

**Vehicle Research and Test Center
Eval of ATD
HIII 10YO**

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Summary Report

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**Prepared For
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SECTION 1

PURPOSE AND SUMMARY FOR HIII 10YO

The purpose of the testing is to evaluate the durability and kinematic response of the HIII 10YO in a dynamic testing environment. Frontal impacts were conducted on the 213-sled buck.

SUMMARY

A HIII 10YO was seated and secured in the left side position. The HIII 10YO was seated in multiple positions for this testing series. These positions included CW_1 with and without a booster and in the erect position(0-SS).

The HIII 10YO was instrumented with triaxial accelerometers (head, chest and pelvis), upper/lower neck force and moment, Femur force (left and right), lumbar force and moment and head and pelvic tilt sensors. During this test series the dummy was restrained with a 3-point seatbelt.

SECTION 2

Left Side 213 BUCK TEST SUMMARY

TEST DUMMY INFORMATION

Description	Position # 4
ATD Type/Serial No.	HIII 10YO / F001
Restraint System	3-Point Seatbelt

CAMERA POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Origin	mm	0.00	0.00	0.00
Left Side Camera	mm	416.07	-903.97	-369.65
Right Side Camera	mm	397.08	907.70	-389.89

DUMMY POSITIONING

HIII 10YO – CW_1 seating procedure with Turbobooster CRS

TRC Test Number: S200131-1

VRTC Test Number: FR_213SS_02



DUMMY POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Z Point Post - Actual	mm	-0.10	0.40	-0.36
Top of Seat Headrest - Actual	mm	-152.26	349.87	-820.62
Top of Head - Actual	mm	92.54	353.56	-892.27
Bridge of Nose - Actual	mm	183.25	355.71	-801.07
Head CG Outboard - Actual	mm	105.03	286.31	-794.20
Chin - Actual	mm	192.01	354.35	-706.64
Neck Center - Actual	mm	105.50	352.84	-671.88
Chest point - Actual	mm	195.25	352.61	-566.97
Chest pot - Actual	mm	229.07	351.50	-480.42
CRS Center - Actual	mm	516.24	352.52	-261.38
Center of Seat Frame Bottom - Actual	mm	619.03	350.25	-104.52
Shoulder Belt up - Actual	mm	178.22	350.26	-598.34
Shoulder Belt down - Actual	mm	216.84	350.36	-522.31
Lap Belt up - Actual	mm	277.75	350.11	-403.16
Lap Belt down - Actual	mm	314.58	349.73	-374.97
Right Knee top - Actual	mm	542.69	437.00	-420.66
Left Knee top - Actual	mm	541.41	264.20	-416.95
Outboard Knee - Actual	mm	545.91	222.32	-339.71
Outboard Ankle - Actual	mm	682.45	234.93	-120.48
H-point - Actual	mm	245.06	228.54	-308.41
Target 2 - Seat Base H-Point - Actual	mm	205.03	156.57	-267.76
Target 3 - Seat Base Side - Actual	mm	448.22	156.42	-236.05

DUMMY INJURY

HIC (36 ms)	611.98
HIC (15 ms)	302.59
BrIC	1.11
NIJ Max	1.38
Neck Tension Load (N)	3315.96
Neck Comp Load (N)	-248.87
Upper Neck Fx (N)	1048.917
Upper Neck Fy (N)	-224.646
Upper Neck Fz (N)	3315.962
Upper Neck Mx (Nm)	-11.299
Upper Neck My (Nm)	-36.438
Upper Neck Mz (Nm)	-3.063
Lower Neck Fx (N)	-2981.292
Lower Neck Fy (N)	-933.426
Lower Neck Fz (N)	1375.506
Lower Neck Mx (Nm)	-76.558
Lower Neck My (Nm)	295.719
Lower Neck Mz (Nm)	-14.671
Chest 3ms Clip (g)	45.71
Chest Deflection (mm)	39.562
Lumbar Fx (N)	1985.624
Lumbar Fy (N)	-328.5588
Lumbar Fz (N)	-1058.194
Lumbar Mx (Nm)	2096.736599
Lumbar My (Nm)	-63.252
Lumbar Mz (Nm)	-128.373
Pelvis Resultant (g)	46.715
Lap Belt Load (N)	4785.933
Shoulder Belt Load (N)	6568.144

DUMMY POSITIONING

HIII 10YO – CW_1 seating procedure with No Booster CRS

TRC Test Number: S200203-1

VRTC Test Number: FR_213SS_04



DUMMY POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Z Point Post - Actual	mm	-0.18	0.20	-0.22
Top of Seat Headrest - Actual	mm	-153.24	349.01	-822.48
Top of Head - Actual	mm	116.31	349.39	-790.04
Bridge of Nose - Actual	mm	210.80	350.83	-701.00
Head CG Outboard - Actual	mm	129.62	280.45	-690.29
Chin - Actual	mm	222.87	348.51	-606.62
Neck Center - Actual	mm	136.66	349.25	-569.02
Chest point - Actual	mm	234.02	348.41	-457.95
Chest pot - Actual	mm	266.15	350.62	-377.02
Center of Seat Frame Bottom - Actual	mm	619.44	349.85	-102.91
Shoulder Belt up - Actual	mm	145.84	349.99	-575.44
Shoulder Belt down - Actual	mm	185.84	350.78	-518.82
Lap Belt up - Actual	mm	285.73	352.82	-334.07
Lap Belt down - Actual	mm	321.10	351.57	-303.36
Right Knee top - Actual	mm	588.12	443.12	-314.63
Left Knee top - Actual	mm	584.56	259.71	-312.70
Outboard Knee - Actual	mm	587.29	215.67	-237.07
Outboard Ankle - Actual	mm	724.18	222.77	-16.54
H-point - Actual	mm	288.02	224.88	-206.78

DUMMY INJURY

HIC (36 ms)	1155.19
HIC (15 ms)	398.19
BrIC	1.02
NIJ Max	1.6
Neck Tension Load (N)	3805.13
Neck Comp Load (N)	-320.1
Upper Neck Fx (N)	1139.818
Upper Neck Fy (N)	-98.27
Upper Neck Fz (N)	3805.129
Upper Neck Mx (Nm)	-14.547
Upper Neck My (Nm)	-36.14
Upper Neck Mz (Nm)	-2.691
Lower Neck Fx (N)	-1734.377
Lower Neck Fy (N)	-480.106
Lower Neck Fz (N)	905.645
Lower Neck Mx (Nm)	-29.266
Lower Neck My (Nm)	282.818
Lower Neck Mz (Nm)	44.42
Chest 3ms Clip (g)	35.89
Chest Deflection (mm)	12.2
Lumbar Fx (N)	4449.342
Lumbar Fy (N)	350.698
Lumbar Fz (N)	2678.645
Lumbar Mx (Nm)	5193.934099
Lumbar My (Nm)	37.323
Lumbar Mz (Nm)	-226.476
Pelvis Resultant (g)	43.399
Lap Belt Load (N)	4775.947
Shoulder Belt Load (N)	5115.594

DUMMY POSITIONING

HIII 10YO – CW_1, Erect Posture (0-SS) seating procedure with No Booster CRS

TRC Test Number: S200204-1

VRTC Test Number: FR_213SS_06



DUMMY POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Z Point Post - Actual	mm	-0.24	0.49	0.54
Top of Seat Headrest - Actual	mm	-153.09	349.97	-821.56
Top of Head - Actual	mm	141.76	353.87	-818.28
Bridge of Nose - Actual	mm	226.98	354.95	-719.83
Head CG Outboard - Actual	mm	147.01	283.28	-718.65
Chin - Actual	mm	229.24	352.34	-625.15
Neck Center - Actual	mm	140.29	350.43	-595.76
Chest point - Actual	mm	227.24	350.01	-479.19
Chest pot - Actual	mm	251.06	352.06	-400.05
Center of Seat Frame Bottom - Actual	mm	619.06	350.46	-104.02
Shoulder Belt up - Actual	mm	157.21	350.52	-563.07
Shoulder Belt down - Actual	mm	215.85	350.34	-504.32
Lap Belt up - Actual	mm	296.13	350.66	-311.58
Lap Belt down - Actual	mm	323.77	350.27	-273.36
Right Knee top - Actual	mm	552.06	419.97	-302.87
Left Knee top - Actual	mm	549.38	266.93	-305.35
Outboard Knee - Actual	mm	567.11	226.56	-236.13
Outboard Ankle - Actual	mm	796.31	245.22	-118.84
H-point - Actual	mm	253.48	224.73	-205.20

DUMMY INJURY

HIC (36 ms)	486.78
HIC (15 ms)	290.43
BrIC	0.994
NIJ Max	1.43
Neck Tension Load (N)	3184.71
Neck Comp Load (N)	-80.12
Upper Neck Fx (N)	1101.806
Upper Neck Fy (N)	-68.955
Upper Neck Fz (N)	3184.713
Upper Neck Mx (Nm)	7.35
Upper Neck My (Nm)	-41.048
Upper Neck Mz (Nm)	2.329
Lower Neck Fx (N)	-1516.179
Lower Neck Fy (N)	-641.027
Lower Neck Fz (N)	1652.001
Lower Neck Mx (Nm)	36.762
Lower Neck My (Nm)	270.261
Lower Neck Mz (Nm)	27.947
Chest 3ms Clip (g)	46.31
Chest Deflection (mm)	22.648
Lumbar Fx (N)	-1550.316
Lumbar Fy (N)	417.636
Lumbar Fz (N)	-1504.246
Lumbar Mx (Nm)	1983.090079
Lumbar My (Nm)	32.076
Lumbar Mz (Nm)	125.117
Pelvis Resultant (g)	48.344
Lap Belt Load (N)	6053.218
Shoulder Belt Load (N)	5644.111

DUMMY POSITIONING

HIII 10YO –CW_1, Erect Posture (0-SS) seating procedure with Turbobooster CRS

TRC Test Number: S200204-2

VRTC Test Number: FR_213SS_08



DUMMY POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Z Point Post - Actual	mm	-0.21	0.26	-0.12
Top of Seat Headrest - Actual	mm	-152.27	350.64	-821.17
Top of Head - Actual	mm	106.64	352.43	-907.38
Bridge of Nose - Actual	mm	193.19	351.90	-808.84
Head CG Outboard - Actual	mm	110.56	282.36	-807.18
Chin - Actual	mm	195.73	350.49	-714.44
Neck Center - Actual	mm	107.38	350.68	-684.61
Chest point - Actual	mm	195.31	350.21	-565.79
Chest pot - Actual	mm	222.22	351.62	-486.27
CRS Center - Actual	mm	505.69	352.14	-254.93
Center of Seat Frame Bottom - Actual	mm	619.59	349.84	-102.93
Shoulder Belt up - Actual	mm	175.44	350.09	-609.39
Shoulder Belt down - Actual	mm	210.16	350.12	-531.06
Lap Belt up - Actual	mm	273.83	350.34	-389.78
Lap Belt down - Actual	mm	308.43	350.33	-357.52
Right Knee top - Actual	mm	519.24	444.29	-412.04
Left Knee top - Actual	mm	516.01	273.62	-412.22
Outboard Knee - Actual	mm	526.66	229.62	-335.39
Outboard Ankle - Actual	mm	678.73	247.97	-127.40
H-point - Actual	mm	220.63	223.38	-299.07
Target 2 - Seat Base H-Point - Actual	mm	197.34	154.33	-267.73
Target 3 - Seat Base Side - Actual	mm	445.82	149.80	-238.40

DUMMY INJURY

HIC (36 ms)	439.09
HIC (15 ms)	194.57
BrIC	1
NIJ Max	1.2
Neck Tension Load (N)	2826.37
Neck Comp Load (N)	-135.2
Upper Neck Fx (N)	820.635
Upper Neck Fy (N)	-250.766
Upper Neck Fz (N)	2826.373
Upper Neck Mx (Nm)	-9.345
Upper Neck My (Nm)	-34.077
Upper Neck Mz (Nm)	-3.93
Lower Neck Fx (N)	-2584.093
Lower Neck Fy (N)	-859.35
Lower Neck Fz (N)	1762.73
Lower Neck Mx (Nm)	-77.234
Lower Neck My (Nm)	248.47
Lower Neck Mz (Nm)	-10.718
Chest 3ms Clip (g)	43.54
Chest Deflection (mm)	40.712
Lumbar Fx (N)	1771.617
Lumbar Fy (N)	-435.425
Lumbar Fz (N)	-1120.457
Lumbar Mx (Nm)	1892.762595
Lumbar My (Nm)	-75.617
Lumbar Mz (Nm)	-77.982
Pelvis Resultant (g)	48.461
Lap Belt Load (N)	4723.853
Shoulder Belt Load (N)	6507.043