	2020-08-13	Pass

Impact Uni-Axial

Testing Laboratory : ACT LAB LLC

Address : 3280 East 59th Street
Long Beach, CA
90805

Helmet Manufacturer : NHTSA

Address : 1200 New Jersey Ave, S.E.
Washington, DC 20590

SystemCheckFile#: N/A

Laboratory Technician name : Devon Dahm

Batch Number :

Ref. P.O. Number : 2020

Model : SIMPSON SHORTY

Color : Black

Size : XL (60-61 cm)

Weight : 912.00 g

Manufacturing Date : 01/2019

Standard Request : FMVSS No.218

Identification Code : 521123001-D

Headform Model : D.O.T.

Headform Size : D D.O.T

Conditioning : Wet

Laboratory Temperature : 23 deg C

Laboratory Humidity : 53 % (moto)

Selected Filter Frequency : CFC1000 # 1650402

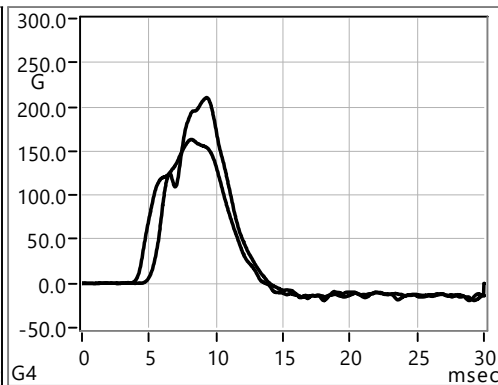
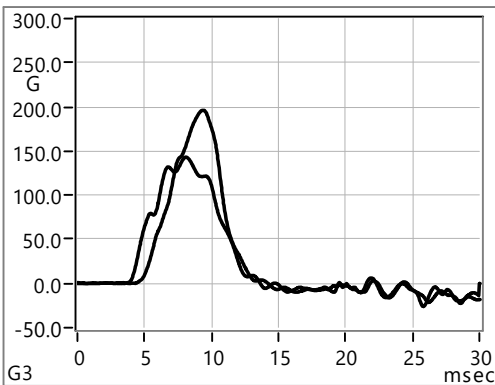
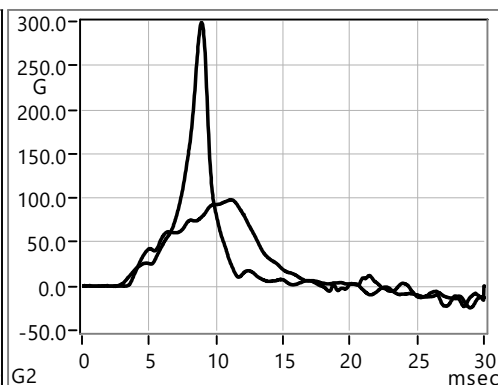
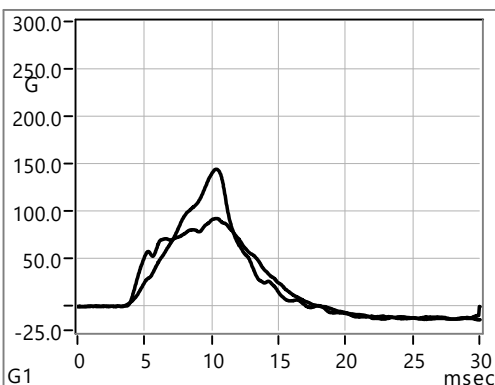
Maximum Peak G's authorized : 400 G

Maximum Peak m/s² authorized : 3923 m/s²

Drop mass assembly : 6.096 kg

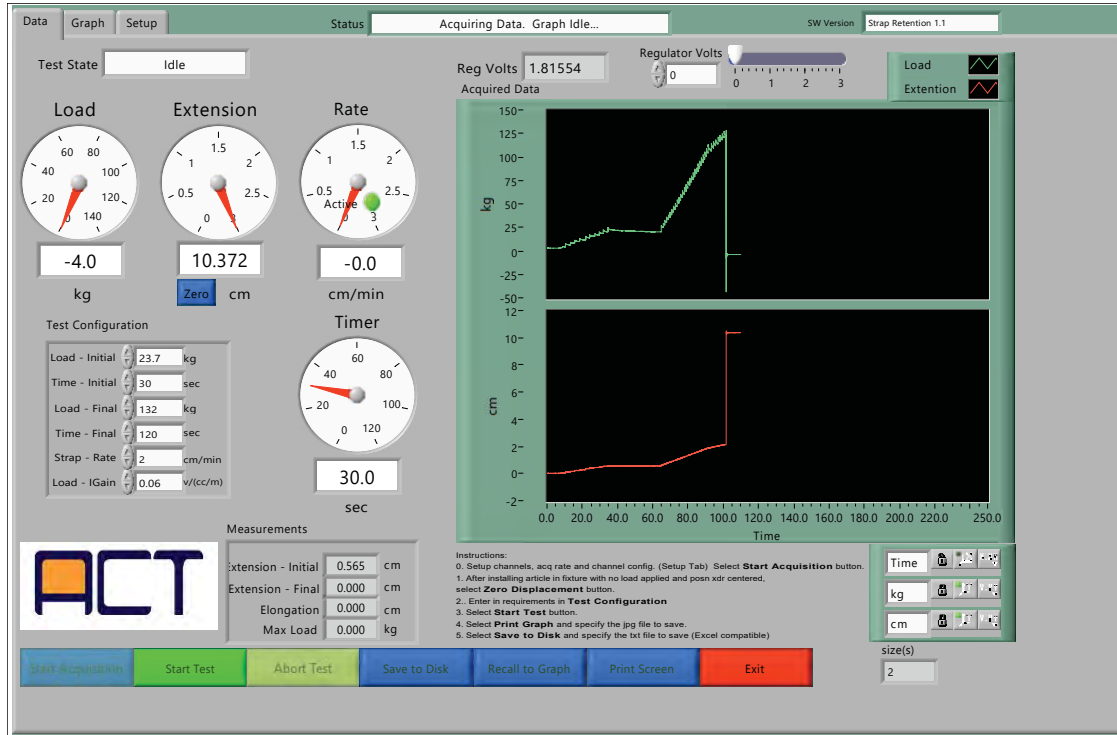
Time gate flag height : 25.40 mm

Acc. sensibility (axis Z) : 10.47

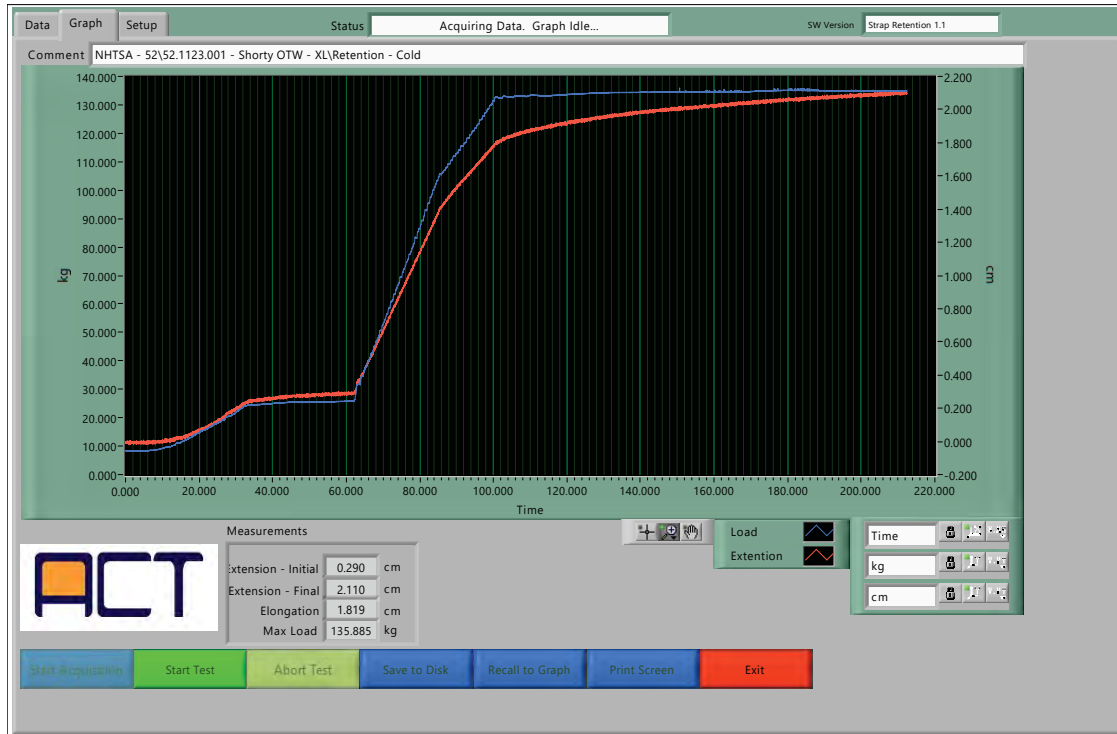


Impact #	Position	Anvil type	Drop Height (cm)	Energy (Joules)	Friction (%)	Time Gate (msec)	Velocity IN (m/sec)	Peak Acc.(G)	Delta T 150G (msec)	Delta T 200G (msec)	HIC	SI	Test Time	Test Date	PASS or FAIL
1	Front	Hemi	151.0	80.5	5.6	4.94	5.1394	92.6	0.00	0.00	388	432	12:36:07	2020-08-13	Pass
2	Front	Hemi	151.0	81.0	5.3	4.93	5.1543	144.5	0.00	0.00	580	710	12:37:36	2020-08-13	Pass
3	Left	Hemi	151.0	85.0	2.9	4.81	5.2816	97.9	0.00	0.00	377	431	14:10:06	2020-08-13	Pass
4	Left	Hemi	151.0	2254.7	-399.8	0.93	27.1978	299.0	1.59	1.06	1189	1655	14:11:16	2020-08-13	Pass
5	Right	Flat	201.0	115.3	2.1	4.13	6.1492	143.1	0.00	0.00	756	875	14:27:21	2020-08-13	Pass
6	Right	Flat	201.0	114.1	2.5	4.15	6.1187	196.3	2.45	0.00	1223	1441	14:28:58	2020-08-13	Pass
7	Rear	Flat	200.0	113.1	2.8	4.17	6.0903	163.0	2.06	0.00	1108	1316	15:39:20	2020-08-13	Pass
8	Rear	Flat	200.0	112.7	2.9	4.18	6.0819	210.5	2.87	0.92	1548	1872	15:40:25	2020-08-13	Pass

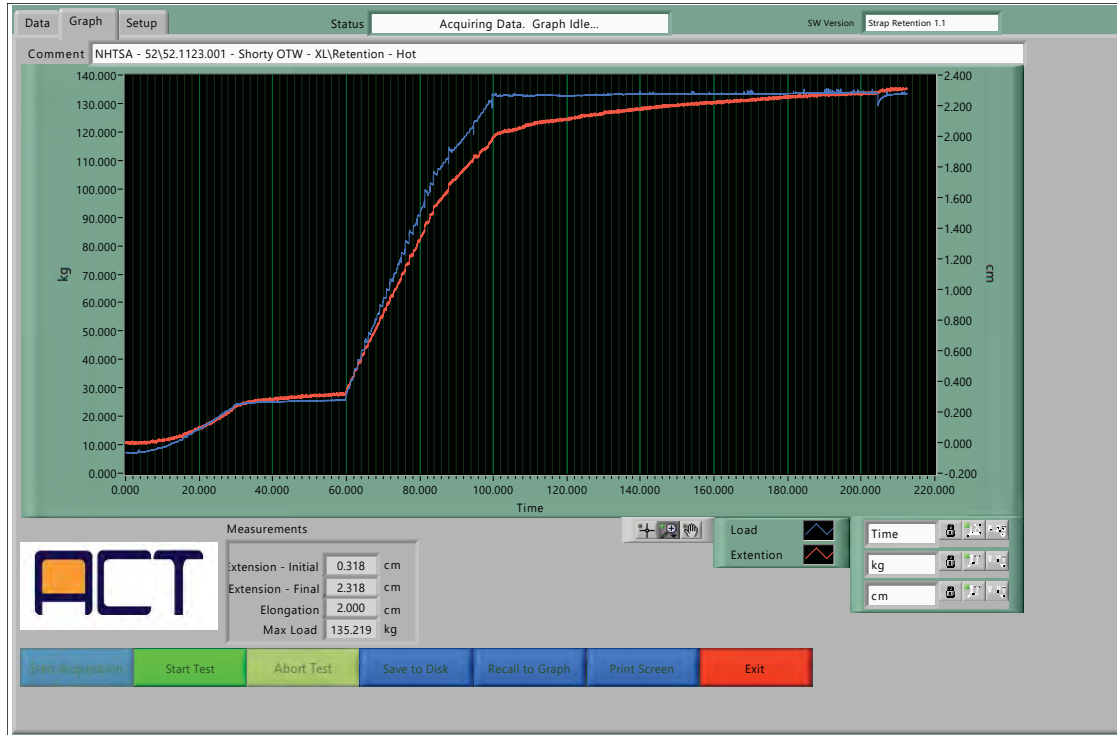
ACT DOT Strap Retention Acquisition
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 Last modified on 2017-10-01 at 4:36 PM
 Printed on 2020-08-13 at 4:28 PM



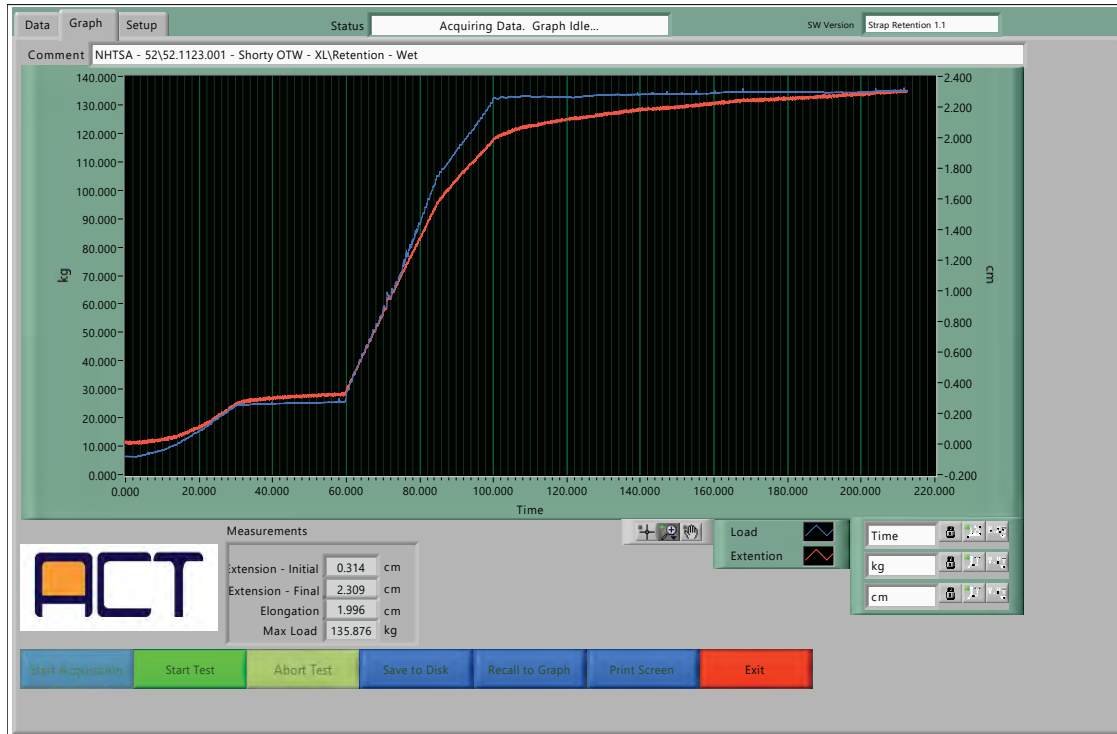
ACT DOT Strap Retention Acquisition
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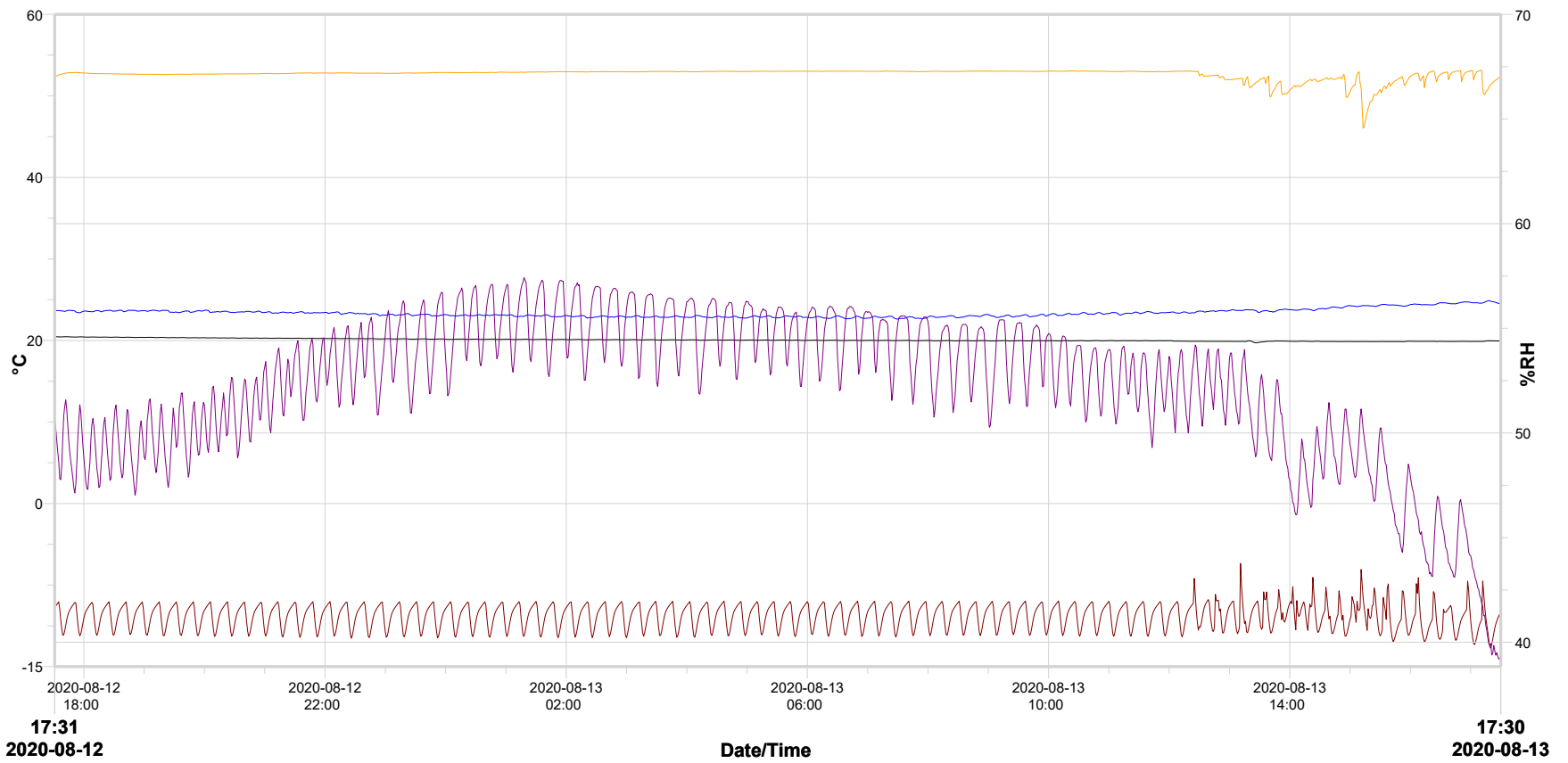


ACT DOT Strap Retention Acquisition
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ACT DOT Strap Retention Acquisition
C:\DAQ\DAQ_ADMIN\Strap Retention\Strap_Retention.exe\Strap Retention - Main.vi
Last modified on 2017-10-01 at 4:36 PM
Printed on 2020-08-14 at 9:34 AM





Report Summary Statistics

#	Location	Zone	Color	Units	Avg	Min	Max	STD	MKT	Samples
1	H0177 - Humidity (1044)	viewLinc/ACT-Helmet Lab (1041)	Yellow	%RH	52.25	39.20	57.42	3.49	0.00	1440
2	H0177 - Lab Temp. (1042)	viewLinc/ACT-Helmet Lab (1041)	Blue	°C	23.36	22.62	24.88	0.49	23.37	1440
3	H0178 - Oven (1046)	viewLinc/ACT-Helmet Lab (1041)	Orange	°C	52.66	46.03	53.14	0.70	52.68	1440
4	H0178 - Water (1048)	viewLinc/ACT-Helmet Lab (1041)	Black	°C	20.08	19.71	20.46	0.16	20.08	1440
5	H0179 - Freezer (1050)	viewLinc/ACT-Helmet Lab (1041)	Red	°C	-10.77	-13.74	-7.33	1.51	-13.61	1440

APPENDIX A

INTERPRETATIONS OR DEVIATIONS FROM FMVSS No. 218

1. Excess water on the water immersed sample was allowed to drip off before testing to prevent water damage to test equipment.
2. The impact #28, the velocity for the 2nd impact at the left hemispherical impact location on the water immersed sample was not captured.

Contract File No.: 52.1123

Test File: 001

Control Document; Official ACT NHTSA FMVSS No.218/Report Template TP-07/USA 30 July 2020/Rev.23
SharePoint/GlobalResourceLibrary/Reporting/ReportTemplates/Helmets/FMVSS No.218

Technician: Devon Dahm

Test Date: 13 August 2020

APPENDIX B EQUIPMENT LIST AND CALIBRATION SCHEDULES

ACT ID	Description	Make/Model	S/N	Last Check	Next Check
H0028	Anvil Hemispherical	Cadex	C070911-01	12/5/2019	12/5/2020
H0029	Anvil Flat	Cadex	C310811-02	12/5/2019	12/5/2020
H0171	Anvil MEP	Cadex	2141901	4/18/2019	4/18/2020
H0040	Clamp	Cadex	NA	12/3/2019	12/3/2020
H0146	Clamp	Cadex	NA	12/3/2019	12/3/2020
H0055	Clamp	Cadex	NA	12/3/2019	12/3/2020
H0144	Clamp	Cadex	NA	12/3/2019	12/3/2020
H0047	Clamp	Cadex	NA	12/3/2019	12/3/2020
H0145	Clamp	Cadex	NA	12/3/2019	12/3/2020
H0194	Drop Carriage	Cadex	NA	5/11/2020	12/3/2020
H0064	Penetration Striker #1	Cadex	NA	12/5/2019	12/5/2020
H0065	Penetration Striker #2	Cadex	NA	12/5/2019	12/5/2020
H0173	Drop Carriage	Cadex	NA	12/3/2019	12/3/2020
H0196	Magnesium Ball Arm	Cadex	NA	7/30/2020	12/3/2020
H0115	Steel Ball Arm	Cadex	NA	12/3/2019	12/3/2020
H0172	Aluminum Ball Arm	Cadex	NA	12/3/2019	12/3/2020
H0092	Environmental Chamber	Immersion Bucket	NA	NA	NA
H0174	Environmental Chamber	Heratherm OSG 750		NA	NA
H0186	Environmental Chamber	69K-035	9123314	NA	NA
H0187	Environmental Chamber	69K-031HC	9129337	NA	NA
H0079	Fixture	Mono Rail Tower	NA	12/5/2019	12/5/2020
H0080	Fixture	Penetration Tube	NA	12/5/2019	12/5/2020
H0081	Fixture	Positional Stability Stand	NA	12/5/2019	12/5/2020
H0082	Fixture	Retention	NA	12/5/2019	12/5/2020
H0087	Fixture	Penetration Heaform Mount	NA	NA	NA
H0088	Fixture	Penetration Height Stick	NA	NA	NA
H0089	Fixture	Peripheral Vision Stand	NA	NA	NA
H0096	Fixture	Positional Stability Ap.	NA	12/5/2019	12/5/2020
H0111	Fixture	Precision Brow Block	NA	12/5/2019	12/5/2020
H0114	Fixture	Peripheral Vision Protractor	NA	NA	NA
H0120	Fixture	Penetration Base	NA	NA	NA
H0148	Fixture	Headform Stand	NA	NA	NA
H0166	Fixture	Peripheral Vision Go-No-Go	NA	12/5/2019	12/5/2020
H0117	Headform Penetration: S	Cadex	7293	12/5/2019	12/5/2020
H0118	Headform Penetration: M	Cadex	7294	12/5/2019	12/5/2020
H0119	Headform Penetration: L	Cadex	7296	12/5/2019	12/5/2020
H0138	Headform Impact: S	Cadex	C04574 - 7567	12/5/2019	12/5/2020
H0139	Headform Impact: M	Cadex	C04575 - 7571	12/5/2019	12/5/2020
H0140	Headform Impact: L	Cadex	C04576 - 7573	12/5/2019	12/5/2020
H0093	Ballast Weight	NA	NA	12/3/2019	12/5/2020
H0188	Lab Computer	ASUS		NA	NA

Contract File No.: 52.1123

Test File: 001

Technician: Devon Dahm

Test Date: 13 August 2020

Control Document; Official ACT NHTSA FMVSS No.218/Report Template TP-07/USA 30 July 2020/Rev.23

SharePoint/GlobalResourceLibrary/Reporting/ReportTemplates/Helmets/FMVSS No.218

Calibrated Measurement Equipment								
ACT ID	Description	Make/Model	S/N	Range	Accuracy from Cal. Certs	Last Calibration	Next Calibration	Calibration By:
H0193	Velocity Gate	Velocimeter HVTG Short	HVTG120200 129-1	--	5.77E-02	1/29/2020	1/29/2021	CADEX
H0192	Accelerometer	PBC	LW226129	2000 g	±2.5%	8/23/2019	8/23/2020	PCB Piezotronics
H1089	Data Acquisition Box	353B18	CC120200129 -1		±2.84 mV	1/29/2020	1/29/2021	CADEX
H1089	Data Acquisition Box	PC--4400	CC120200129 -1		±2.84 mV	1/29/2020	1/29/2021	CADEX
H0098	LVDT - Retention	Schaevitz	16071	2 in	±0.5%	11/26/2019	11/26/2020	Micro Quality Calibration
H0180	Ohaus Scale	2000-HR	90921684	0-6000 gm	±1 g	10/28/2019	10/28/2020	Micro Quality Calibration
H0099	Load Cell - Retention	Futek	490706	0-500 lbs	±0.2%	11/25/2019	11/26/2020	Micro Quality Calibration
H0105	Height Gage	LSB350	3121016	0-12 in	±0.001 in	11/26/2019	11/26/2020	Micro Quality Calibration
H0180	Ohaus Scale	V11P6	90921684	0-6000 gm	±1 g	10/28/2019	10/28/2020	Micro Quality Calibration
H0124	Digital Measuring Tape	ADIR PRO	-	16.5 ft/192 in	±0.03125 in	11/26/2019	11/26/2020	Micro Quality Calibration
H0179	Environmental Data Logger	Etape	19381045	-90 To +95 °C	±0.05 °C	9/17/2019	9/17/2020	Vaisala
H0105	Height Gage	Mitutoyo	3121016	0-12 in	±0.001 in	11/26/2019	11/26/2020	Micro Quality Calibration
H0177	Environmental Data Logger	Veriteq	19382001	-25 To +70°C,	0.80%RH	9/16/2019	9/16/2020	Vaisala
H0181	Digital Caliper	SP-2000-20R	B19221219	0-100% RH	±0.06 °C	11/13/2019	11/13/2020	Micro Quality Calibration
H0178	Environmental Data Logger	Veriteq	19381048	-90 To +95 °C	±0.07 °C	9/17/2019	9/17/2020	Vaisala

Contract File No.: 52.1123

Test File: 001

Technician: Devon Dahm

Test Date: 13 August 2020

Control Document: Official ACT NHTSA FMVSS No.218/Report Template TP-07/USA 30 July 2020/Rev.23

SharePoint/GlobalResourceLibrary/Reporting/ReportTemplates/Helmets/FMVSS No.218

APPENDIX C
PHOTOGRAPHS

Contract File No.: 52.1123
Test File: 001

Technician: Devon Dahm
Test Date: 13 August 2020

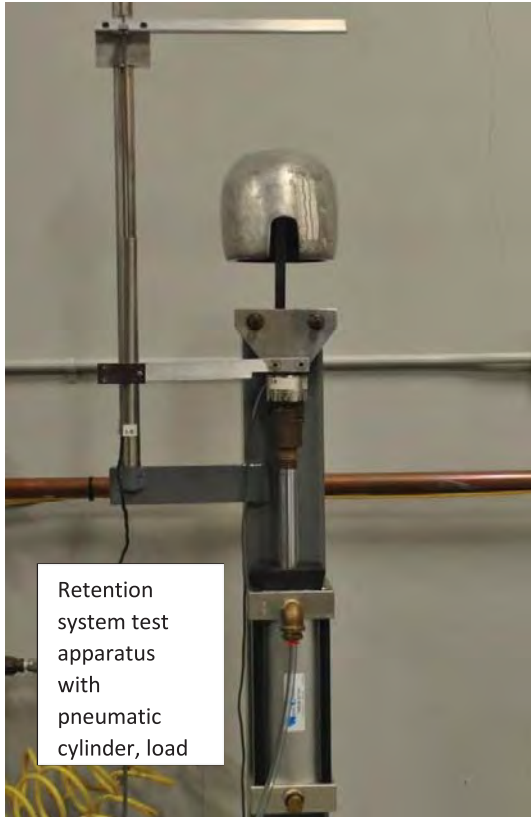
Impact attenuation test apparatus with three headforms (S, M, L), flat, hemi and MEP anvils



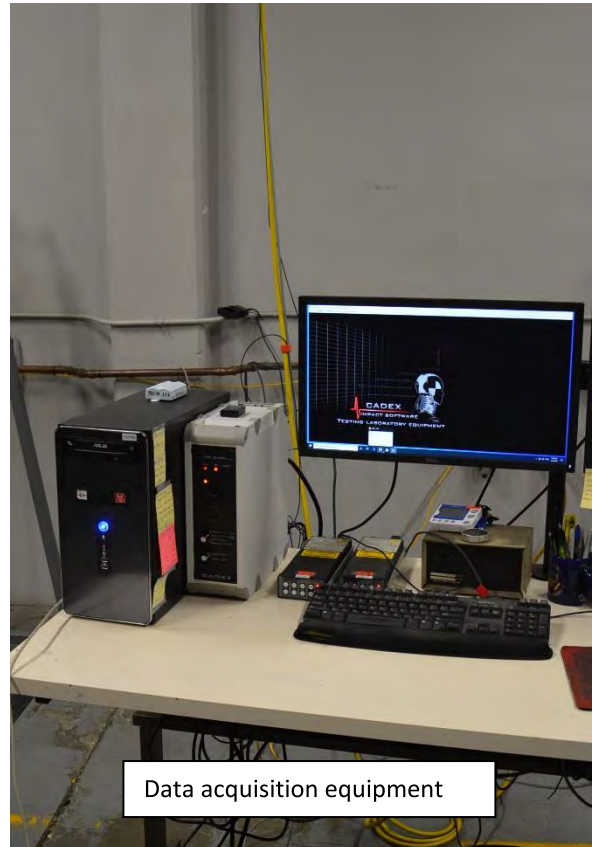
Penetration test apparatus with adjustable base



Retention system test apparatus with pneumatic cylinder, load



Data acquisition equipment





Low temperature conditioning cabinet



High temperature conditioning cabinet and water immersion equipment

SIMPSON SHORTY OTW helmet and box showing model designation



SIMPSON SHORTY OTW helmet with test line, front left view



SIMPSON SHORTY OTW helmet with test line, rear left view



SIMPSON SHORTY OTW helmet interior view



SIMPSON SHORTY OTW helmet
front and left side hemispherical
anvil impact locations

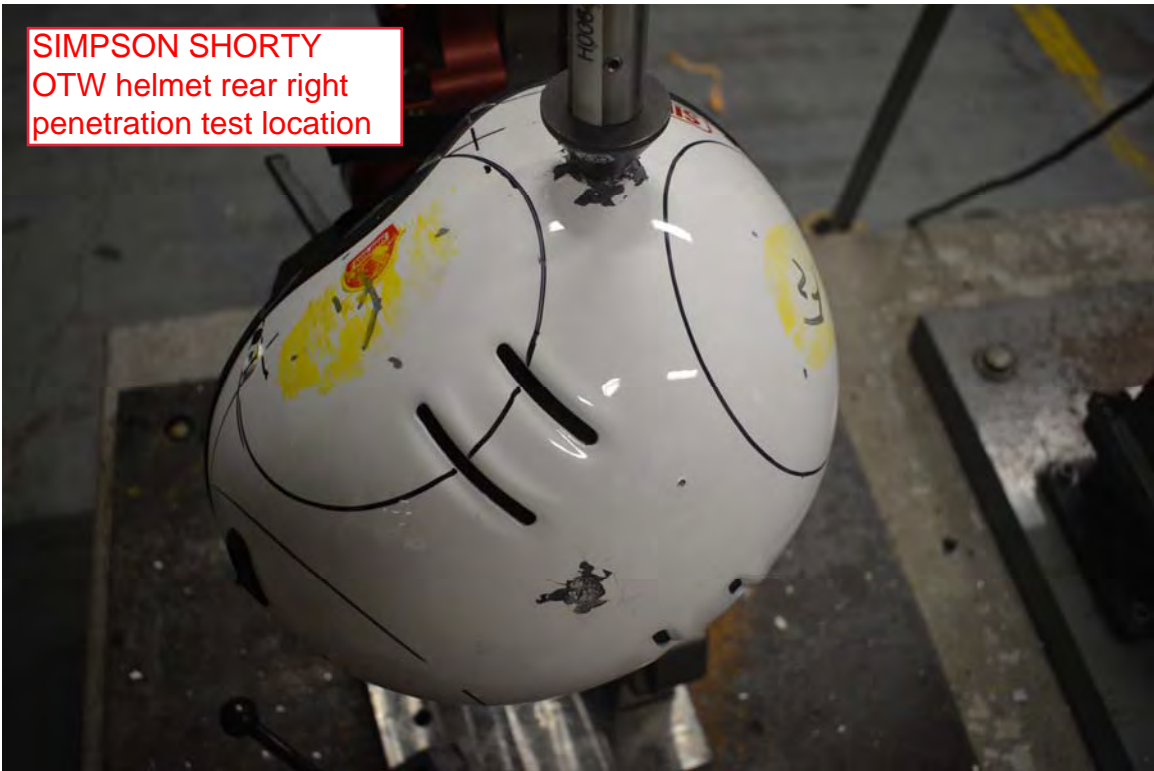


SIMPSON SHORTY OTW
helmet right side and rear flat
anvil impact locations





SIMPSON SHORTY
OTW helmet crown
penetration test location



SIMPSON SHORTY
OTW helmet rear right
penetration test location

SIMPSON SHORTY OTW failing ambient retention sample



SIMPSON SHORTY OTW ambient sample broken retention buckle



SIMPSON SHORTY OTW helmet
S5.6.1 Labeling readily visible
failure



SIMPSON SHORTY OTW
helmet S5.6.1 Labeling



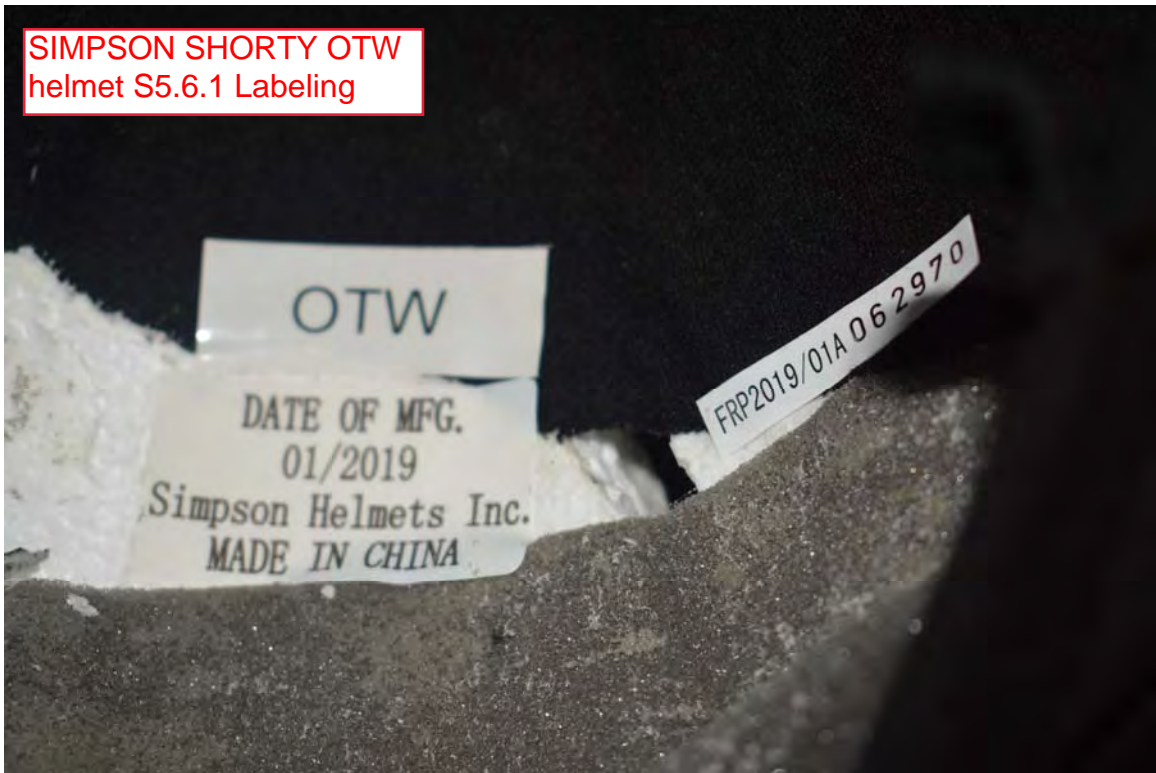


SIMPSON SHORTY OTW helmet S5.6.1 Labeling

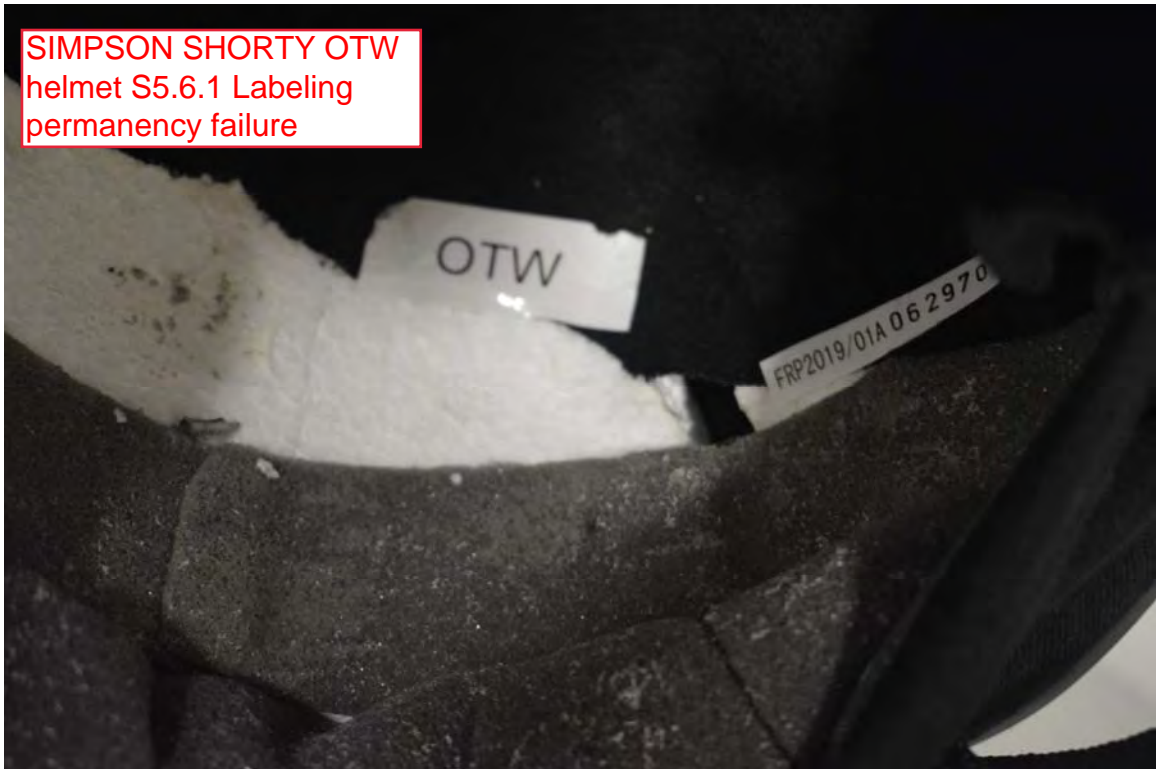


SIMPSON SHORTY OTW helmet S5.6.1 Labeling permanency failure

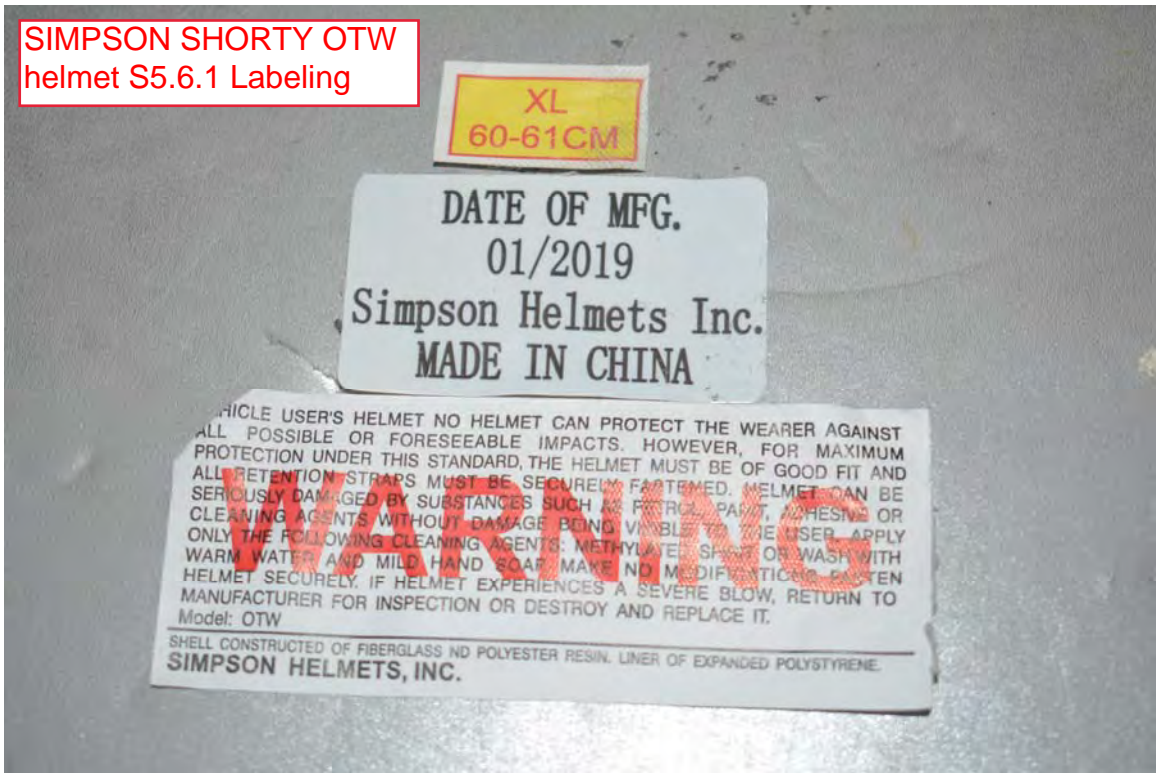
SIMPSON SHORTY OTW
helmet S5.6.1 Labeling



SIMPSON SHORTY OTW
helmet S5.6.1 Labeling
permanency failure



SIMPSON SHORTY OTW
helmet S5.6.1 Labeling



SIMPSON SHORTY OTW helmet
S5.6.2 Certification Label



SIMPSON SHORTY OTW helmet
penetration witness tape

