

Test Report



Customer

Exmoor Trim Ltd.

Test Description

ECE Regulation 17.08
Uniform provisions concerning the approval of
vehicles with respect to the seats, their
anchorages and any head restraints.

Annex 7
Testing of strength of seat anchorages and
their adjustment, locking and displacement
systems

Test Item

Lock and Fold Seats

Millbrook Test No.

S15410 Combined

Millbrook Report No.

18/0763

Author:

A handwritten signature in black ink, appearing to read "C. Sells".

C. Sells
Engineer

Approved:

A handwritten signature in black ink, appearing to read "N. Targett".

N. Targett
Manager: Safety Test
Engineering

Date:

1st May 2018

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

Distribution

Organisation	Recipient	Format	Qty
Exmoor Trim Ltd. Roughmoor Trading Estate Williton Somerset TA4 4RF	J. Pettinger	PDF	1
Millbrook Proving Ground Ltd Millbrook Bedford MK45 2JQ	Contract file	PDF	1

Report Revision History

Rev.	Revision Description	Date	Author	Approver	Pages
0	Initial release	1 st May 2018	C. Sells	N. Targett	All

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Appendices

Graphical Results	Appendix A
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Pre and Post Test Photographs	Appendix B
High Speed Digital Films	See "Films" directory on data media
Still Photography	See "Stills" directory on data media

Test Facility and Date

The test, number S15410, was performed on 30th April 2018 at the Servo Sled facility at Millbrook Proving Ground Ltd.

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

Contact: Catherine Sells
Telephone: 01525 408465
Email: catherine.sells@millbrook.co.uk

Test Items

The Land Rover Defender 90 body shell was delivered to the Millbrook Servo Sled facility on 30th April 2018.

Item	Model	Mass (kg)
Land Rover	Defender 90	232
Exmoor Trim	Lock and Fold Seats x 2	

Test Objective

Exmoor Trim Ltd. commissioned the Servo Sled Laboratory at Millbrook Proving Ground to conduct dynamic sled tests according to ECE Regulation 17.08 Annex 7 Strength of seat anchorages and their adjustment, locking and displacement systems, on Lock and Fold seats within a Land Rover Defender 90 body shell, of a vehicle of M1 Category.

Test Method

The Land Rover Defender 90 body shell was attached to the surface of the Servo Sled carriage via purpose made brackets to enable the test item to be exposed to forward and rearward crash orientations.

Seats were fitted to the body shell as per the vehicle manufacturers fitting instructions with one seat facing forward and one facing rearward.

The head restraints on both seats were positioned fully up, considered to be the most unfavourable condition.

Two on-board high speed digital cameras were positioned to achieve left and right side general views of the seats within the vehicle to provide a witness of seat performance.

The sled carriage with combined body shell and seats was subjected to the dynamic acceleration pulse given in Clause 6.3.1 of the Regulation, being not less than 20g for a period of 30ms in forward and rearward directions.

Pre and post-test still photography recorded the test set-up and post-test observations, and high speed film images provided a record of the performance of seats during the test

Test Outcome

In both forward and rearward dynamic tests no evidence of failure was observed of the seats, being that of seat frame or seat anchorage, when tested in accordance with Paragraph 6.3 of the Regulation.

No permanent deformations of the seats occurred in a manner that would increase risk of injury.

Note 1: High definition still photography of test outcomes is within the 'Stills' folder of the media file.

Note 2: High speed footage recorded during the test is within the 'Films' folder of the media file.

Photographic

Two on-board high speed digital cameras were used to observe events during each dynamic test and to provide a record of test outcomes for subsequent analysis.

The high speed cameras (nominal 1000 frames per second) used for this test were as detailed below:

Camera Position	Camera	Lens
LH $\frac{3}{4}$ rear on-board	MotionXtra NX-Air-5-S2 - 657	IDT 12.5mm
RH $\frac{3}{4}$ rear on-board	MotionXtra NX-Air-5-S2 - 655	IDT 12.5mm

Disclaimers

This report does not constitute certification, approval or compliance of tested items with ECE Regulation 17.08 Annex 7 Strength of seat anchorages and their adjustment, locking and displacement systems. Persons or Bodies seeking Type Approval should consult with the relevant National Approval Authority.

Information contained within this report provides evidence of the performance of the Exmoor Trim Lock and Fold vehicle seats within the Land Rover Defender 90 body shell.

Millbrook Proving Ground Servo Sled Laboratory has no control over matters pertaining to conformity of production items with tested items.



At Millbrook, we provide a comprehensive range of engineering, test and validation services to customers in the automotive, transport, petrochemical, defence and security industries. We are independent and impartial in everything we do.

At our Proving Ground in the UK, we have 70km of varied test tracks, including hills routes, high speed areas and challenging off road courses. Our professional drivers and engineers perform repeatable tests, on all types of vehicles, in a secure and safe environment. We have a range of test facilities for components and full vehicles.

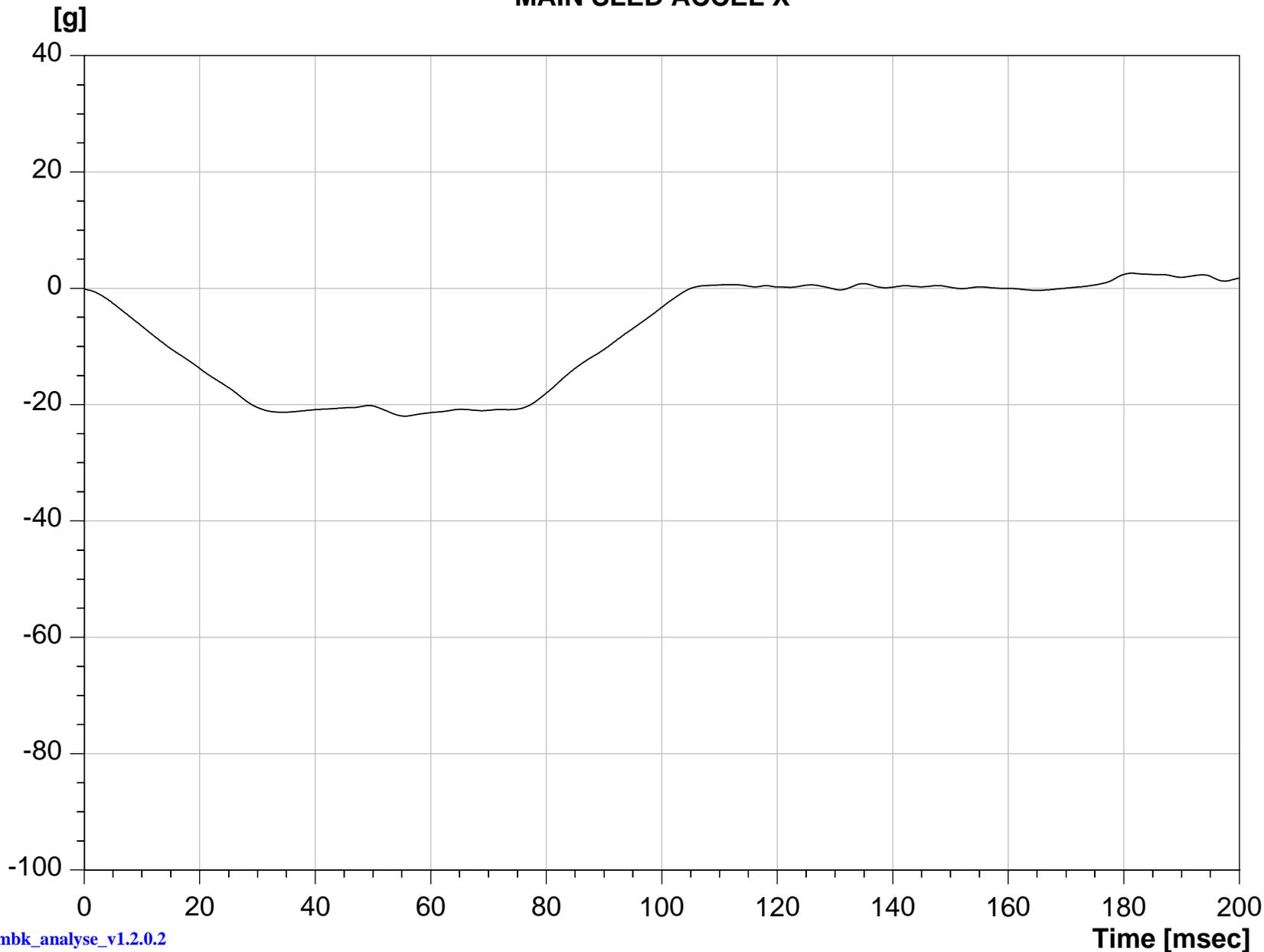
These include engine dynamometers, environmental chambers, crash laboratory and advanced emissions testing. We engineer and manufacture specialist vehicle conversions. These range from new versions of existing platforms, such as

estate cars, to armoured solutions and complex electronics installations. We conduct impartial vehicle assessments and develop class-leading vehicle dynamics improvements. We help Vehicle Manufacturers manage complex bills of materials and launch new models.

We are passionate about customer service and technical excellence; we take pride in delivering exactly what our customers want, whether that is a vehicle test, engineered solution or smooth-running conference. We develop our people so that they remain at the leading edge of their specialist fields and contribute to the development of future regulations. The quality of our work is reflected in our ISO 9001 and ISO 17025 certification. All of this combines to make Millbrook an integral part of the industries we serve and an ideal partner at any stage in the development and launch of the vehicles of tomorrow.



MAIN SLED ACCEL X



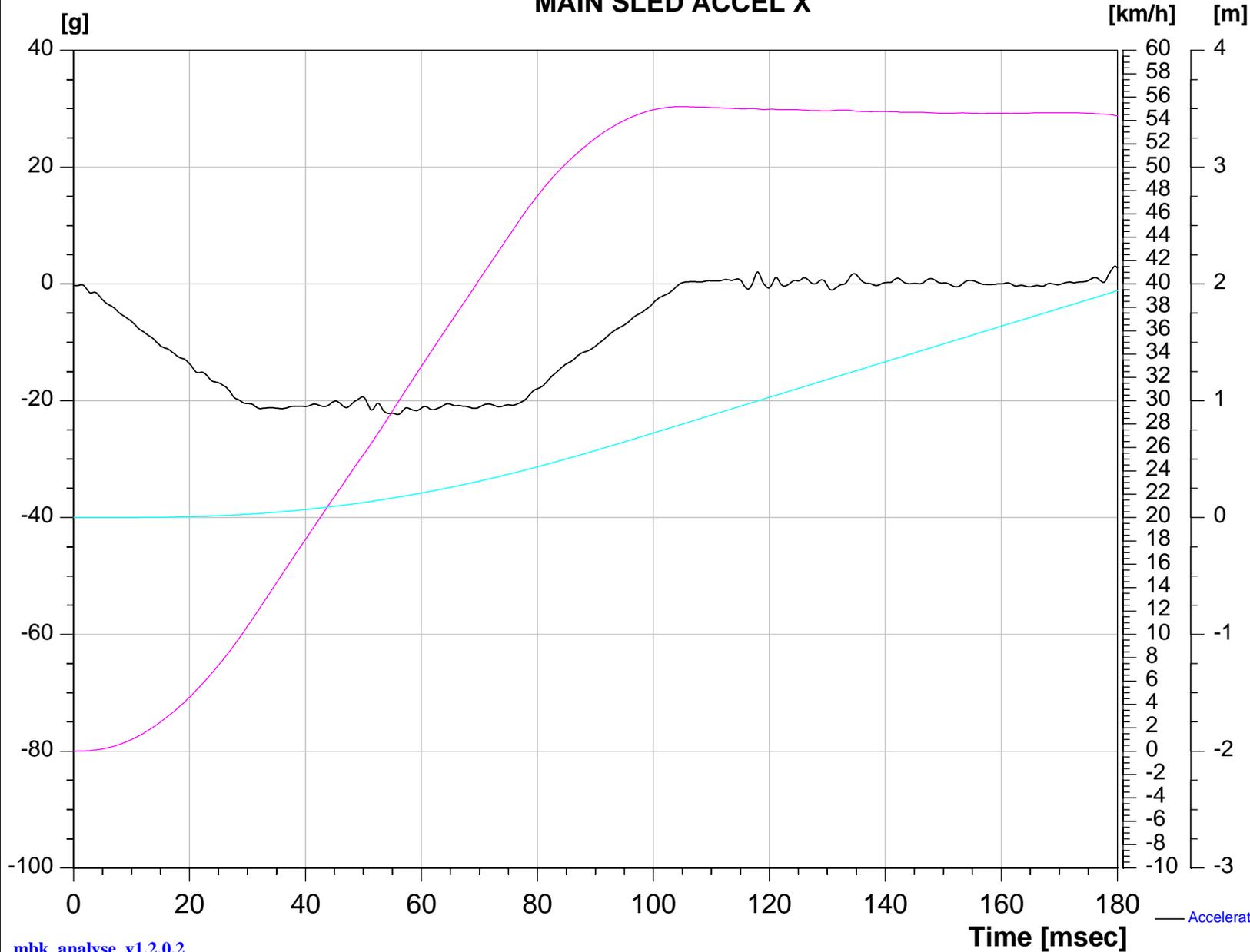
Test No. : S15410
 Test Date : 30 April 2018
 Customer : Exmoor Trim
 Seat ID : Lock and Fold
 Test Type : ECE R17 Seat
 : Anchorage and
 : Locking Mechanisms
 Orientation : Combined
 Vehicle : Land Rover
 : Defender 90
 Engineers
 Exmoor Trim : J. Pettinger
 MBK : C. Sells

Time over 20g = 48.3 [msec]

Filter : CFC 60 (SAE J211)
 CAC : 50.00 [g]
 Sensor ID : A223809
 Max Value : 2.59 g [181.3 msec]
 Min Value : -21.98 g [55.5 msec]
 Plot Date : 30/04/2018 at 12:18:20



MAIN SLED ACCEL X



Test No. : S15410
 Test Date : 30 April 2018
 Customer : Exmoor Trim
 Seat ID : Lock and Fold
 Test Type : ECE R17 Seat
 : Anchorage and
 : Locking Mechanisms
 Orientation : Combined
 Vehicle : Land Rover
 : Defender 90
 Engineers
 Exmoor Trim : J. Pettinger
 MBK : C. Sells

Filter : CFC 180 (SAE J211)
 CAC : 50.00 [g]
 Sensor ID : A223809

Acceleration
 Max Value : 3.48 g [194.7 msec]
 Min Value : -22.36 g [55.9 msec]
Velocity
 Max Value : 55.18 km/h [104.5 msec]
 Min Value : 0.00 km/h [0.0 msec]
Displacement
 Max Value : 10.26 m [1000.0 msec]
 Min Value : 0.00 m [0.0 msec]
 Plot Date : 30/04/2018 at 12:18:50

Sensor Calibration Report



Print Date: 24 Jan 2018

Device No	A223809	Calibration Date	13 Jun 2017
Description	Accel	Calibration Due	13 Jun 2018
Department	Crash	Range (Min)	-2000
Manufacturer	MSI Sensors	Range (Max)	2000
Model	58-2000	Engineering Units	g
Serial No	A223809	Output Units	mV
Comments		Calibration Notes	Screw Clamp

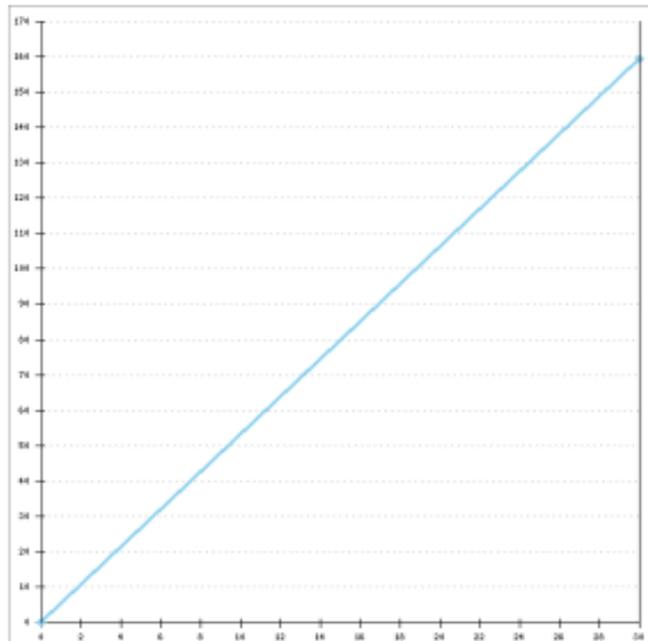
Procedure	INW003	Calibration Uncertainty	1.20796% min 0.0248 g
Supply Voltage	5 V	Calibrated By	TM
Temperature	20.4 °C	Calibration Equipment 1	50-CB37-36
Humidity	51.3 %	Calibration Equipment 2	50-9081-24
Barometric Pressure	mBar	Calibration Equipment 3	50-EE01-35
Amplifier Gain	100.6838	Calibration Equipment 4	50-2689-96
Manufacturer Sensitivity	0.01466 mV/V/g	Calibration Equipment 5	51-8135-55
Tolerance	±2.5 %	Calibration Equipment 6	50-4154-97

Low Cal	134.32 mV	Sensitivity	0.0149185 mV/V/g
High Cal	5.27039 mV	KT Gain	88.2147
Cal Resistor	102 kΩ	Correlation	1
Shunt	683.872	Emulation Resistance	4262.08 Ω

Graph Data

Input	Output
0.000	0.000
30.000	159.317

Calibration Graph



Test Report

S15410 Appendix B



Rear view, pre-test



Front view, pre-test

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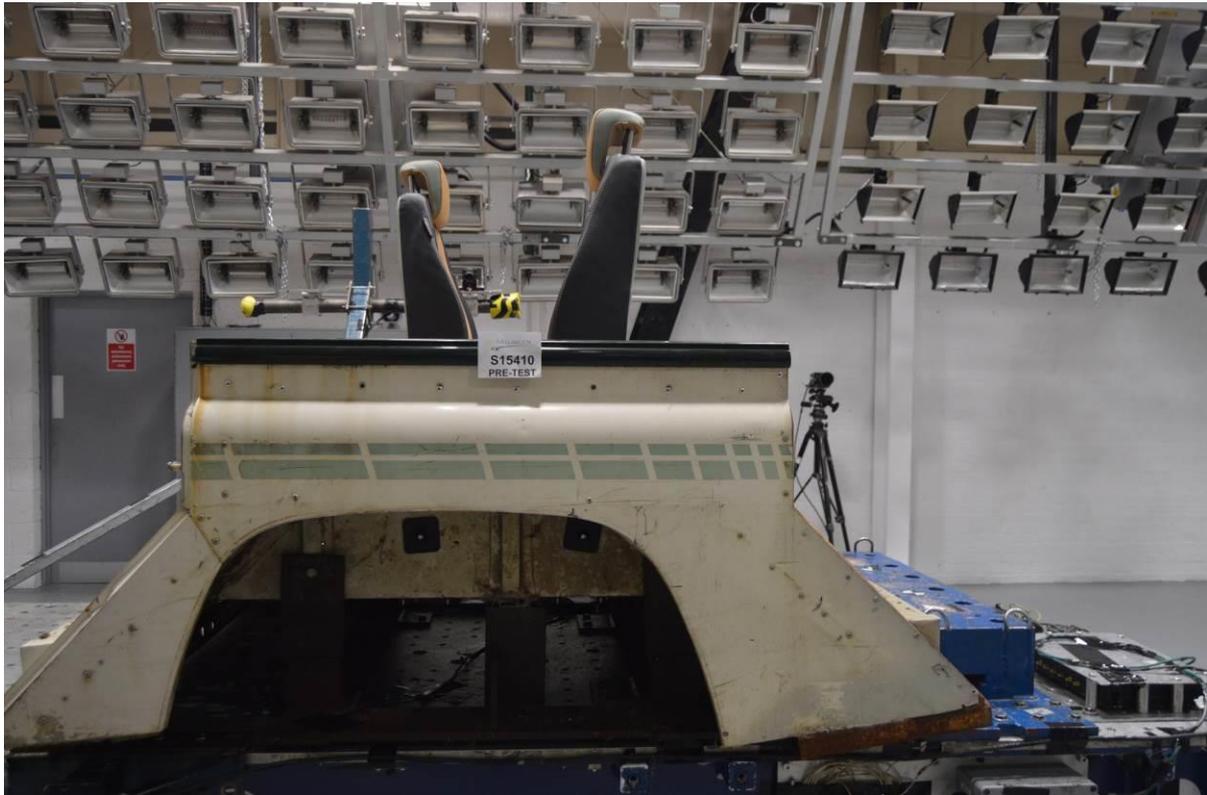
LH $\frac{3}{4}$ view, pre-test



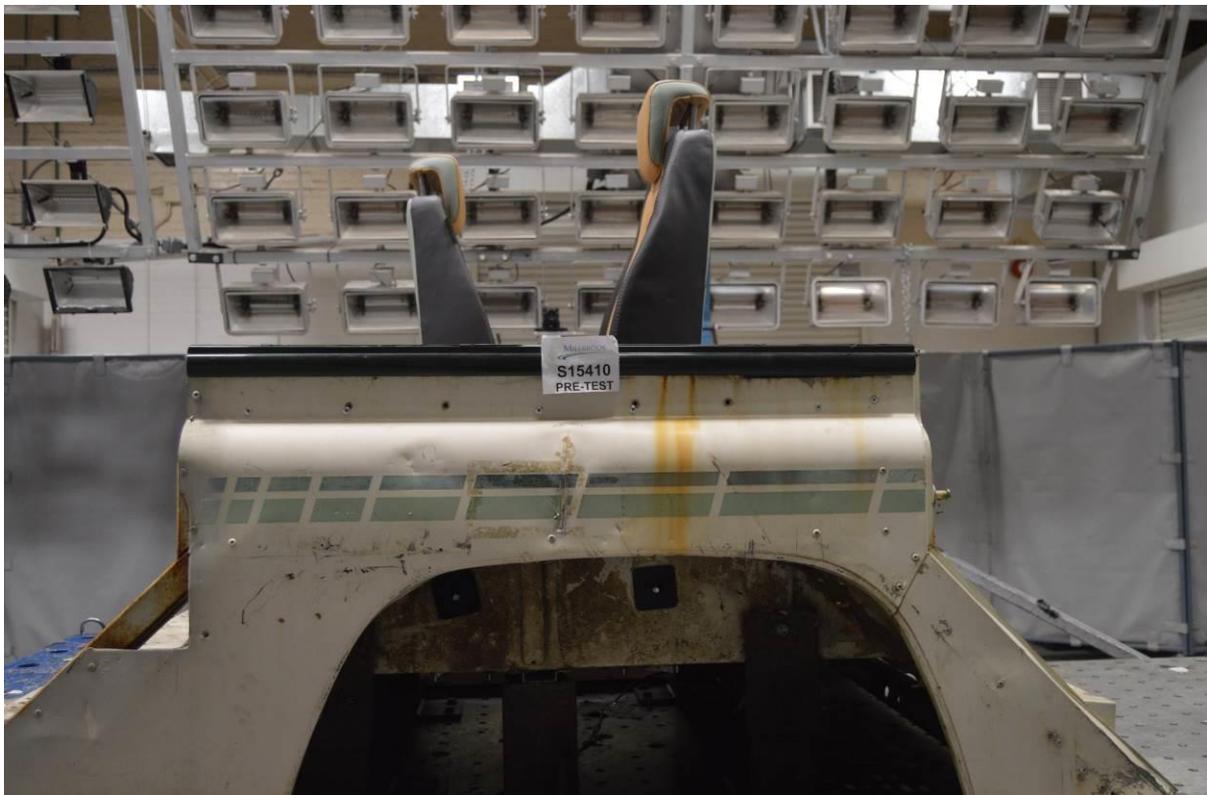
RH $\frac{3}{4}$ view, pre-test

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LH View, pre-test



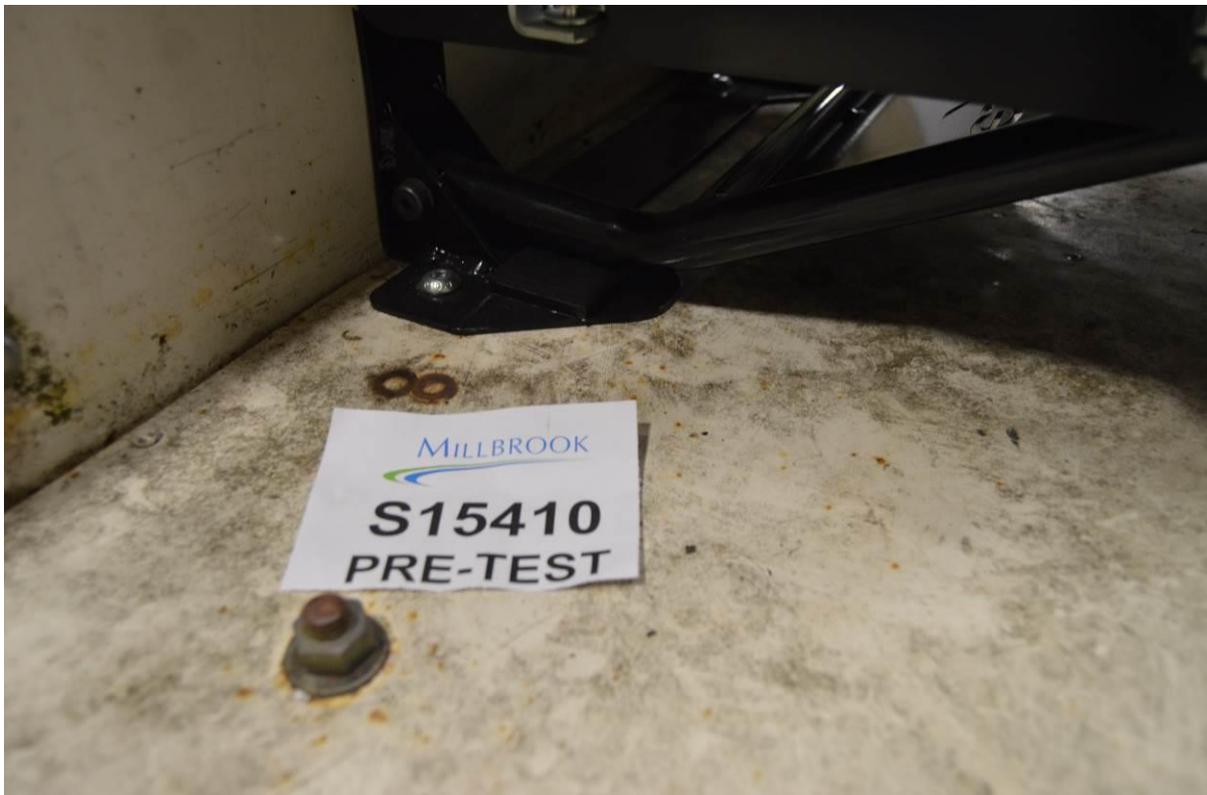
RH view, pre-test

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Rearward facing seat headrest position, pre-test



Rearward facing seat rear mount, pre-test

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Rearward facing seat wheel arch mount, pre-test



Forward facing seat rear mount, pre-test

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Forward facing seat displacement mechanism, pre-test



Forward facing seat headrest position, pre-test

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Forward facing seat front mount, pre-test



Rearward facing seat displacement mechanism, pre-test

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Forward facing seat folding backrest hinge mechanism, pre-test



Forward facing seat rear mount, pre-test

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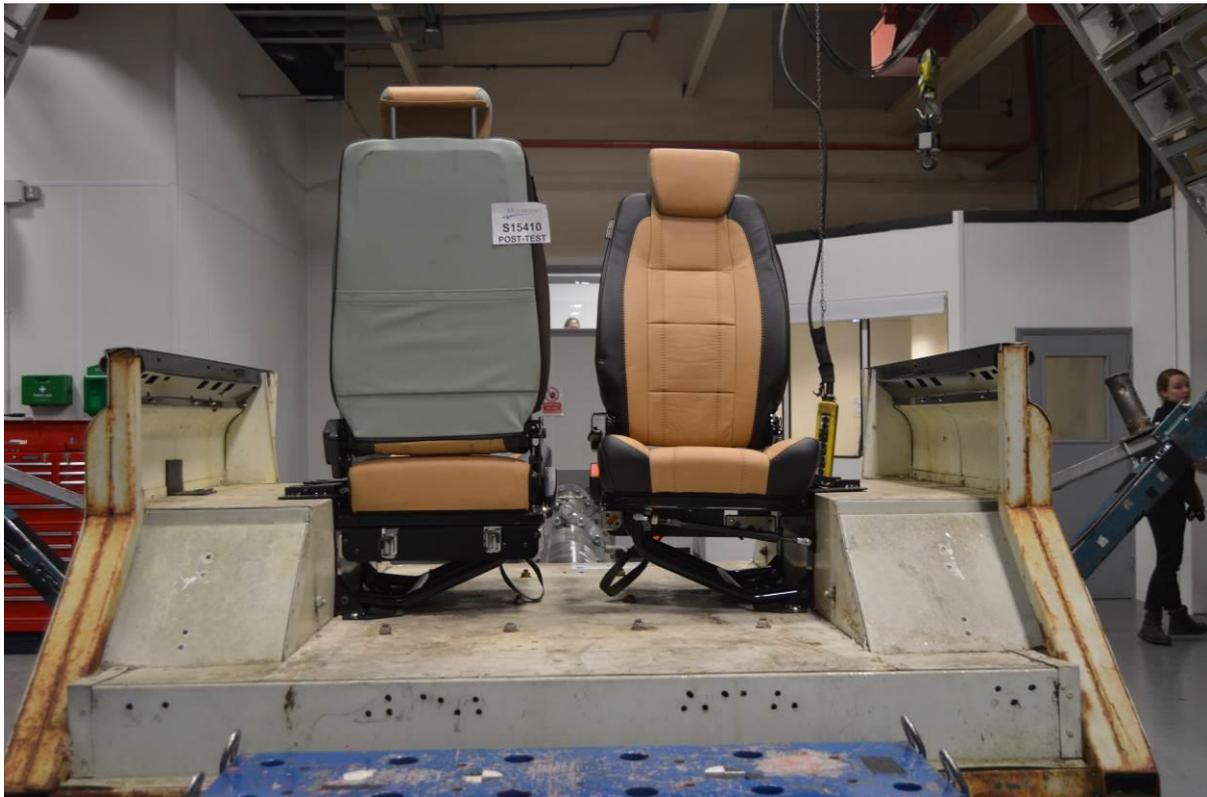
Forward facing seat wheel arch mount, pre-test



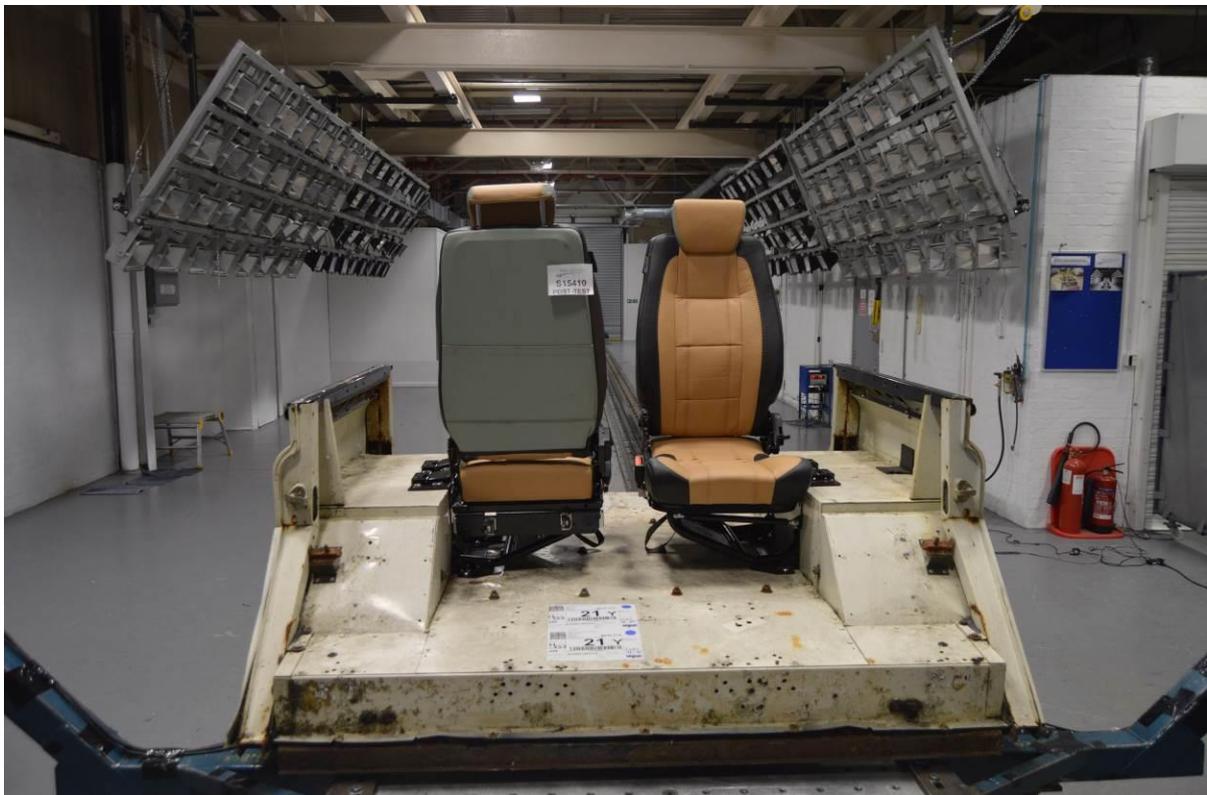
Rearward facing seat rear view, pre-test

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Rear view, post-test



Front view, post-test

Test Report

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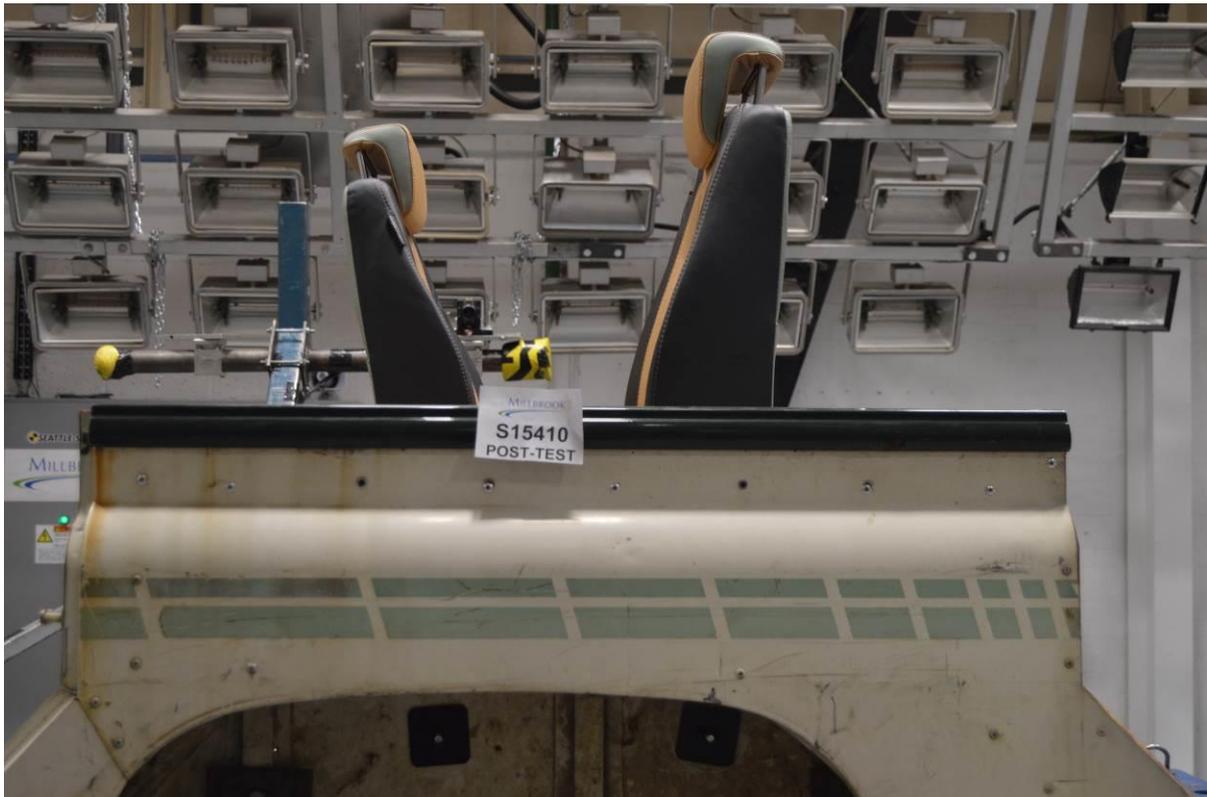
LH $\frac{3}{4}$ view, post-test



RH $\frac{3}{4}$ view, post-test

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LH view, post-test



RH view, post-test



Rearward facing seat headrest position, post-test



Rearward facing seat rear mount, post-test

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Rearward facing seat wheel arch mount, post-test



Forward facing seat displacement device, post-test



Close up of rearward facing seat wheel arch mount, post-test



Close up of rearward facing seat wheel arch mount, post-test

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Forward view of seats when folded, post-test