

**Vehicle Research and Test Center
Eval of ATD
HIII 5th**

**Prepared By:
Transportation Research Center Inc.
10820 State Route 347
P. O. Box B-67
East Liberty, OH 43319**



Summary Report

January 2020

**Prepared For
Vehicle Research and Test Center
P. O. Box 37
East Liberty, OH 43319**

SECTION 1
PURPOSE AND SUMMARY FOR THOR-05F

The purpose of the testing is to evaluate the durability and kinematic response for the HIII 5th in a dynamic testing environment. Frontal impacts were conducted in the Mazda CX-3 rear seat sled buck.

SUMMARY

A HIII 5th was seated and secured in the left rear occupant position. The HIII 5th was seated in two positions which included the 208 seating procedure and the 208 seating procedure with pelvis moved forward.

The HIII 5th was instrumented with triaxial accelerometers (head, chest and pelvis), angular rate sensors (head, chest and pelvis), upper/lower neck force and moment, ASIS force and moment(left and right) and Femur force and moment (left and right), lumbar force and moment. During this test series the dummy was restrained with a 3-point seatbelt.

SECTION 2

Left Rear Mazda CX-3 BUCK TEST SUMMARY

TEST DUMMY INFORMATION

Description	Position # 4
ATD Type/Serial No.	HIII 5 th / 421
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	358.50	-707.61	36.65
Right Side Camera	mm	356.67	714.77	47.83

DUMMY POSITIONING

HIII 5th – 208 seating procedure

TRC Test Number: S200123-1

VRTC Test Number: FR_RSHTS_08



DUMMY POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Rear Striker - Actual	mm	0.49	0.04	0.36
Top of Head - Actual	mm	128.52	401.65	-349.41
Bridge of nose - Actual	mm	220.47	400.36	-262.20
Head CG - Actual	mm	136.20	331.85	-247.53
Right Cheek - Actual	mm	218.63	427.38	-222.92
Left Cheek - Actual	mm	215.87	368.41	-224.81
Chin - Actual	mm	226.98	398.52	-165.96
Neck center - Actual	mm	143.35	400.73	-144.21
Top of jacket - Actual	mm	153.46	399.78	-126.49
Chest point - Actual	mm	233.99	396.31	-24.03
Chest pot - Actual	mm	269.40	398.55	64.90
Bottom of jacket - Actual	mm	309.88	400.94	157.09
Top of pelvis jacket - Actual	mm	326.74	399.29	198.16
Elbow - Actual	mm	154.06	194.99	192.03
Seatbelt up - Actual	mm	237.17	400.74	-22.53
Seatbelt down - Actual	mm	269.08	401.13	59.08
Lapbelt up - Actual	mm	327.48	399.91	195.18
Lapbelt down - Actual	mm	351.48	400.98	234.13
H-point - Actual	mm	284.63	224.07	307.18
H-point bolt - Actual	mm	223.21	214.65	265.52
Outboard Knee - Actual	mm	629.90	230.23	270.00
Outboard Ankle - Actual	mm	709.26	260.68	545.27
Left knee top - Actual	mm	590.50	287.31	198.79

DUMMY POSITIONING FARO MEASUREMENTS, CONTINUED

Right knee top - Actual	mm	595.94	488.74	191.26
Left toe - Actual	mm	904.42	288.79	647.62
Right toe - Actual	mm	894.93	502.32	645.90
Left heel - Actual	mm	650.13	294.80	668.39

DUMMY INJURY

HIC (36 ms)	1158
HIC (15 ms)	895
BrIC	1.13
NIJ Max	0.967
Neck Tension Load (N)	3099.11
Neck Comp Load (N)	-422.2
Upper Neck Fx (N)	-1690.656
Upper Neck Fy (N)	-442.025
Upper Neck Fz (N)	3099.114
Upper Neck Mx (Nm)	-16.44
Upper Neck My (Nm)	-46.213
Upper Neck Mz (Nm)	-7.323
Lower Neck Fx (N)	-3650.553
Lower Neck Fy (N)	-863.873
Lower Neck Fz (N)	-1426.923
Lower Neck Mx (Nm)	-130.364
Lower Neck My (Nm)	422.106
Lower Neck Mz (Nm)	-41.691
Chest 3ms Clip (g)	73.67
Chest Deflection (mm)	51.4
Lumbar Fx (N)	2882.702
Lumbar Fy (N)	-552.9471
Lumbar Fz (N)	-4475.057
Lumbar Mx (Nm)	-94.482
Lumbar My (Nm)	144.438
Lumbar Mz (Nm)	NA
Pelvis Resultant (g)	102.769
Asis Left Force (N)	4560.613
Asis Left Moment Nm)	25.07
Asis Right Force (N)	5036.879
Ais Right Moment (Nm)	10.241
Femur Right Force (N)	2968.411
Femur Left Force (N)	3775.248
Lap Belt Load (N)	9103.965
Shoulder Belt Load (N)	9771.639

DUMMY POSITIONING

HIII 5th – 208 seating procedure with pelvis forward

TRC Test Number: S200127-1

VRTC Test Number: FR_RSHTS_10



DUMMY POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Rear Striker - Actual	mm	-0.49	-0.01	0.68
Top of Head - Actual	mm	134.43	400.96	-340.29
Bridge of nose - Actual	mm	226.97	400.74	-251.12
Head CG - Actual	mm	143.42	330.57	-237.38
Right Cheek - Actual	mm	224.97	426.43	-211.46
Left Cheek - Actual	mm	222.98	367.16	-215.19
Chin - Actual	mm	233.34	397.03	-155.11
Neck center - Actual	mm	149.92	397.21	-134.23
Top of jacket - Actual	mm	160.51	399.46	-119.76
Chest point - Actual	mm	243.35	398.27	-6.18
Chest pot - Actual	mm	273.24	398.17	68.72
Bottom of jacket - Actual	mm	317.13	399.27	162.56
Top of pelvis jacket - Actual	mm	329.70	401.01	203.58
Elbow - Actual	mm	193.69	180.22	190.15
Seatbelt up - Actual	mm	241.07	400.30	-13.41
Seatbelt down - Actual	mm	274.85	398.66	64.76
Lapbelt up - Actual	mm	313.14	400.25	172.31
Lapbelt down - Actual	mm	344.51	402.80	207.79
H-point - Actual	mm	309.36	226.27	307.02
H-point bolt - Actual	mm	244.41	213.01	272.17
Outboard Knee - Actual	mm	648.00	244.28	252.58
Outboard Ankle - Actual	mm	700.90	256.82	535.67
Left knee top - Actual	mm	605.40	304.73	187.47

DUMMY POSITIONING FARO MEASUREMENTS, CONTINUED

Right knee top - Actual	mm	607.48	502.77	190.53
Left toe - Actual	mm	888.60	291.18	643.48
Right toe - Actual	mm	909.24	508.02	644.69
Left heel - Actual	mm	636.30	284.27	658.49
Right heel - Actual	mm	651.48	501.79	653.77

DUMMY INJURY

HIC (36 ms)	1475
HIC (15 ms)	1092
BrIC	1.07
NIJ Max	1.06
Neck Tension Load (N)	3331.38
Neck Comp Load (N)	-20.638
Upper Neck Fx (N)	-1724.277
Upper Neck Fy (N)	291.275
Upper Neck Fz (N)	3331.382
Upper Neck Mx (Nm)	23.632
Upper Neck My (Nm)	15.444
Upper Neck Mz (Nm)	-4.363
Lower Neck Fx (N)	-3993.52
Lower Neck Fy (N)	375.054
Lower Neck Fz (N)	-1550.17
Lower Neck Mx (Nm)	21.8
Lower Neck My (Nm)	452.95
Lower Neck Mz (Nm)	-33.78
Chest 3ms Clip (g)	56.83
Chest Deflection (mm)	50.12
Lumbar Fx (N)	10435.576*
Lumbar Fy (N)	-1176.804
Lumbar Fz (N)	-5720.355
Lumbar Mx (Nm)	-66.908
Lumbar My (Nm)	-250.244
Lumbar Mz (Nm)	NA
Pelvis Resultant (g)	142.885
Asis Left Force (N)	3828.378
Asis Left Moment (Nm)	62.349
Asis Right Force (N)	3752.499
Ais Right Moment (Nm)	48.316
Femur Right Force (N)	3256.143
Femur Left Force (N)	2069.631
Lap Belt Load (N)	6553.942
Shoulder Belt Load (N)	10072.18