

CLIENT CONFIDENTIAL

Client: **Karma Mobility Ltd.**


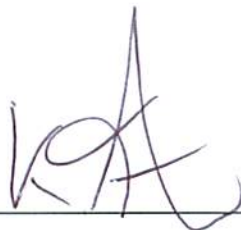
Test: **ISO 7176/19 Wheelchair test**

Test Item: **MVP502 (21 kg)**

Occupant: **HII 50%ile (75kg)**

Restraints: **(Wch) : Unwin
(Occ) : Unwin**

Millbrook Report No.:	MBK 09/0258
Millbrook Project No.:	CR0071-003-01
Millbrook Test No.:	S10728

Author :	 _____	G. Ayton Engineer
Approved :	 _____	K. Forinton Principal Engineer
Date :	31st March 2009	

This test report shall not be reproduced, except in full, without written approval of the laboratory

Distribution

Organisation	Recipient	Format	Qty
2 Crown Road Kings Norton Business Centre Kings Norton Birmingham B30 3HY	M. Duffield	PDF	1
Millbrook Proving Ground Ltd	Contract file	PDF	1

Report Revision History

Table 0-1

Rev.	Revision Description	Date	Author	Approver	Pages
1	Initial release	31/03/09	G. Ayton	K. Forinton	All

Contents

Section	Page Nos.
Distribution.....	2
Report Revision History	2
Contents	3
Appendices.....	3
Test Facility and Date	3

Appendices

Graphical results	See Appendix A
Pre and post test photographs	See Appendix B
Film Analysis	See Appendix C
Test Results	See Appendix D

Test Facility and Date

The test, number S10728, was performed on 23rd March 2009 at the HyGE Sled Test Facility at Millbrook Proving Ground Ltd.

Address: Millbrook Proving Ground Ltd
 Millbrook
 Bedford
 MK45 2JQ
 England

Contact: Mr. K.Forinton - Principal Engineer.
 Telephone: 01525 408212
 Fax: 01525 408203
 Email: kforinton@millbrook.co.uk



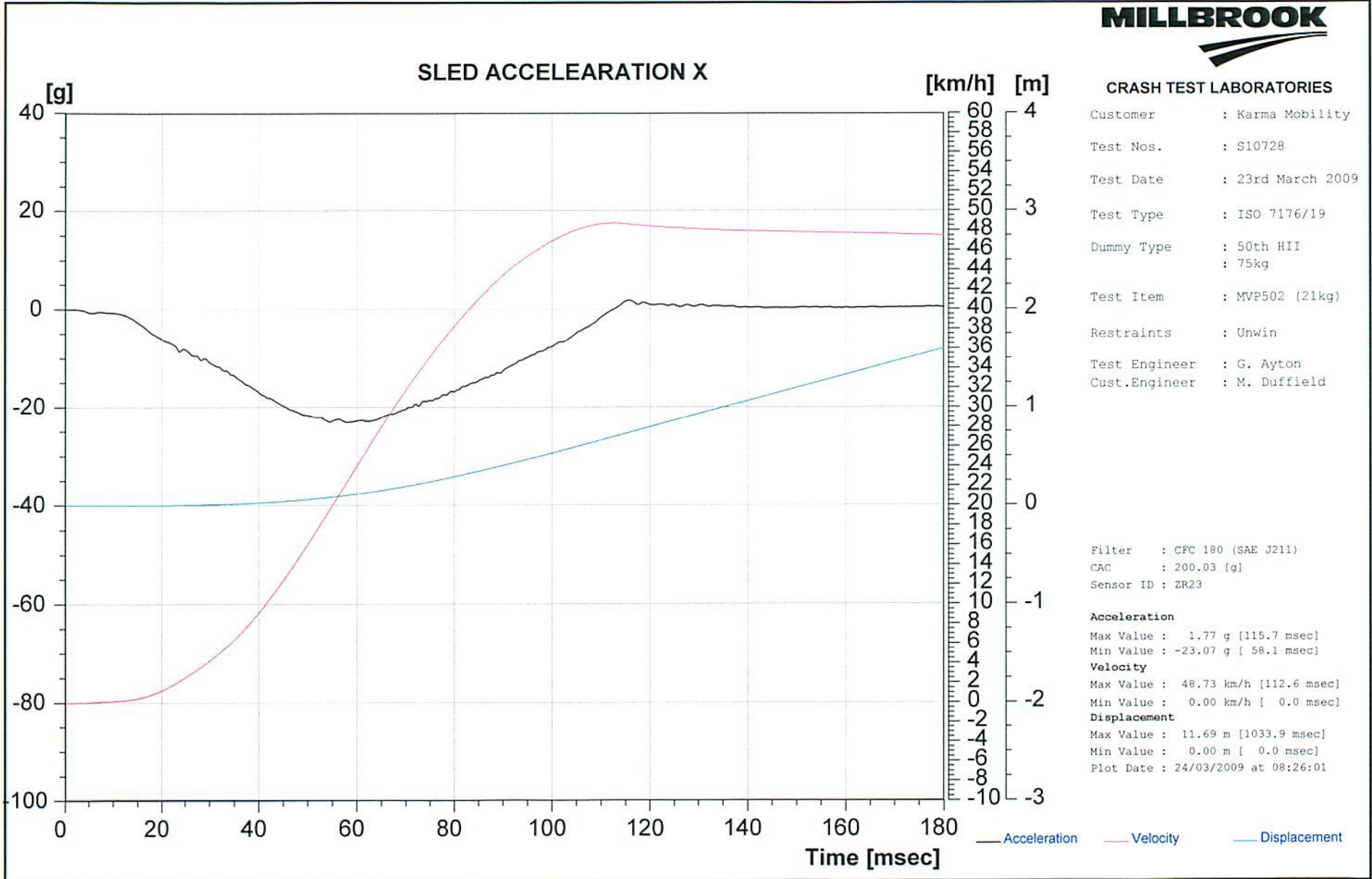
CRASH TEST LABORATORIES

Customer : Karma Mobility
Test Nos. : S10728
Test Date : 23rd March 2009
Test Type : ISO 7176/19
Dummy Type : 50th HII
: 75kg
Test Item : MVP502 (21kg)
Restraints : Unwin
Test Engineer : G. Ayton
Cust.Engineer : M. Duffield

Max Test Velocity = 48.73 [km/h]

Filter : CFC 60 (SAE J211)
CAC : 200.03 [g]
Sensor ID : ZR23
Max Value : 1.45 g [116.2 msec]
Min Value : -22.92 g [56.9 msec]
Plot Date : 24/03/2009 at 08:25:59





CRASH TEST LABORATORIES

Customer : Karma Mobility

Test Nos. : S10728

Test Date : 23rd March 2009

Test Type : ISO 7176/19

Dummy Type : 50th HII
: 75kg

Test Item : MVP502 (21kg)

Restraints : Unwin

Test Engineer : G. Ayton

Cust.Engineer : M. Duffield

Filter : CFC 180 (SAE J211)

CAC : 200.03 [g]

Sensor ID : ZR23

Acceleration

Max Value : 1.77 g [115.7 msec]

Min Value : -23.07 g [58.1 msec]

Velocity

Max Value : 48.73 km/h [112.6 msec]

Min Value : 0.00 km/h [0.0 msec]

Displacement

Max Value : 11.69 m [1033.9 msec]

Min Value : 0.00 m [0.0 msec]

Plot Date : 24/03/2009 at 08:26:01

— Acceleration — Velocity — Displacement



DATAPACK



Front view of occupant, pre-test



Front 3/4 view, pre-test

DATAPACK



RH view, pre-test



Rear 3/4 view, pre-test

DATAPACK



Rear view, pre-test

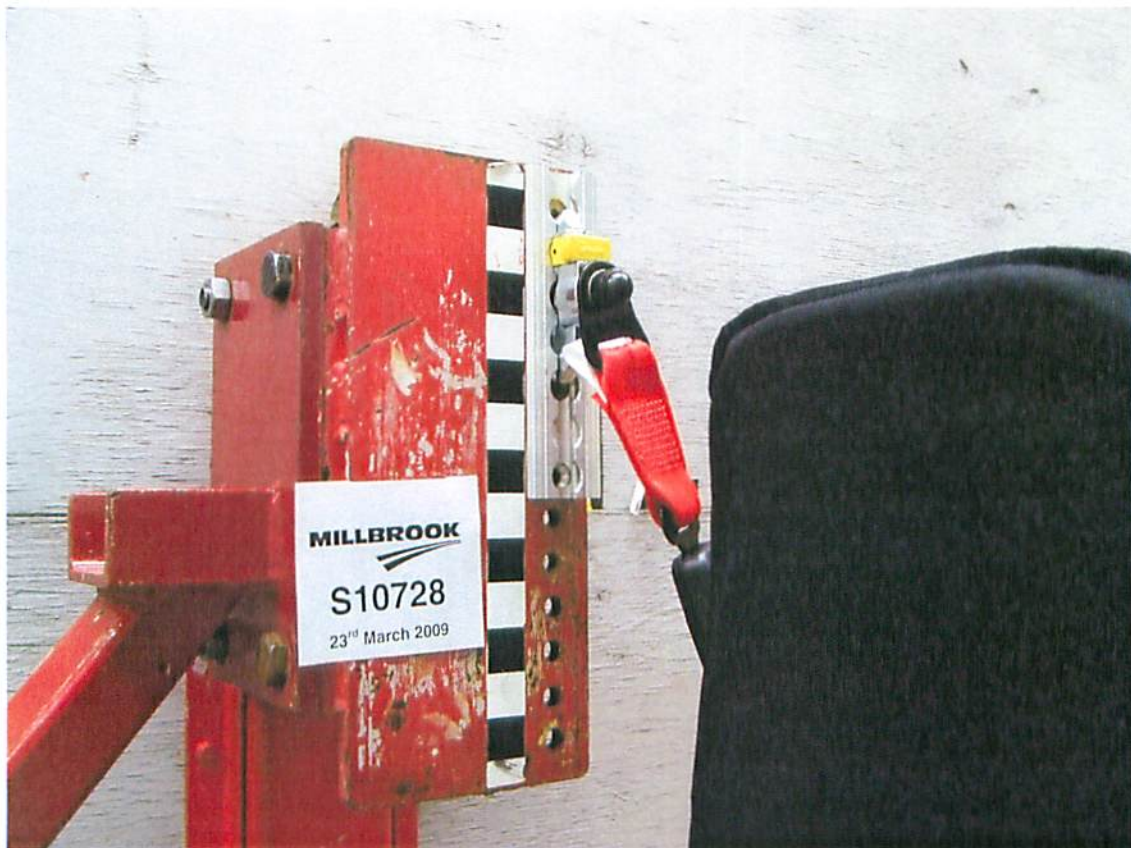


Front wheelchair restraints, pre-test

DATAPACK

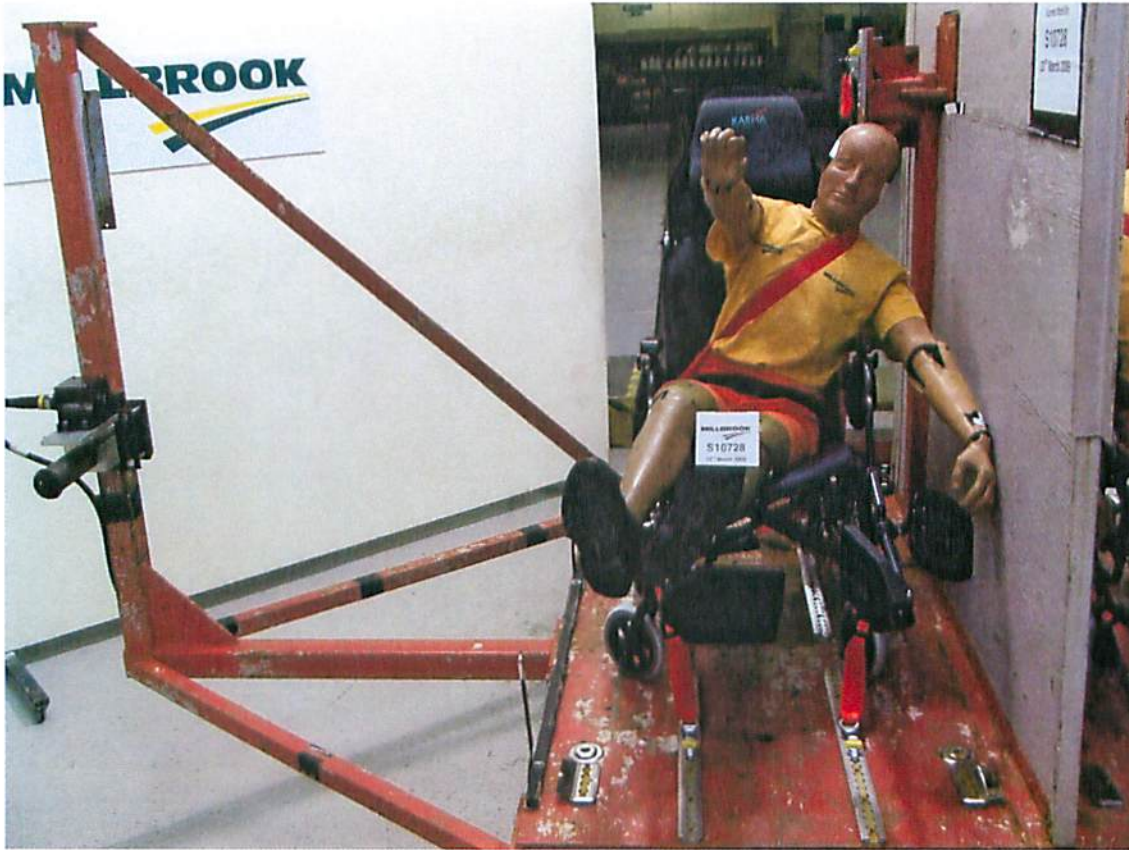


Rear wheelchair restraints, pre-test



Occupant restraint anchorage point, pre-test

DATAPACK



Front view of occupant, post-test



Front 3/4 view, post-test

DATAPACK



RH view, post-test



Rear 3/4 view, post-test

DATAPACK



Rear view, post-test

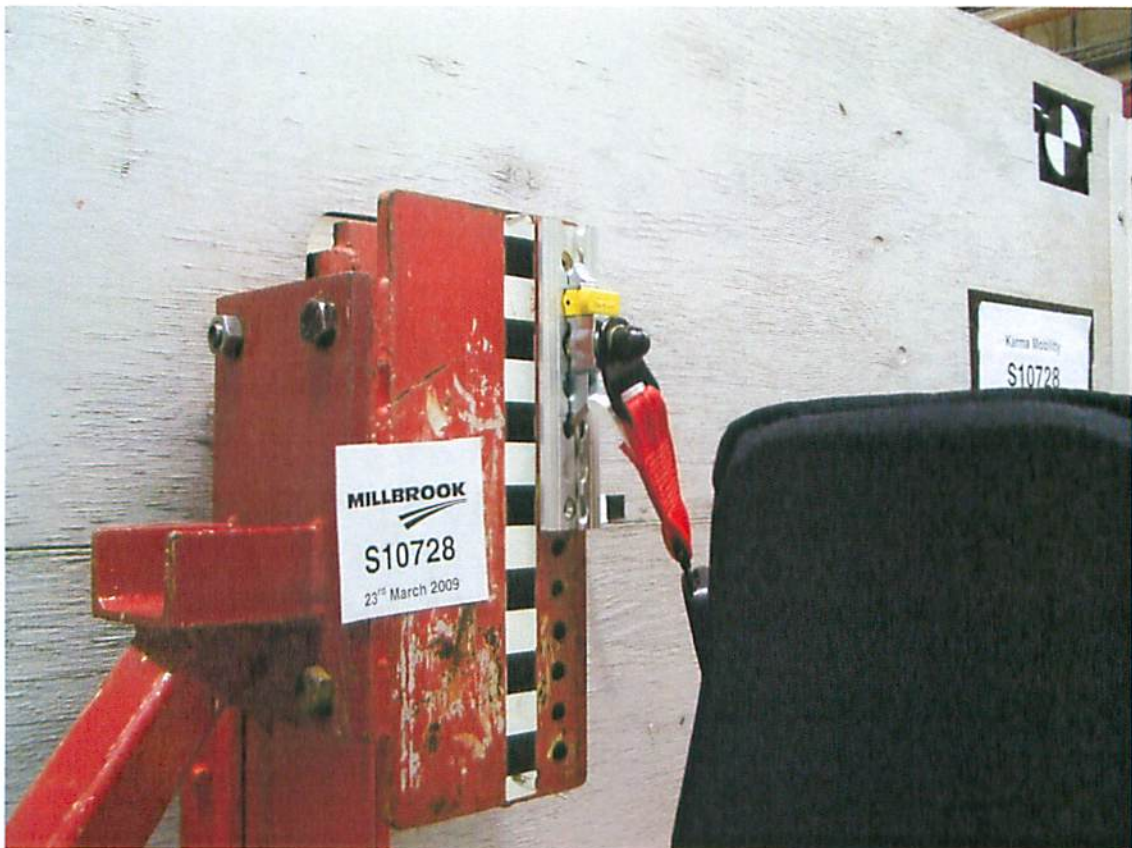


Front wheelchair restraints, post-test

DATAPACK

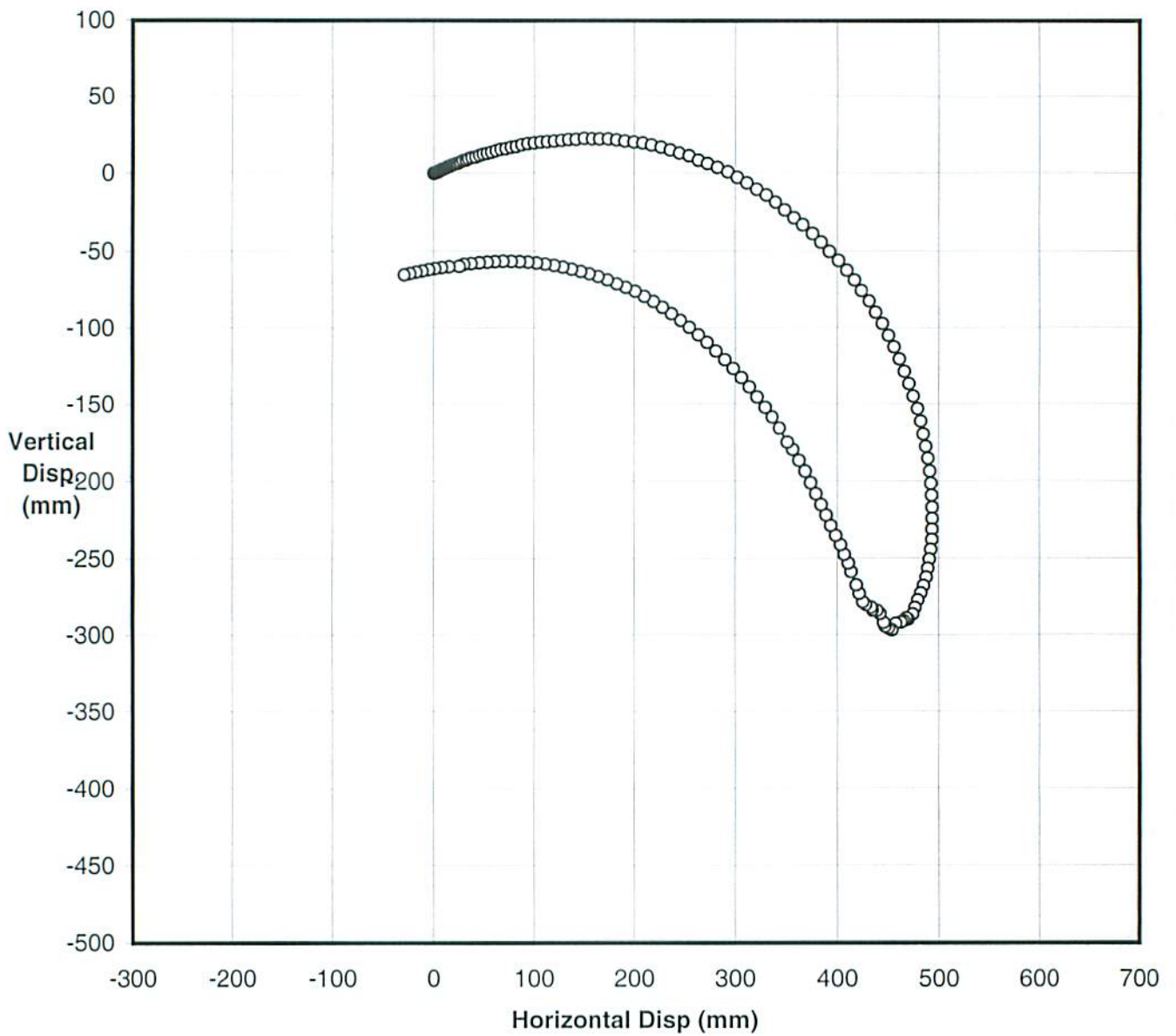


Rear wheelchair restraints, post-test



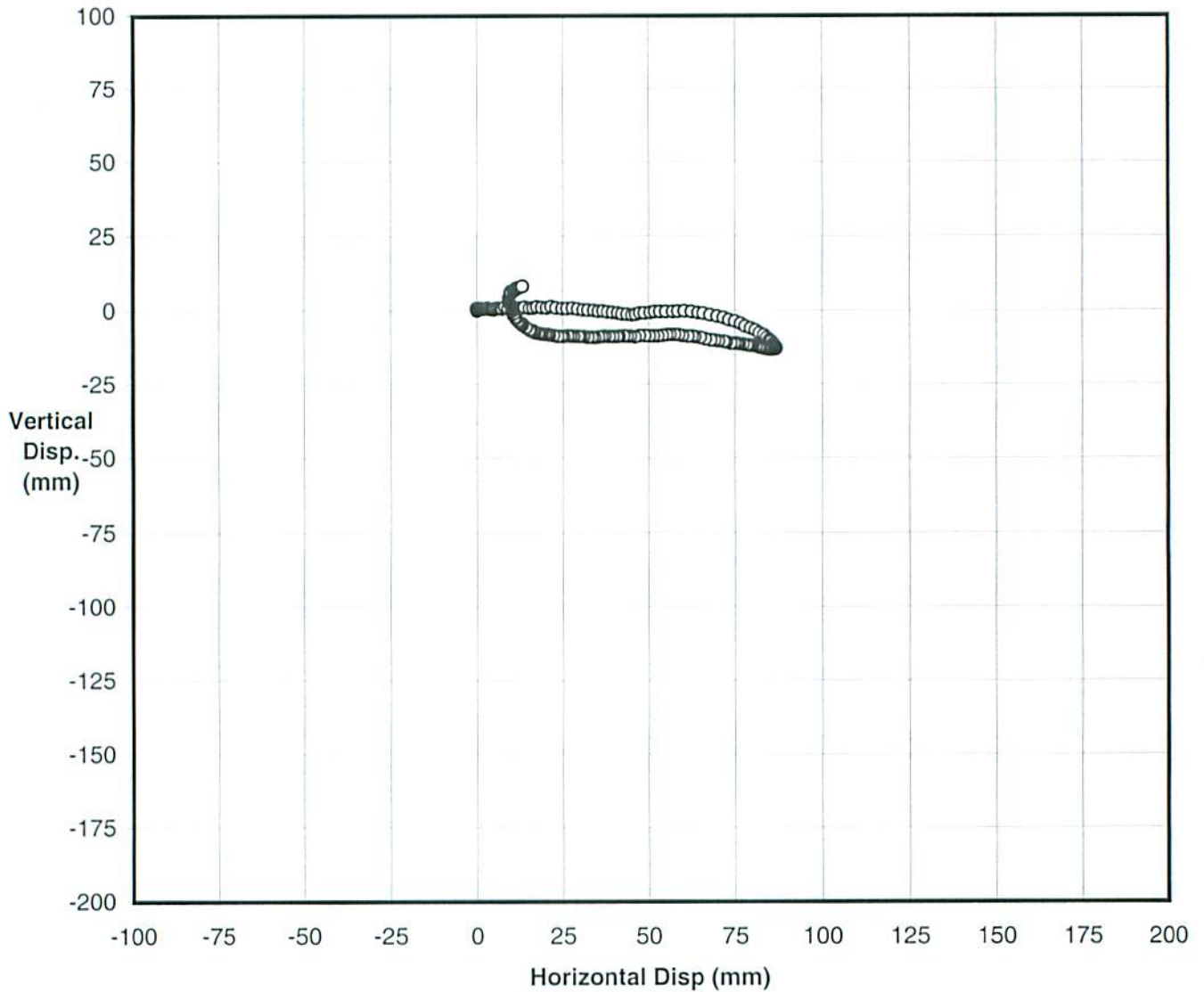
Occupant restraint anchorage point, post-test

HEAD TRAJECTORY



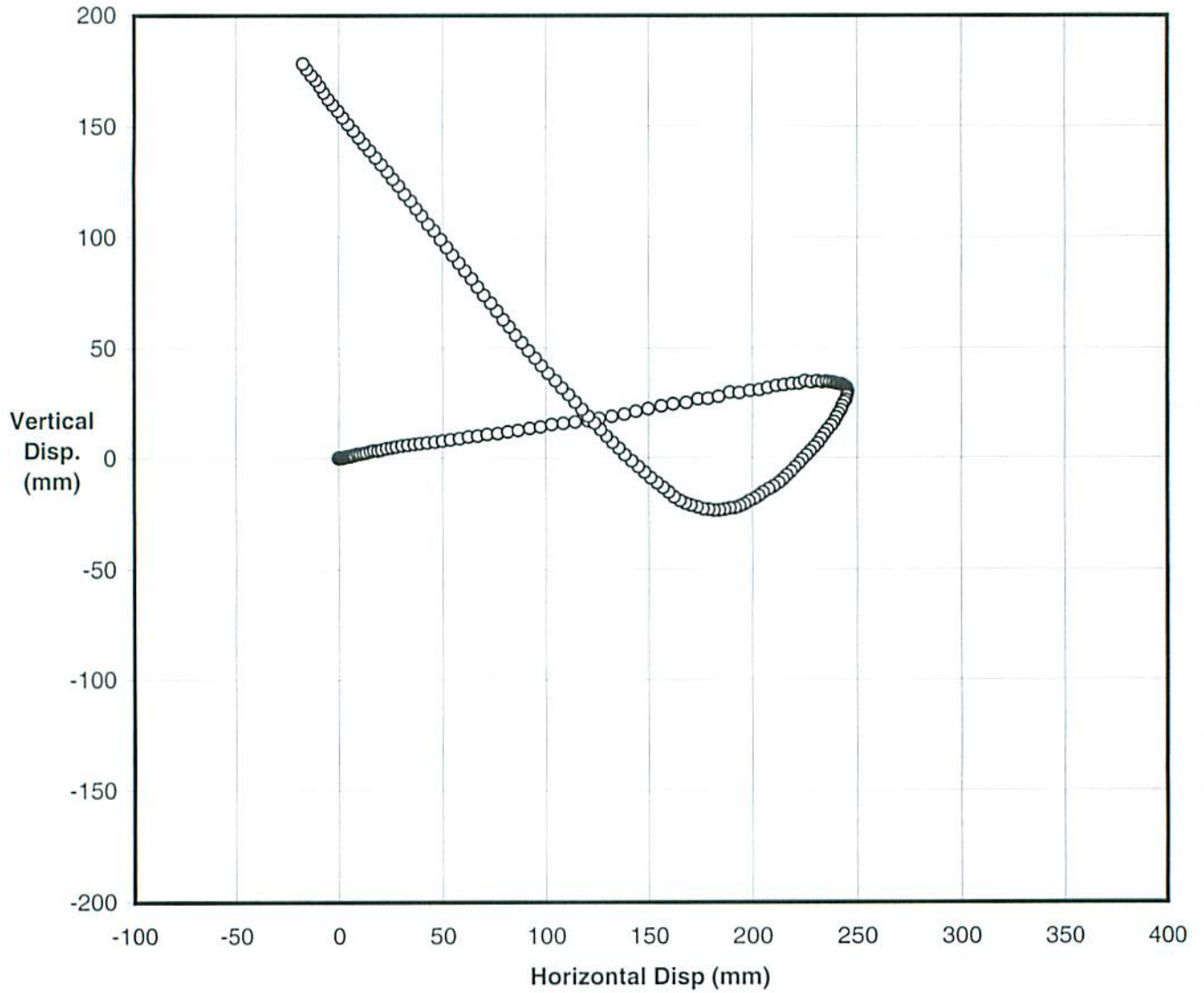
Maximum horizontal displacement	=	494 mm
Minimum horizontal displacement	=	0 mm
Maximum vertical displacement	=	22 mm
Minimum vertical displacement	=	-297 mm

P-POINT TRAJECTORY



Maximum horizontal displacement	=	87 mm
Minimum horizontal displacement	=	0 mm
Maximum vertical displacement	=	6 mm
Minimum vertical displacement	=	-13 mm

KNEE TRAJECTORY



Maximum horizontal displacement	=	246 mm
Minimum horizontal displacement	=	-3 mm
Maximum vertical displacement	=	160 mm
Minimum vertical displacement	=	-24 mm

Test Results
ISO/NP 7176/19
30th August 2001

Section 5.2 - Dynamic Performance Requirements

Wheelchair: MVP502 (21 kg)		RESULTS
Occupant: HII 50 %ile (75 kg)		
5.2.1	During the Test	
a).	Horizontal ATD and wheelchair excursion limits as per limits shown in Table 3:-	
	Was the horizontal movement of the test wheelchair P- Point (X_{wc}) less than 200 mm (± 5 mm)	PASS 87 mm
	Was the horizontal movement of the dummy knee (X_{knee}) less than 375 mm (± 5 mm)	PASS 246 mm
	Was the horizontal movement of the dummy head (X_{head}) less than 650 mm (± 5 mm)	PASS 494 mm
b).	Was the ratio $X_{knee}/X_{wc} > 1.1:1$	PASS 2.8:1
c).	Not Measured	
	Did the batteries of powered wheelchairs, or their surrogate parts:-	
	i). move outside of the wheelchair footprint	N/A
	ii). move into the wheelchair user's space	N/A
5.2.2	Post Test	
a).	Did the wheelchair remain upright on the test platform Did the ATD remain in a seated posture in the test wheelchair with a torso angle less than 45°	PASS
b).	Did the wheelchair securement points show visible signs of material failure	PASS
c).	Did any components of a mass greater than 100g become detached from the wheelchair	PASS
d).	Did any occupant contactable components fragment or separate with an edge of less than 2mm	PASS
e).	Did any primary load carrying components of the wheelchair show any visible signs of failure	PASS
f).	Did any 'tilt in space' locking mechanisms show signs of failure	PASS
g).	Was the ATD released from the wheelchair without the use of tools	PASS
h).	Was the wheelchair released from the restraint system without the use of tools	PASS
i).	Was the average decrease of H-Point height relative to the wheelchair platform less than 20% of the pre-test height.	YES
Has the wheelchair satisfied the Dynamic Test requirements of ISO/FDIS 7176/19 of 30 August 2001		PASS