Test Report

No. OKB/2021/04/01-01

C/FMVSS 207/210

SEATING SYSTEMS AND SEAT BELT ASSEMBLY ANCHORAGES

SAF12
(to cover also SAF11)

May 08, 2023

Procedure Number:	C/FMVSS 207/210	
No of Pages:	117	
Prepared by:	Piotr Odziemek, Head of Research Laboratory	Date: April 15, 2021
Approved by:	Łukasz Walczak, Head of Homologation Department	Date: April 15, 2021
Updated by:	Łukasz Walczak, Head of Homologation Department	Date: May 08, 2023

Basing on test results presented in this report and on the ECE Regulation 14 TUV Sud Auto Service test reports 22-00051-CP-PRG-00 and 21-00097-CP-PRG-00, SAF12/SAF11 benches fixed to MOBIFRAME Composite Floor are allowed to be used i.a. in the following vehicle bodies:

Manufacturer	Commercial name / Model	Wheelbase
Daimler / Mercedes-Benz	Sprinter, e-Sprinter	3250, 3259, 3665, 3924, 4325
	Metris/Vito/Viano/V-klasse, e-Vito	3200, 3430
Freightliner/Dodge	Sprinter	3250, 3665, 4325
VW	Crafter, e-Crafter	3640, 4490
	T6, T6.1, e-Transporter (7H_, 7E_, 7J_)	3000, 3400
Fiat	Ducato, e-Ducato (250)	3000, 3450, 4035
RAM	ProMaster	3000, 3450, 4035
Ford	Transit, e-Transit	2933, 3300, 3750, 3954
	Transit Custom, Turneo Custom	2933, 3300
	Transit Connect	2662, 3062

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TEST SUMMARY

Tests were conducted in accordance with Test Procedure C/FMVSS 207/210 on 2nd row or next rows seating positions modified in 2nd stage of production, to determine compliance for the requirements of both Federal Motor Vehicle Safety Standards (FMVSS) and Canadian Motor Vehicle Safety Standards (CMVSS) 207 Seating Systems and Seat Belt Assembly Anchorages.

Tests were conducted on bench seat “3 panel” SAF12 with 3-designated seating position (representative “worse case” for 2-designated seating position bench seat “3 panel” SAF11).

SEAT MEASUREMENTS

Prior to installation, complete bench seat weight, hinged seat back weight and their Center of Gravity positions checks were measured.
This information was then used to calculate the Minimum Target Loads and determine force application position to be used for testing.

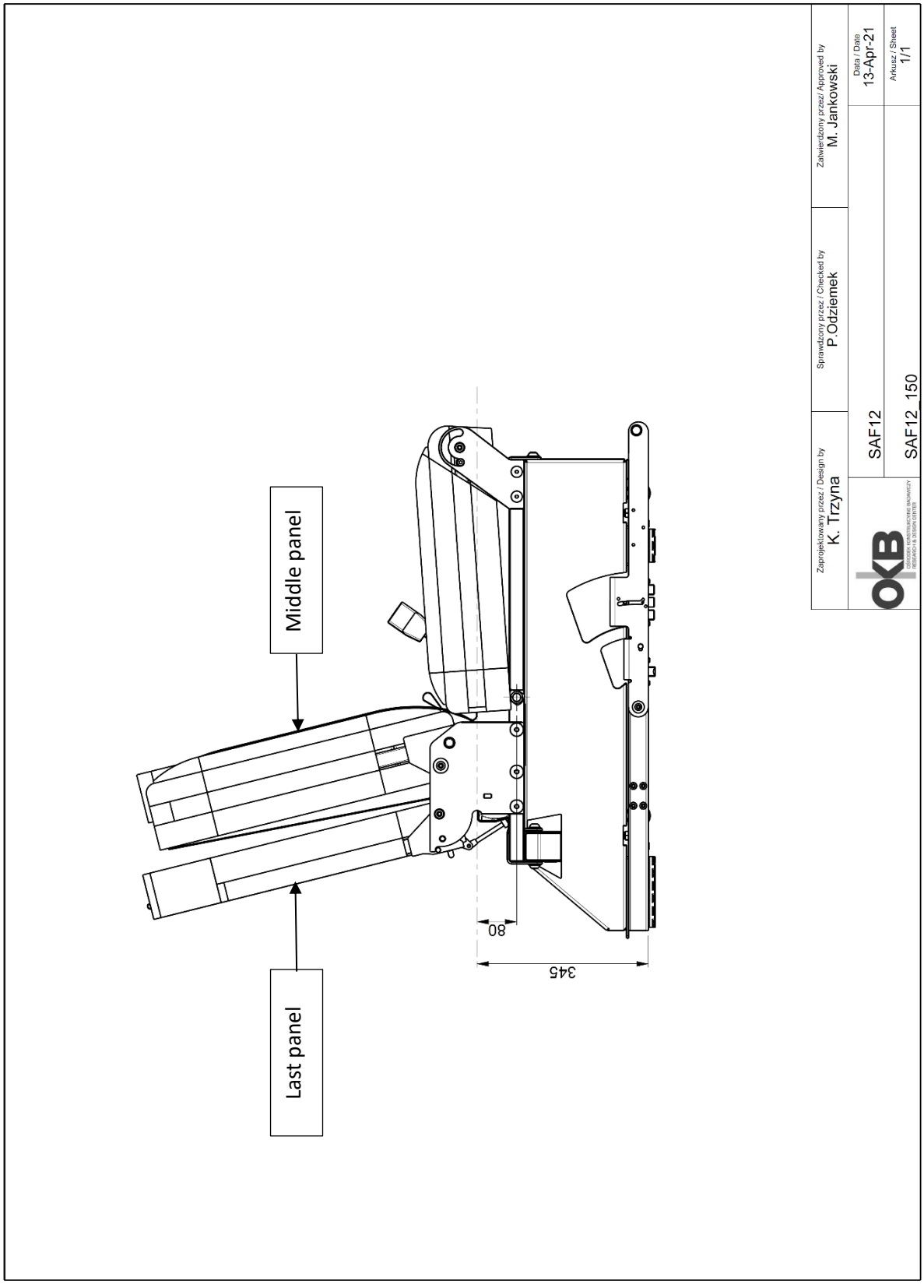
Seat Bench	Seat bench weight [kg/lb]	Seat back weight [kg/lb]	CG height [mm/in]
SAF12	132,8 kg / 292,77 lb	16,4 kg / 36,16 lb – last panel 30,0 kg / 66,14 lb – middle panel/Seat Back	229 mm / 9,02” From lower anchorage point (see drawings below)

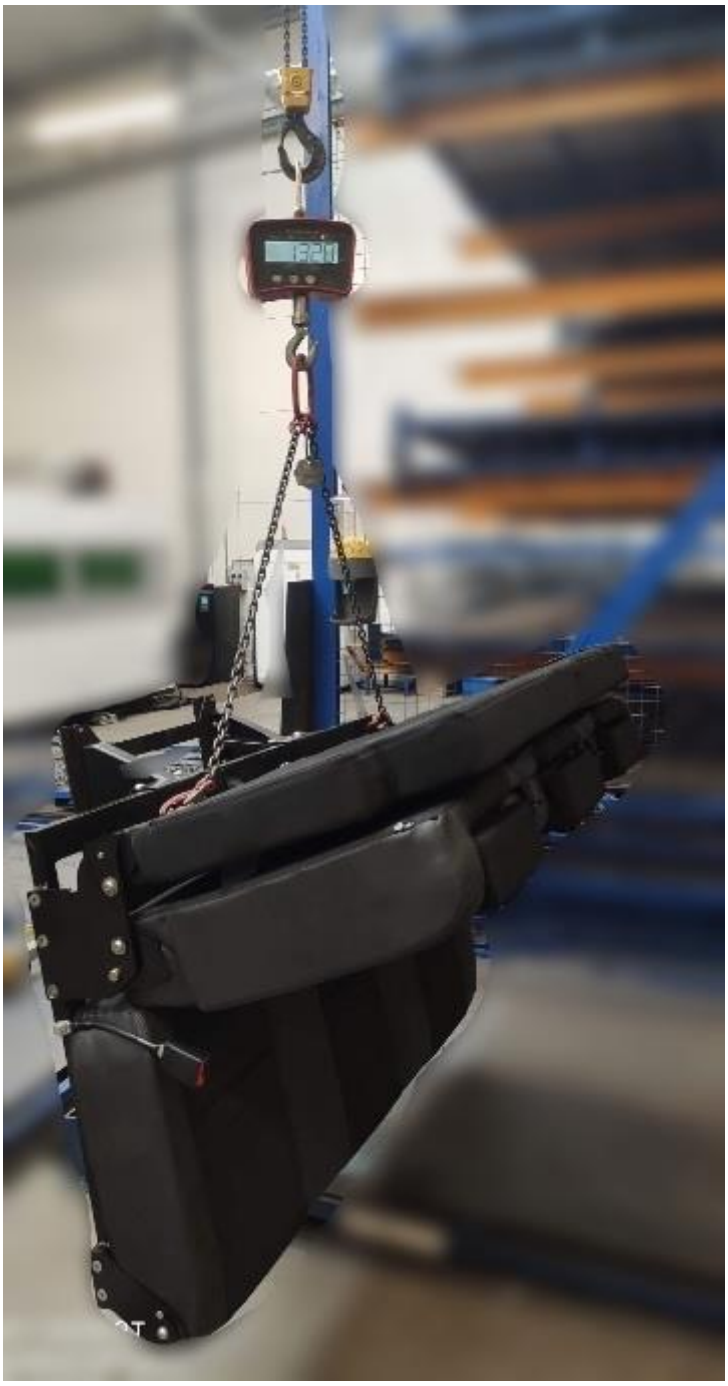
Minimum Target Loads					
Item Test #	Direction	Target loads [daN/lb]			
		Seat Back Moment	Seat Inertia Force	Lap Block	Torso Block
4.2.(b)	Rearward	-	Seat: 2656 daN / 5855,4 lbs	-	-
4.2.(c)	Forward	-	Seat: 2656 daN / 5855,4 lbs	1334,5 daN / 3000 lbs	1334,5 daN / 3000 lbs
4.2.(d)	Rearward	373 [N*m] / 3300 [lbs*in] / SRP to Upper Cross-Member [m/in] 456 mm / 17,85” 818 N / 183,89 lbs Per 1 Designated Seating Position 2454 N (245,4 daN) / 550,17 lbs Per 3 Designated Seating Positions	-	-	-
4.3.2.1.(a)	Forward / Rearward	-	Last panel (RWD) 328 daN / 723,2 lbs Middle panel (FWD) 600 daN / 1348,85 lbs	-	-
4.3.2.2.	Forward / Rearward	-	20g dynamic test of complete seat bench	-	-

CG DETERMINATION AND WEIGHT

Complete seat bench

Seat	CG height – transversal position [mm/in]	Weight [kg/lb]
SAF12	345mm / 13,59” from floor level (see drawings below)	132,8 kg / 292,77 lb

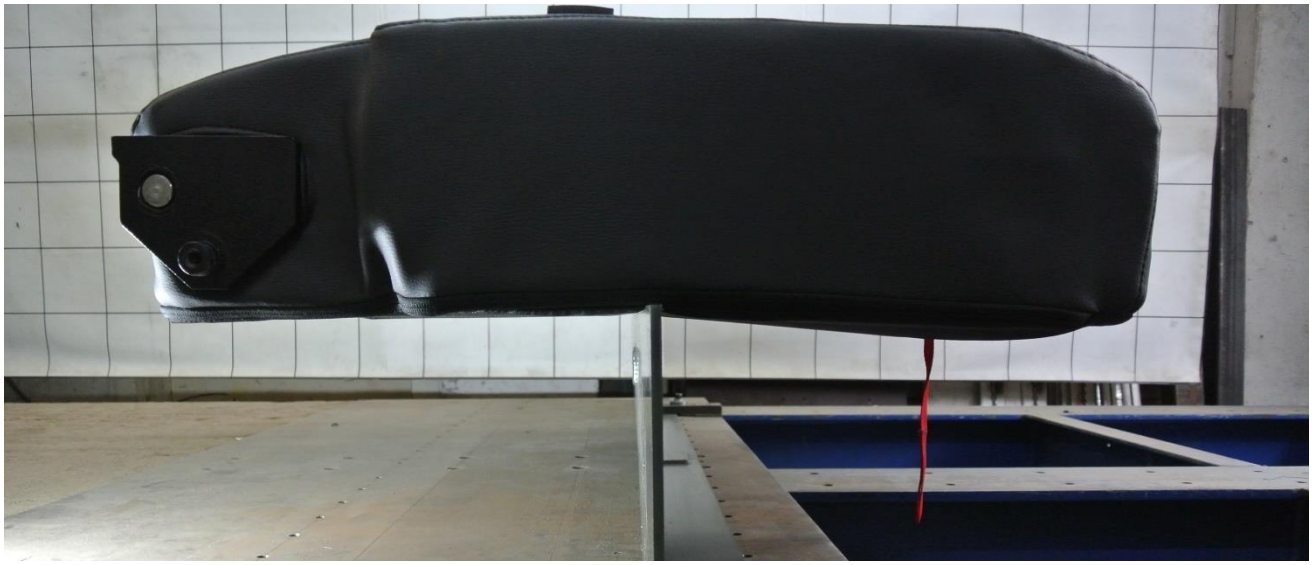

Middle panel
Last panel
80
345
Zaprojektowany przez / Design by
K. Trzyna
Sprawdzony przez / Checked by
P.Odziemek
Zatwierdzony przez/ Approved by
M. Jankowski
SAF12
Data / Date
13-Apr-21
Arkusz / Sheet
1/1
SAF12_150




132.8

Middle panel – Seat Back

Seat	CG height [mm/in]	Weight [kg/lb]
SAF12	321 mm / 12,64”	30,0 kg / 66,14 lb

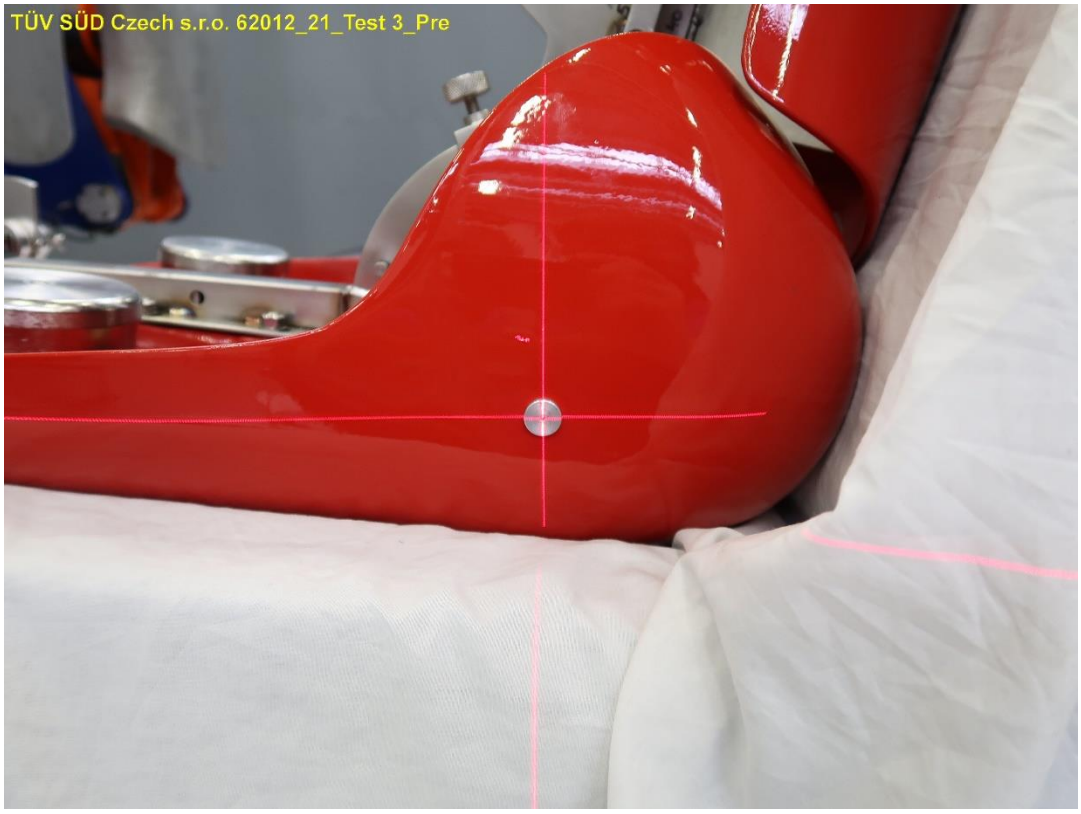


Last panel

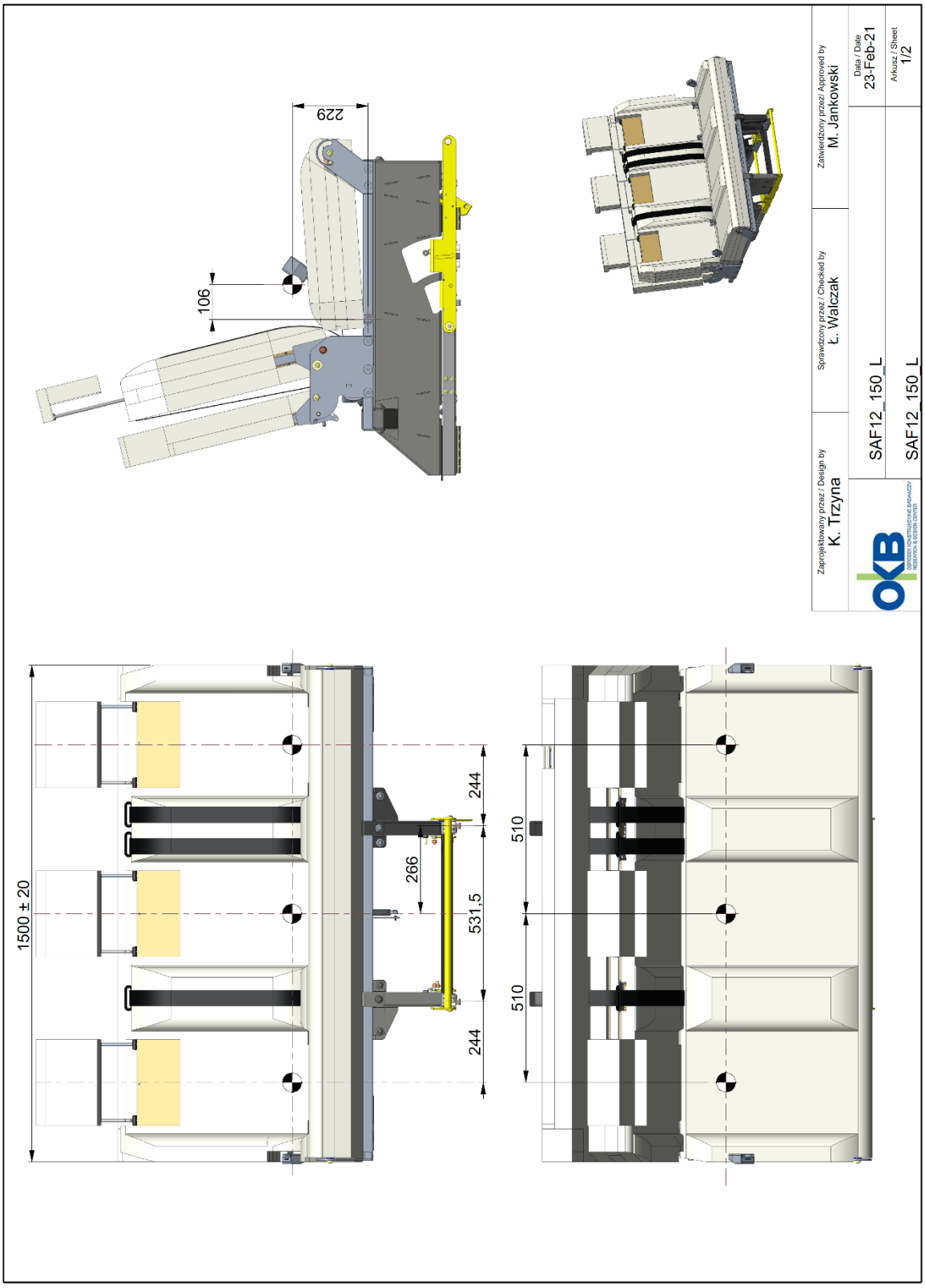
Seat	CG height [mm/in]	Weight [kg/lb]
SAF12	309 mm / 12,17”	16,4 kg / 36,16 lb

REFERENCE POINT MEASUREMENT

Seat	SRP – longitudinal position [mm/in]	SRP height – transversal position [mm/in]	Torso angle [°]
SAF12	106 mm / 4,17” From buckle anchorage point (see drawings below)	229 mm / 9,02” From buckle anchorage point (see drawings below)	17°

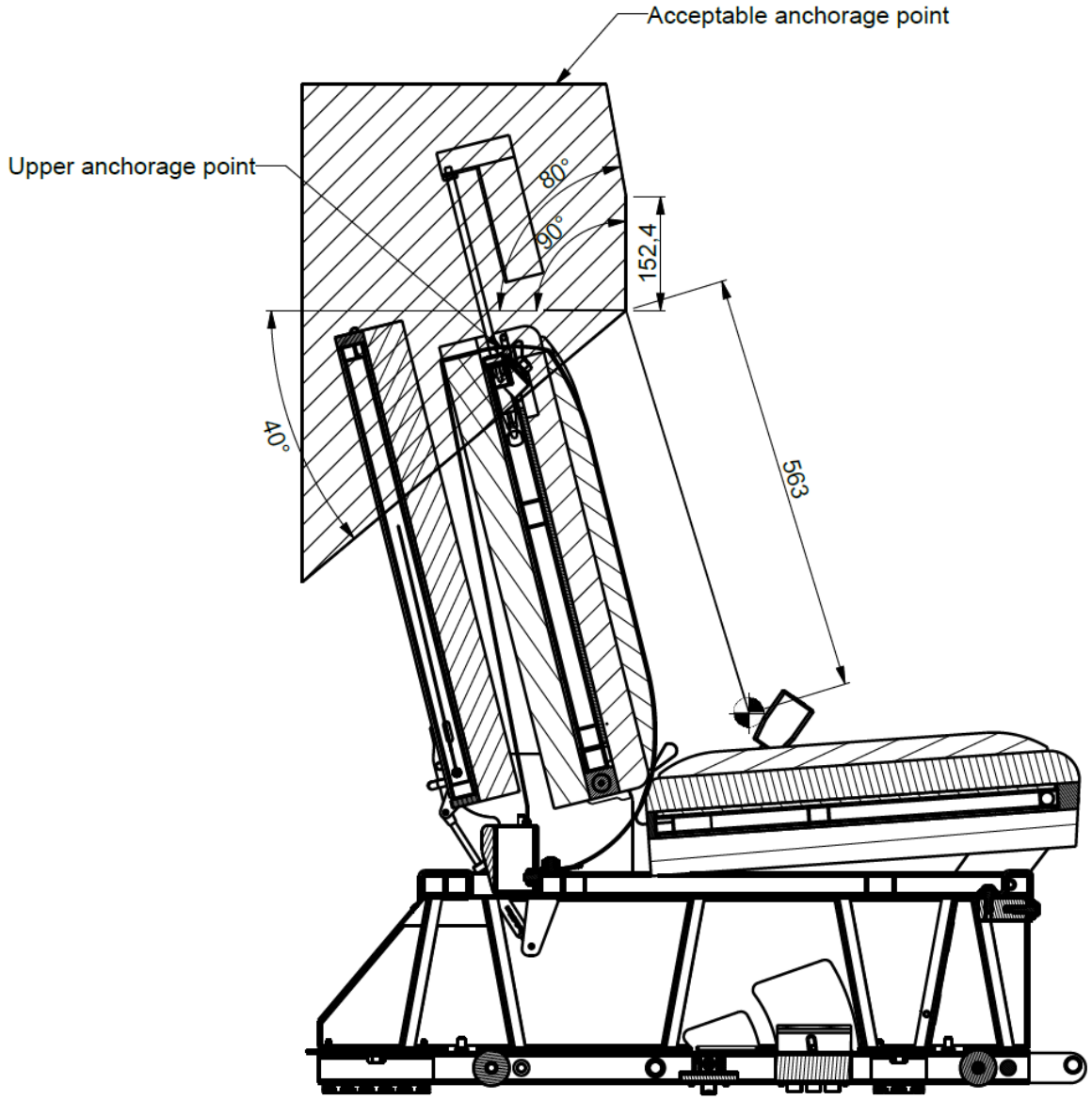

TÜV SÜD Czech s.r.o. 62012_21_Test 3_Pre


TÜV SÜD Czech s.r.o. 62012_21_Test 3_Pre
BOSCH
DNM 60L
17.0
ON/OFF
HOLD

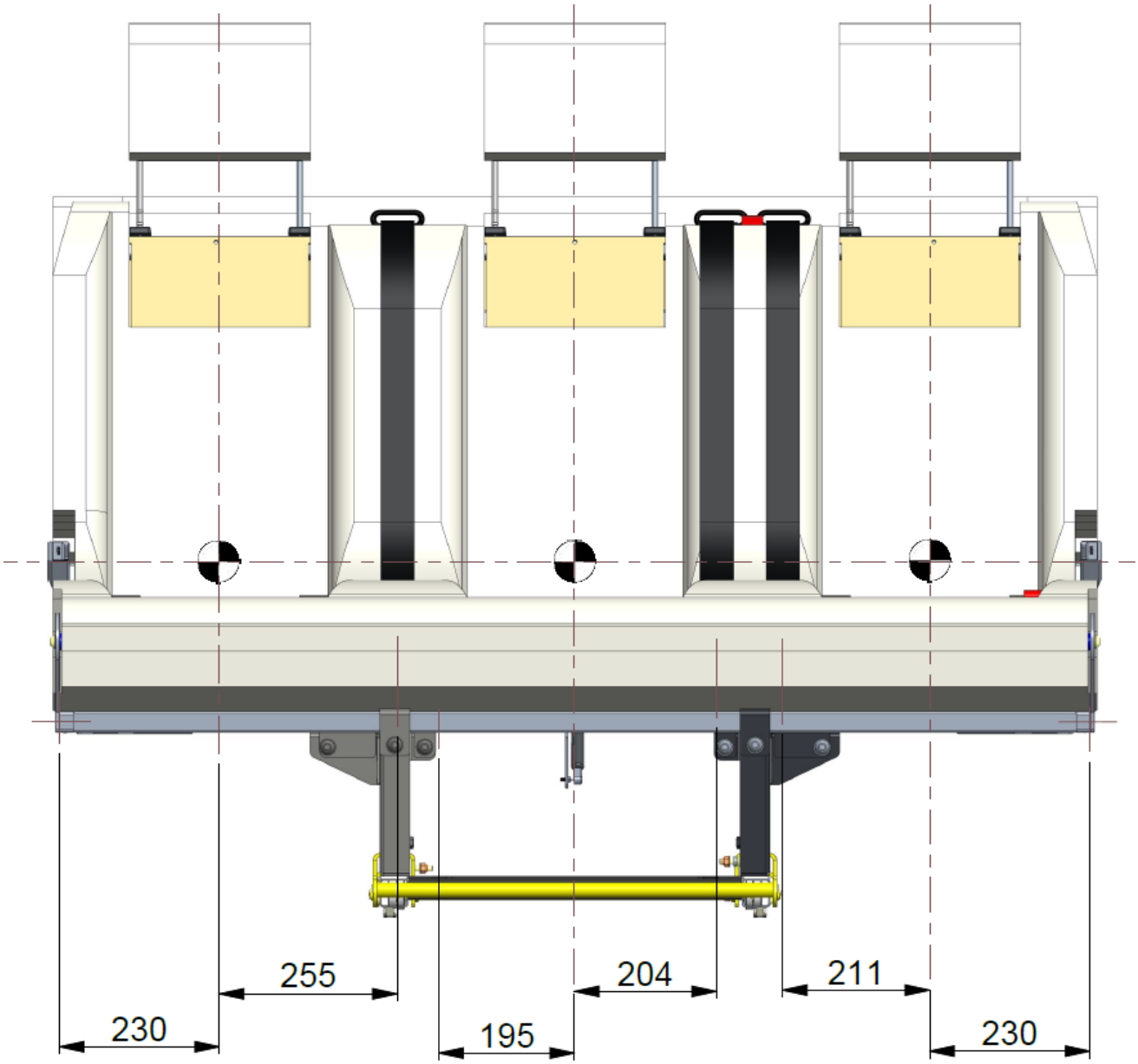

229
106
Zaprojektowany przez / Design by
K. Trzyna
Sprawdzony przez / Checked by
Ł. Walczak
Zatwierdzony przez/ Approved by
M. Jankowski
Data / Date
23-Feb-21
Arkusz / Sheet
1/2
SAF12_150_L
SAF12_150_L
1500 ± 20
244
266
531,5
244
510
510

SEATBELT GEOMETRY CHECK

Upper anchorage point location in accordance with C/FMVSS 207/210 requirements:



Arrangement of lower seatbelt anchorage points (left and right – for each DSP)
in accordance with C/FMVSS 207/210 requirements:



REARWARD "STATIC" 20G TEST OF COMPLETE SEAT

TEST INFORMATION

Test Date:	07.04.2021
Requirement:	FMVSS 207 4.2.(b)
Test Article Seating Position:	2nd and/or next rows
Mass of complete seat:	132,8 kg / 293,21 lb
Required load:	2656 daN / 5855,4 lbs
Seat Back Angle:	14° (fixed)
CG Load Attachment Height [mm/in]:	373 mm / 14,69" (above minimum required 345 mm / 13,59")

TEST SETUP:

The seat was installed in the 2nd row seating position in the vehicle. The vehicle was secured to test stand. A chain was attached to the seat at the CG height. CG vertical height was determined using a "Knife's Edge" method.

A load cell was placed inline with the hydraulic cylinder and the load attachment point to the seat. A preload of the test load force was placed on the cylinder, and a check was made to make sure all anchor points were secure and the load angle was within tolerance

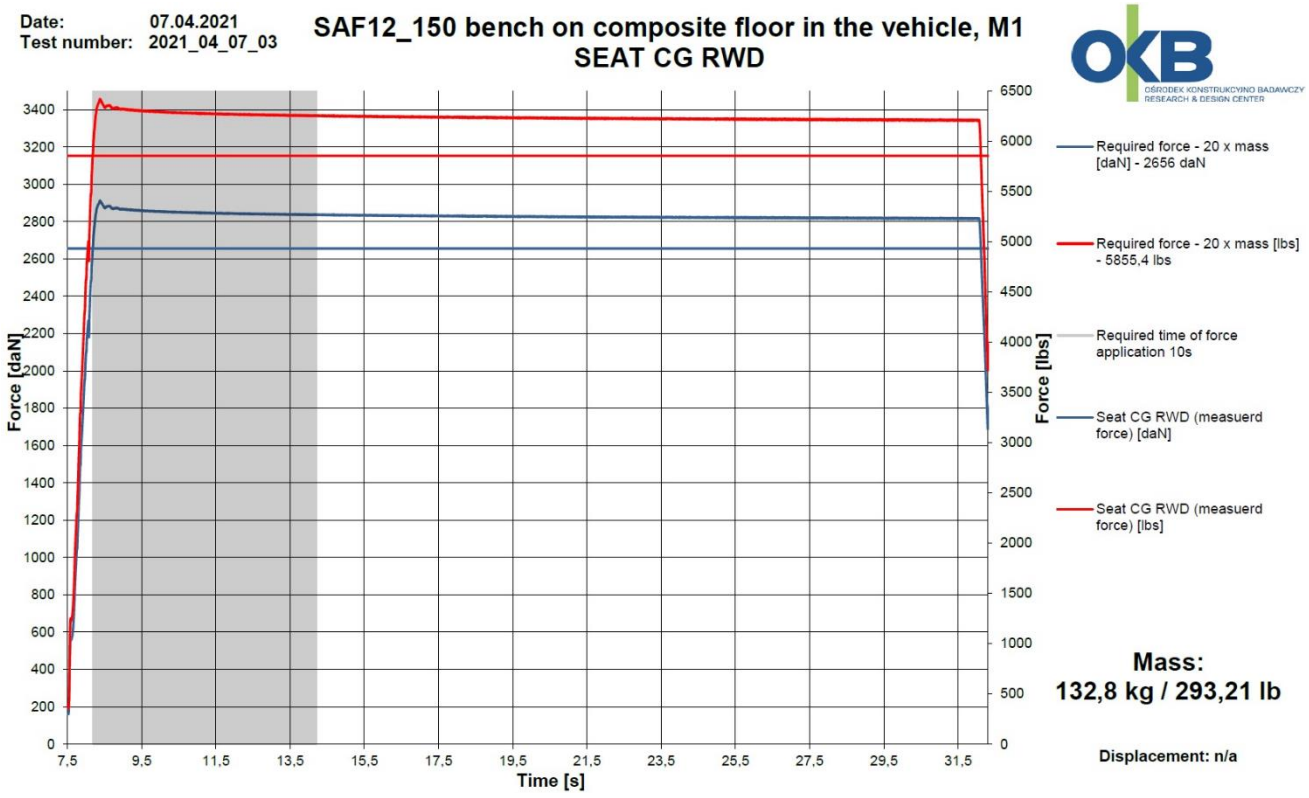
This test was to be performed to slightly above the Minimum Target Loads. The Minimum Target Loads were to be held for minimum 10 seconds.

TEST RESULTS:
The test article was able to achieve and maintain the minimum required loads. All the seat anchorages were intact after the test was complete.

APPLIED LOAD DATA

Controller Channel:	7	
Load Cell S/N:	380511A	
Cylinder Angle (0±3°)	0,7°	
TEST PROFILE	Time [sec]	Load [daN/lbs]
	7,5	~ 90 daN / ~194 lbs
	8,5	~2870 daN /~6452 lbs
	32,5	~2810 daN /~6317 lbs
	33,0	~1700 daN /~3750 lbs
Actual Max Load [daN/lb]	~2810 daN /~6317 lbs	
Minimum Target Load [daN/lb]	2656 daN / 5855,4 lbs	
% of Minimum Target Load Achieved	~105,8%	
Time Above Minimum Target Load [sec]	23,9	
Anchorage Failures	None	
Adjustment Mechanism Movement	None	
Notes	None	

APPLIED LOAD GRAPH



PHOTOGRAPHS

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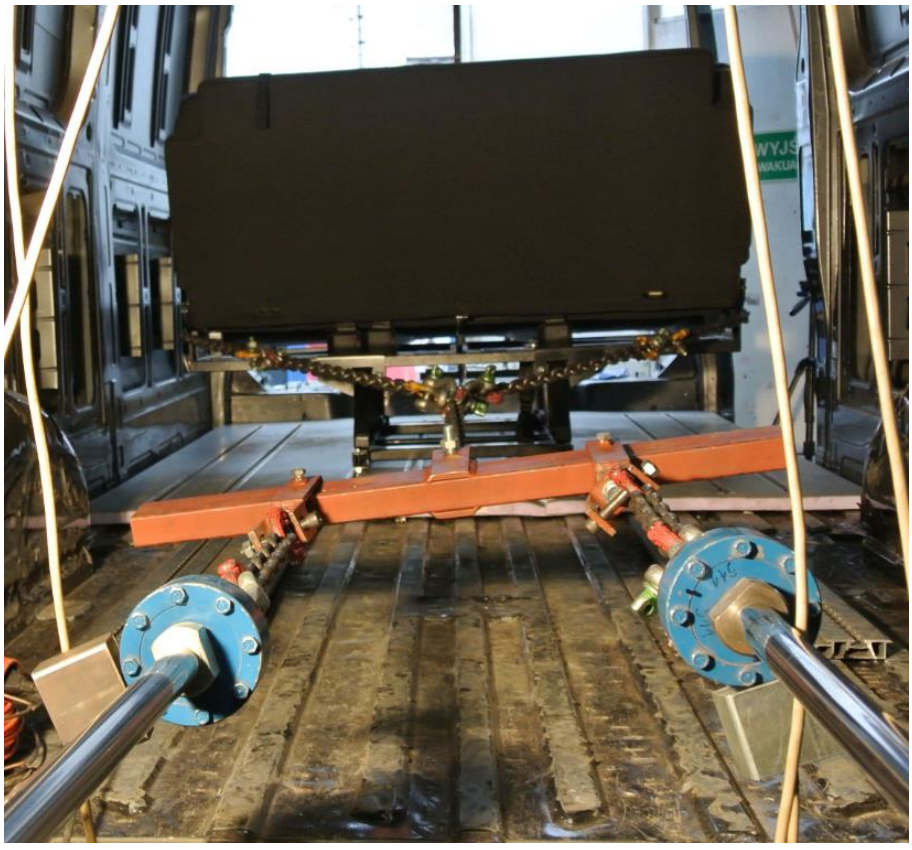
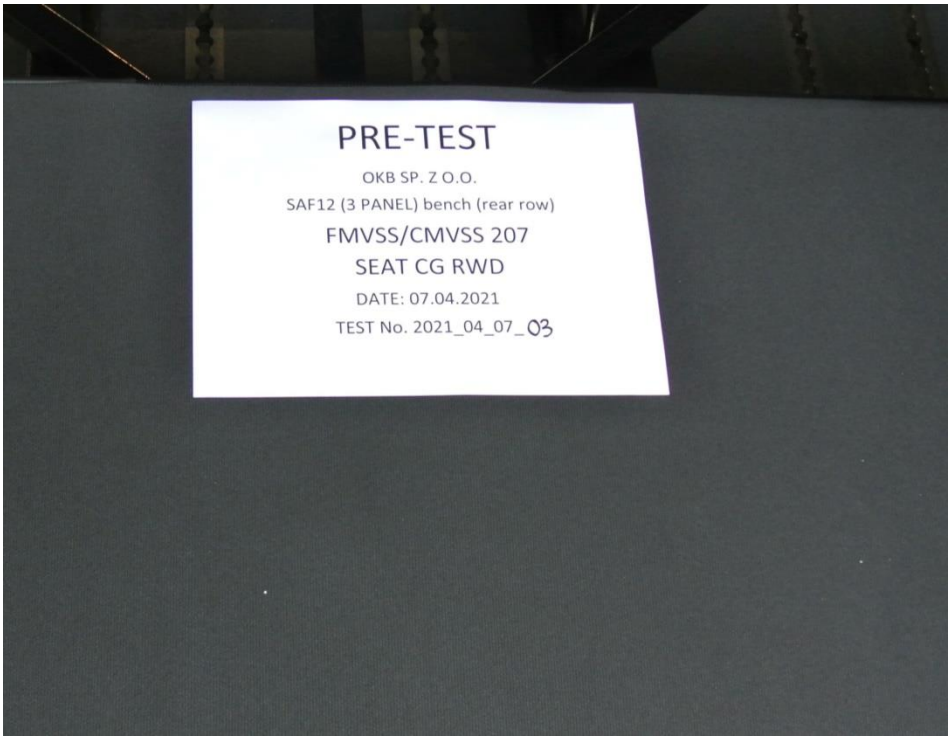
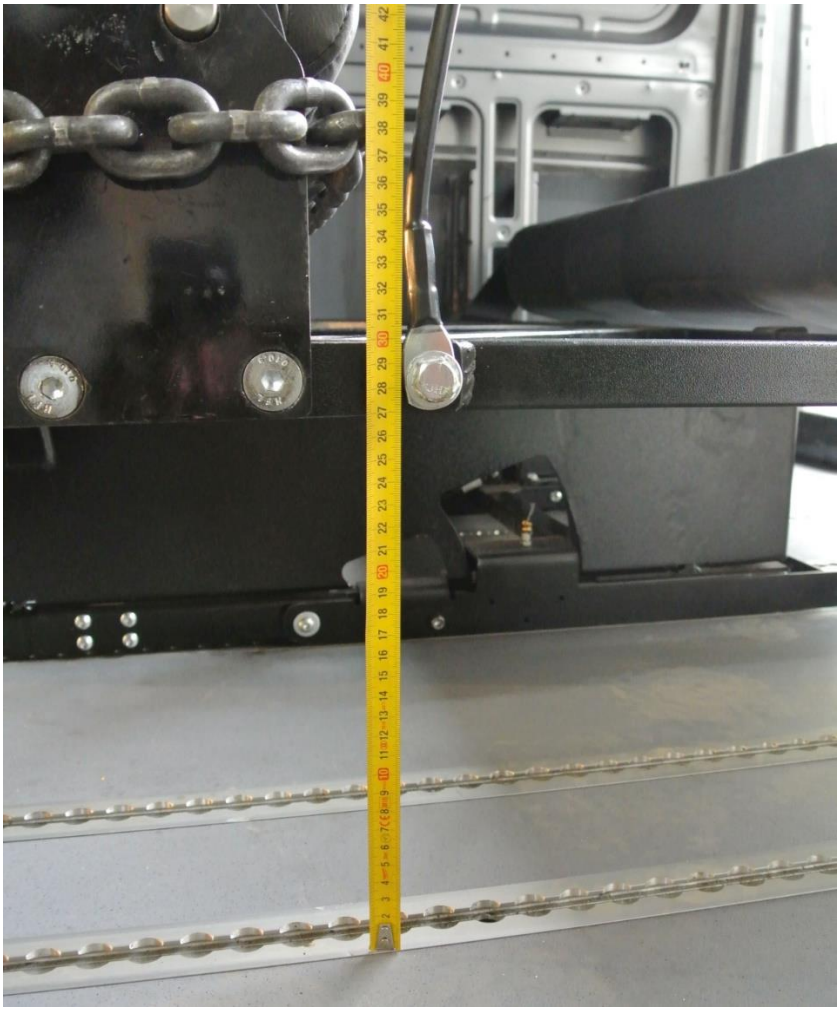
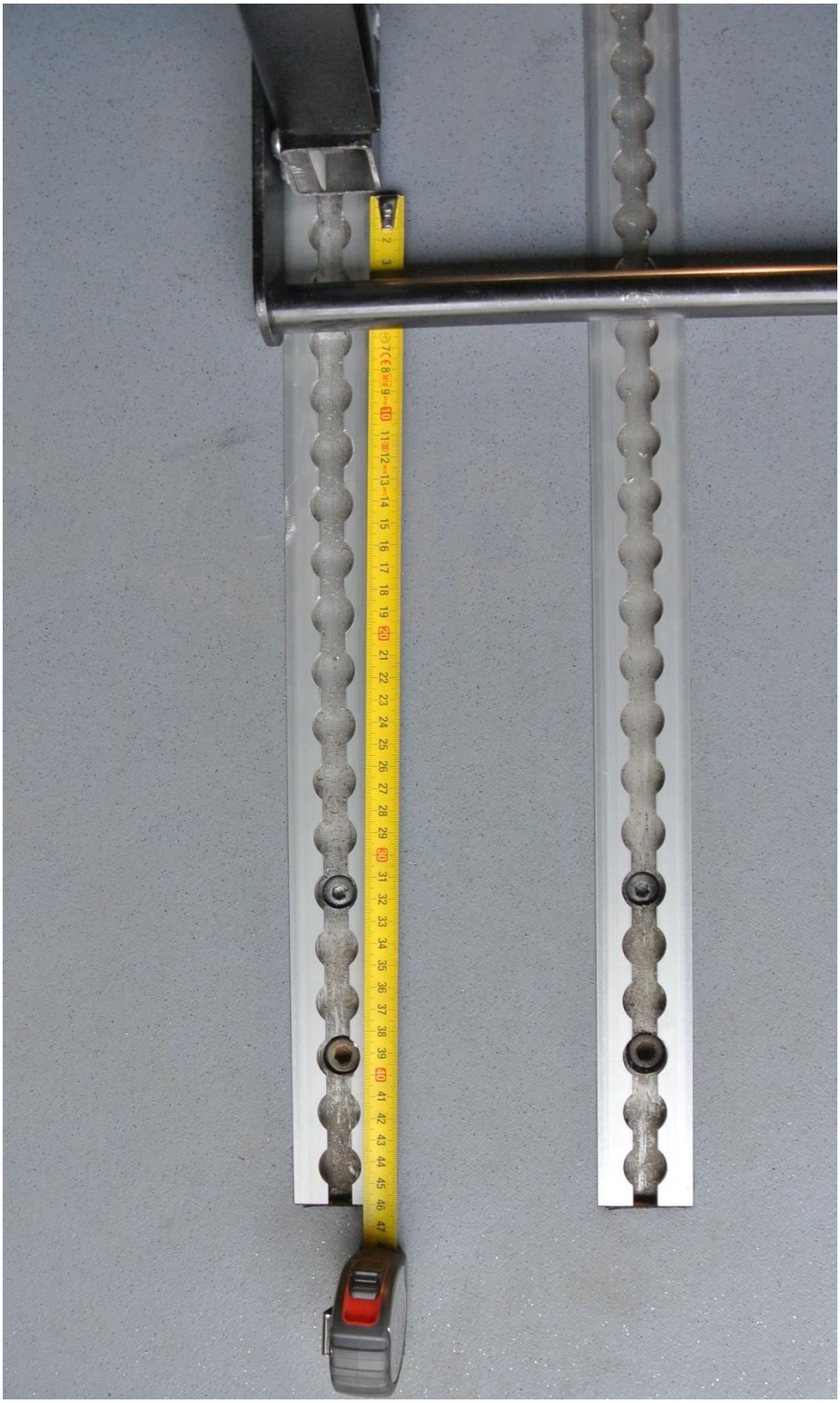


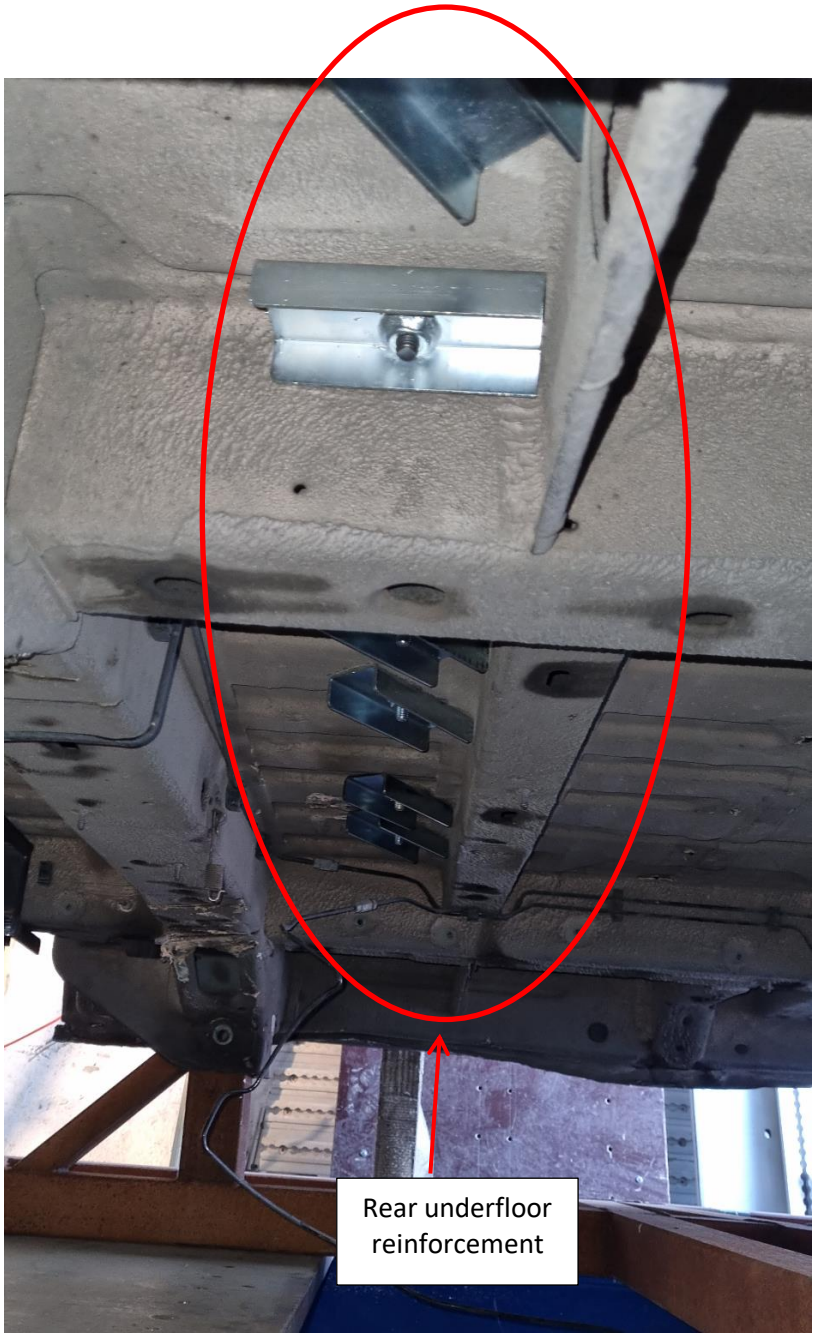

PRE-TEST
OKB SP. Z O.O.
SAF12 (3 PANEL) bench (rear row)
FMVSS/CMVSS 207
SEAT CG RWD
DATE: 07.04.2021
TEST No. 2021_04_07_03





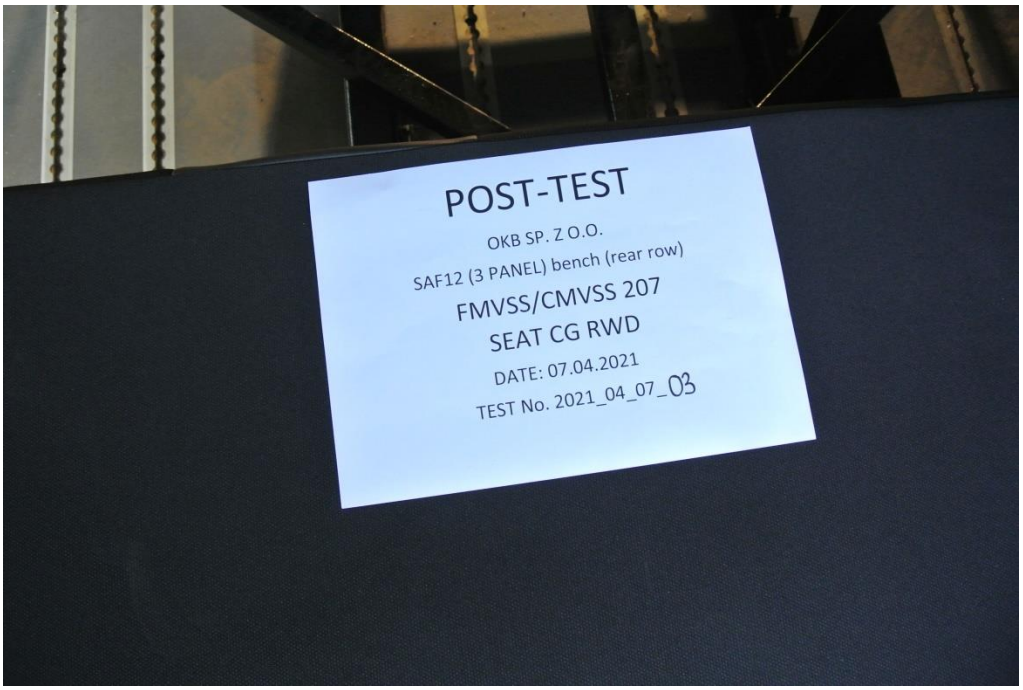

Front underfloor reinforcement
Longitudinal position of underfloor reinforcement
Rear underfloor reinforcement

Front underfloor reinforcement

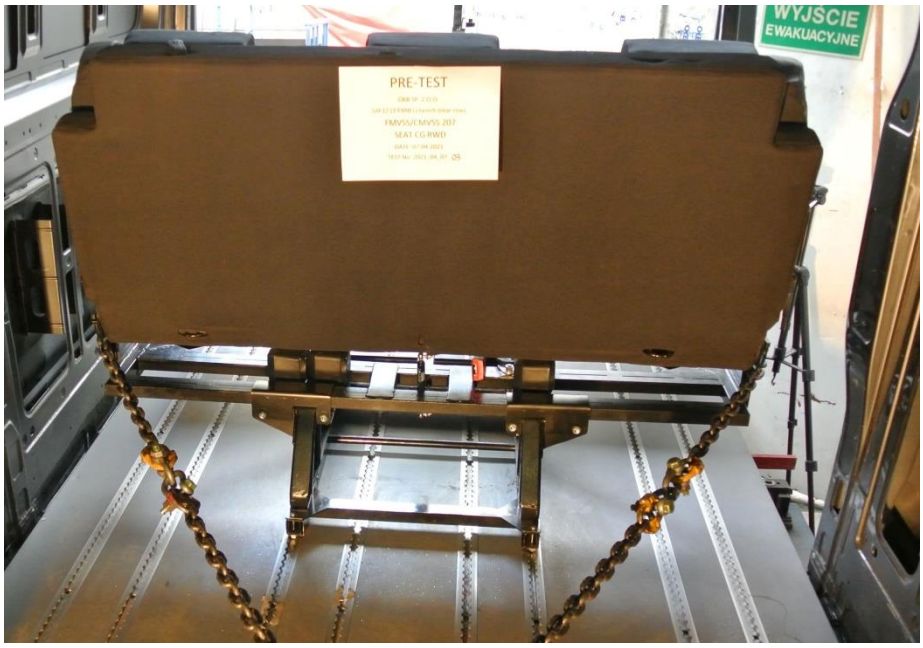

Rear underfloor
reinforcement

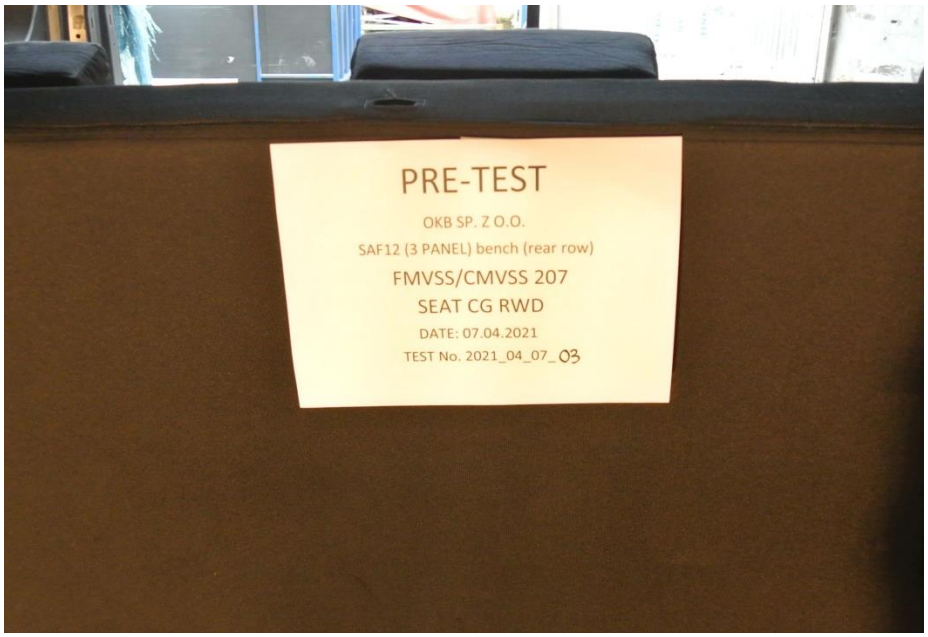
After test:


POST-TEST

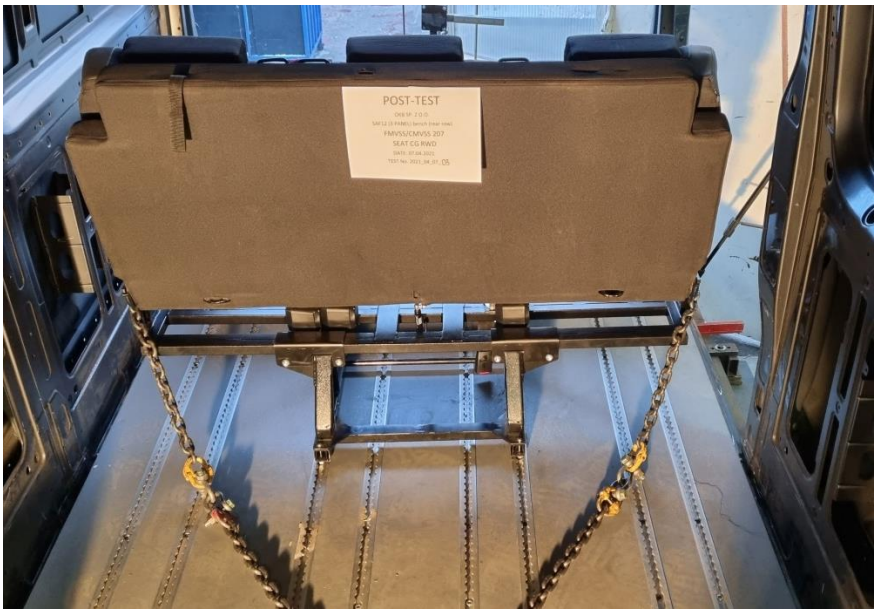

POST-TEST
OKB SP. Z O.O.
SAF12 (3 PANEL) bench (rear row)
FMVSS/CMVSS 207
SEAT CG RWD
DATE: 07.04.2021
TEST No. 2021_04_07_03

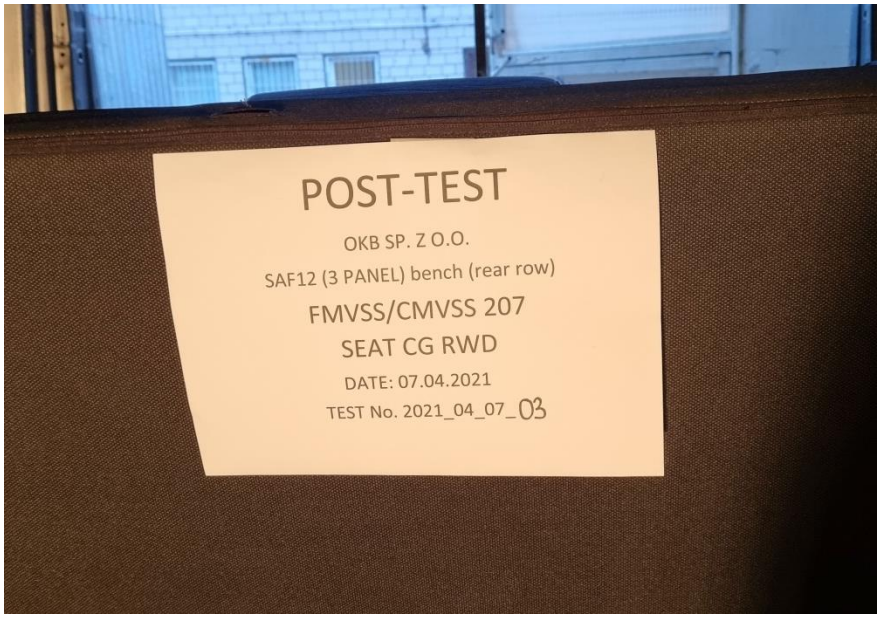
Before test:


PRE-TEST
WYJSCIE
EWAKUACYJNE


PRE-TEST
OKB SP. Z O.O.
SAF12 (3 PANEL) bench (rear row)
FMVSS/CMVSS 207
SEAT CG RWD
DATE: 07.04.2021
TEST No. 2021_04_07_03

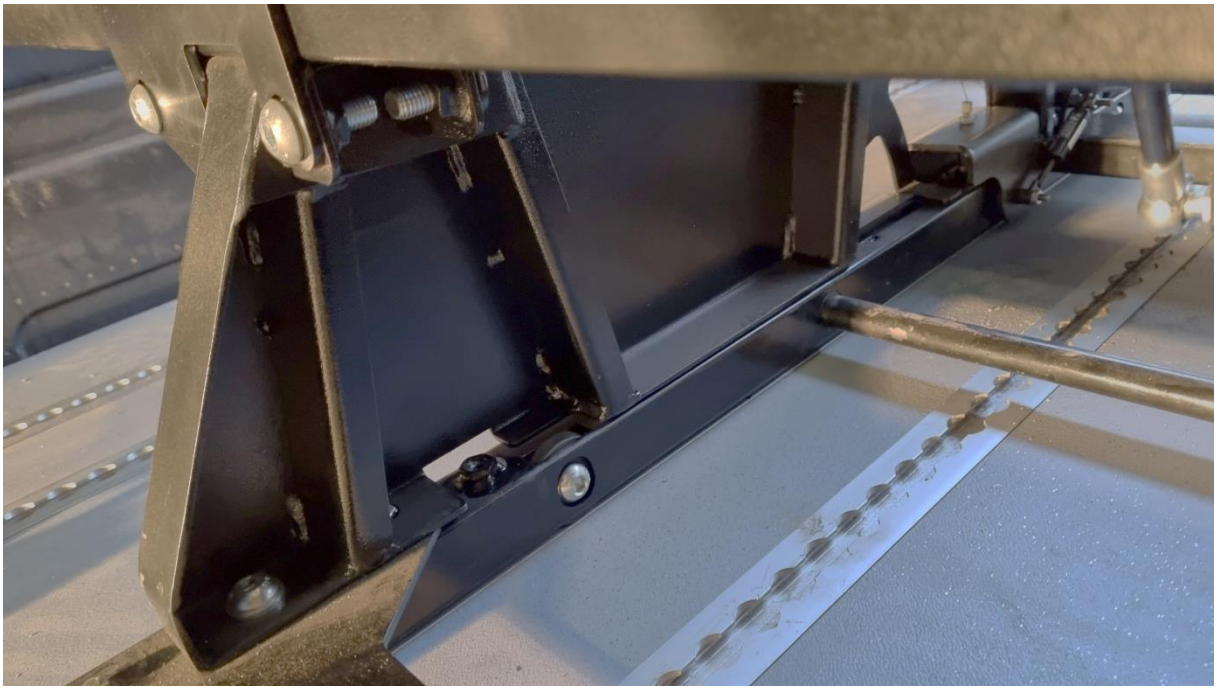
After test:


POST-TEST


POST-TEST
OKB SP. Z O.O.
SAF12 (3 PANEL) bench (rear row)
FMVSS/CMVSS 207
SEAT CG RWD
DATE: 07.04.2021
TEST No. 2021_04_07_03

Before test:

After test:



FORWARD "STATIC" 20G TEST OF COMPLETE SEAT
SEATBELT ANCHORAGES AT ONE TIME

TEST INFORMATION

Test Date:	12.04.2021
Requirement:	FMVSS 207 4.2.(c)
Test Article Seating Position:	2nd and/or next rows
Mass of complete seat:	132,8 kg / 293,21 lb
Required force	1334,5 daN / 3000 lbs
Required inertia load:	2656 daN / 5855,4 lbs
Seat Back Angle:	14° (fixed)
CG Load Attachment Height [mm/in]:	345 mm / 13,59"

TEST SETUP:

The seat was installed in the 2nd row seating position in the vehicle. The vehicle was secured to test stand. A chains were attached to the seat at the Torso and Lap belt for each seat and at the CG height. The Lap & Torso loads were applied through body blocks. The original belts were used to the tests.

A load cell was placed inline with the hydraulic cylinder and the load attachment point to the seat. A preload of the test load force was placed on the cylinder, and a check was made to make sure all anchor points were secure and the load angle was within tolerance.

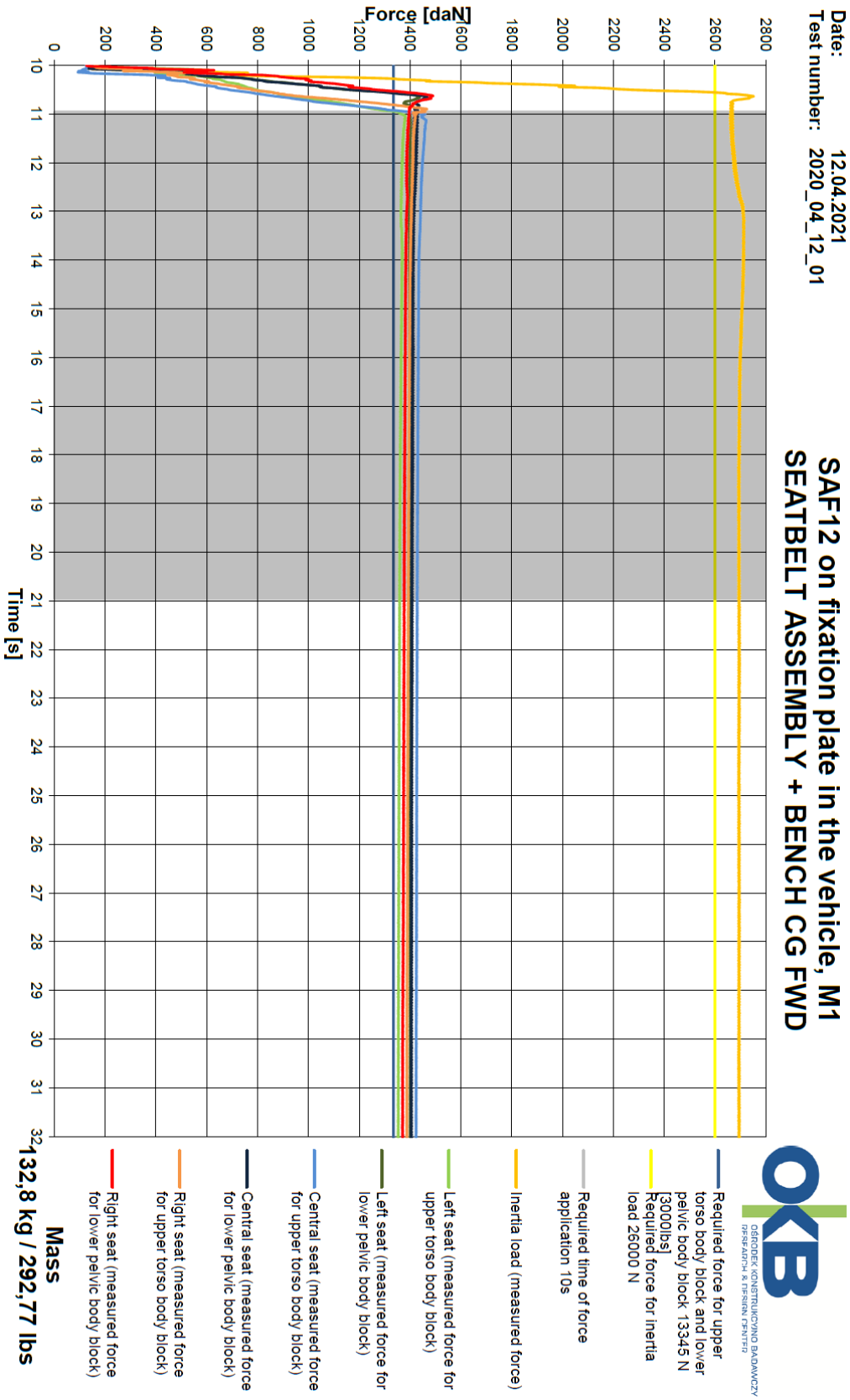
This test was to be performed to slightly above the Minimum Target Loads. The Minimum Target Loads were to be held for minimum 10 seconds.

TEST RESULTS:
The test article was able to achieve and maintain the minimum required loads. All safety restraint and seat anchorages appeared to be intact after the test.

APPLIED LOAD DATA

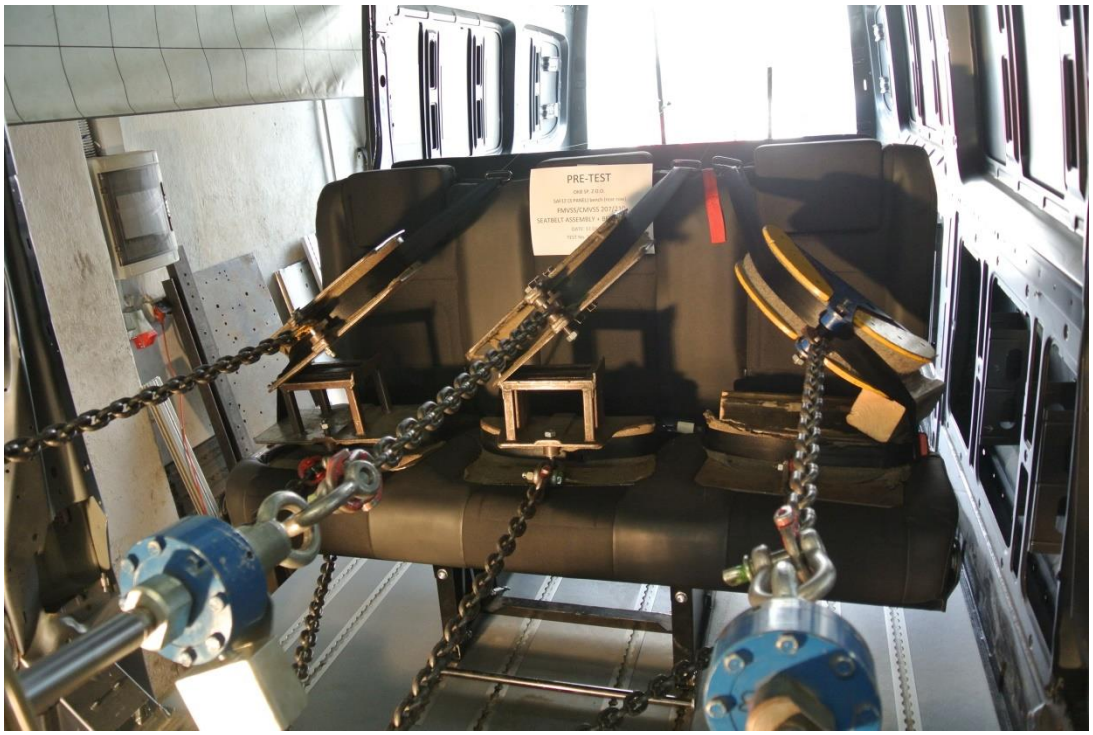
		Left Torso	Left Lap	Central Torso	Central Lap	CG	Right Torso	Right Lap
Controller Channel:		1	2	3	4	6	5	10
Load Cell S/N:		380514A	380548A	380524A	380522A	380511A	380513A	380565A
Cylinder Angle		10,7°	8,7°	10,5°	8,4°	2,1°	10,6°	8,5°
TEST PROFILE	Time [sec]	Load [daN/lbs]						
	10	~161daN /~362lbs	~126daN / ~283lbs	~125daN /~281lbs	~147daN / ~330lbs	~162daN /~364lbs	~167daN /~375lbs	~126daN /~283lbs
	11	~1364daN / ~3066lbs	1400daN / ~3147lbs	~1445daN / ~3248lbs	~1430daN / ~3215lbs	~2664daN /~5989lbs	~1425daN / ~3204lbs	~1397daN / ~3141lbs
	32	~1353daN / ~3042lbs	~1396daN / ~3138lbs	~1422daN / ~3197lbs	~1404daN / ~3156lbs	~2695daN /~6059lbs	~1387daN / ~3118lbs	~1370daN / ~3080lbs
Actual Max Load [daN/lb]		~1353daN / ~3042lbs	~1396daN / ~3138lbs	~1422daN / ~3197lbs	~1404daN / ~3156lbs	~2695daN /~6059lbs	~1387daN / ~3118lbs	~1370daN / ~3080lbs
Minimum Target Load [daN/lb]		1330 daN / 3000 lbs		1330 daN / 3000 lbs		2656 daN / 5855,4 lbs	1330 daN / 3000 lbs	
% of Minimum Target Load Achieved		~101,7%	~105,0%	~106,9%	~105,6%	~103,7%	~104,3%	~103,0%
Time Above Minimum Target Load [sec]		21	21	21	21	21	21	21
Anchorage Failures		None						
Adjustment Mechanism Movement		None						
Notes		None						

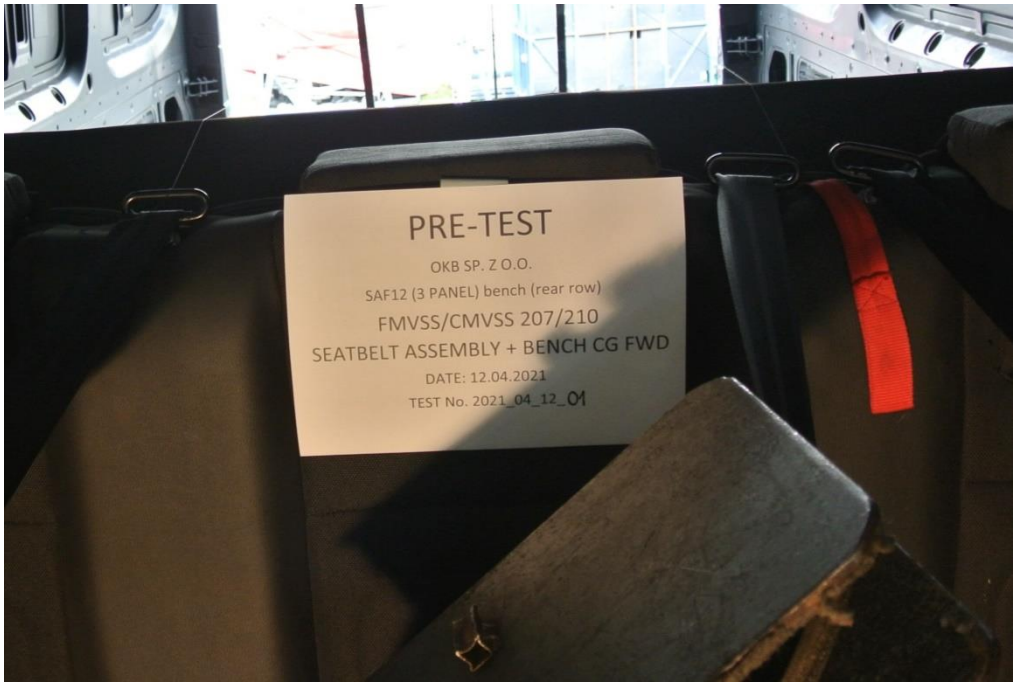
APPLIED LOAD GRAPH



PHOTOGRAPHS

Before test:





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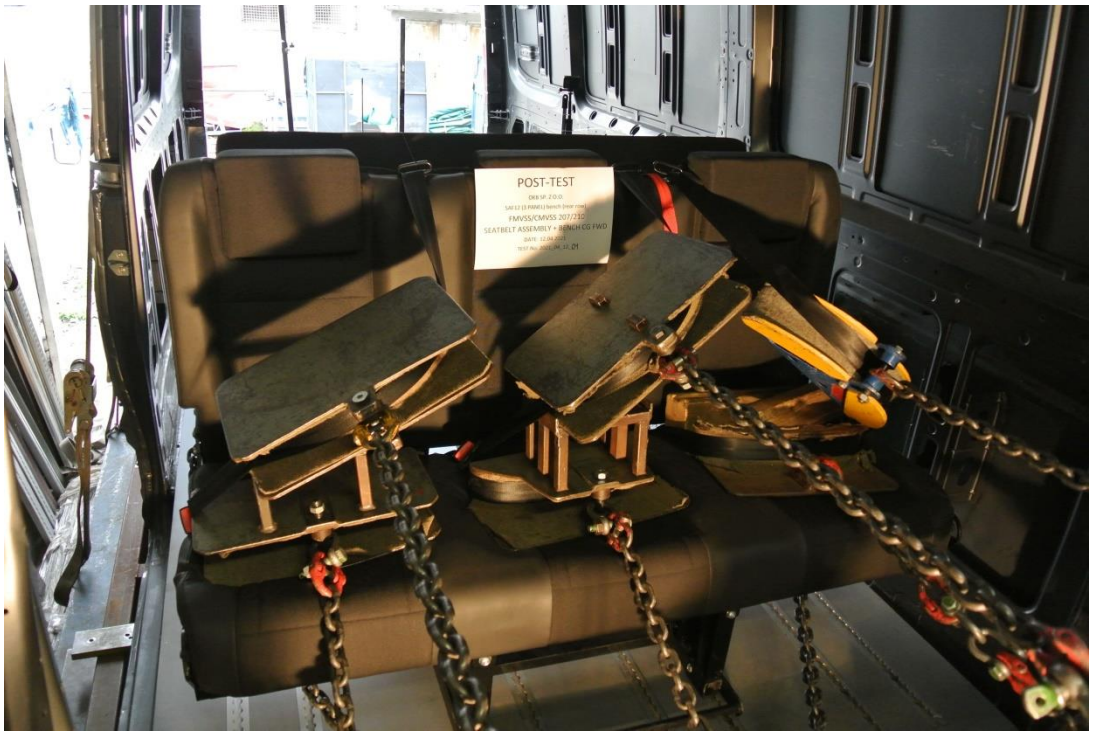
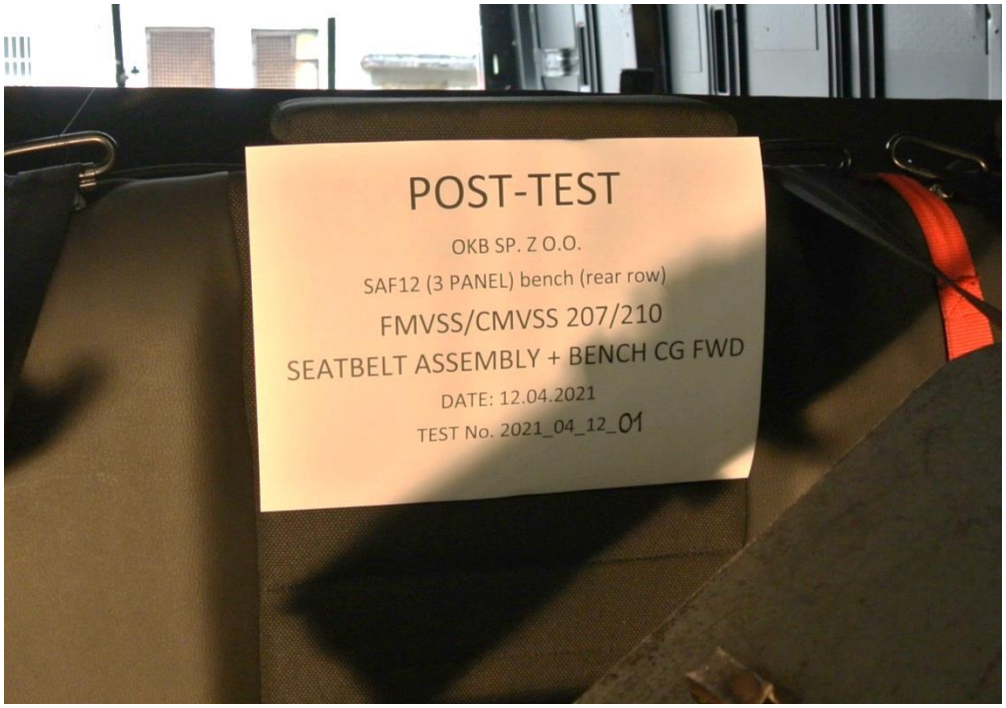
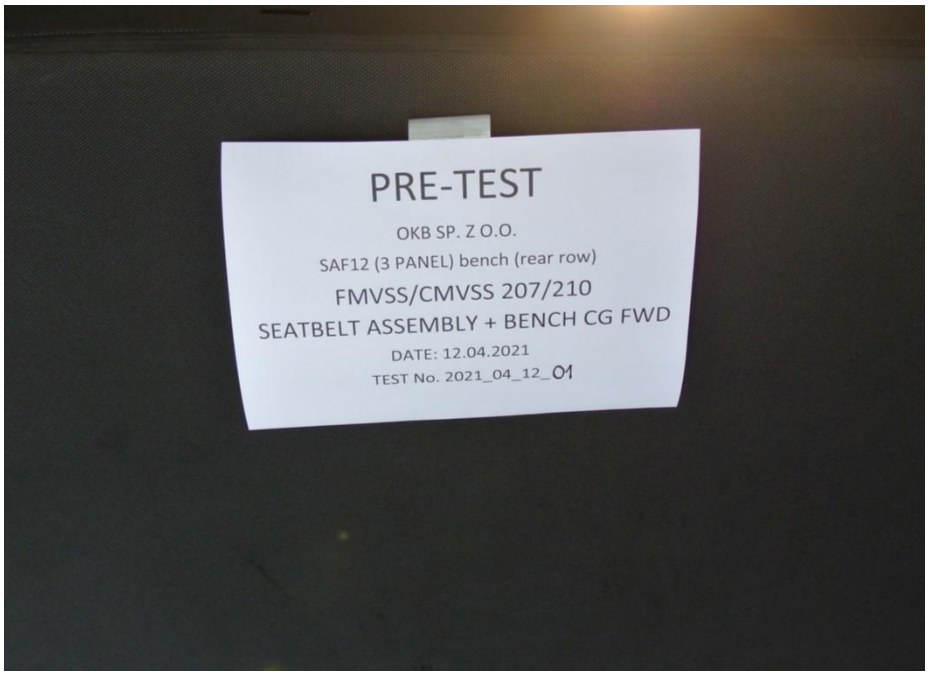

POST-TEST

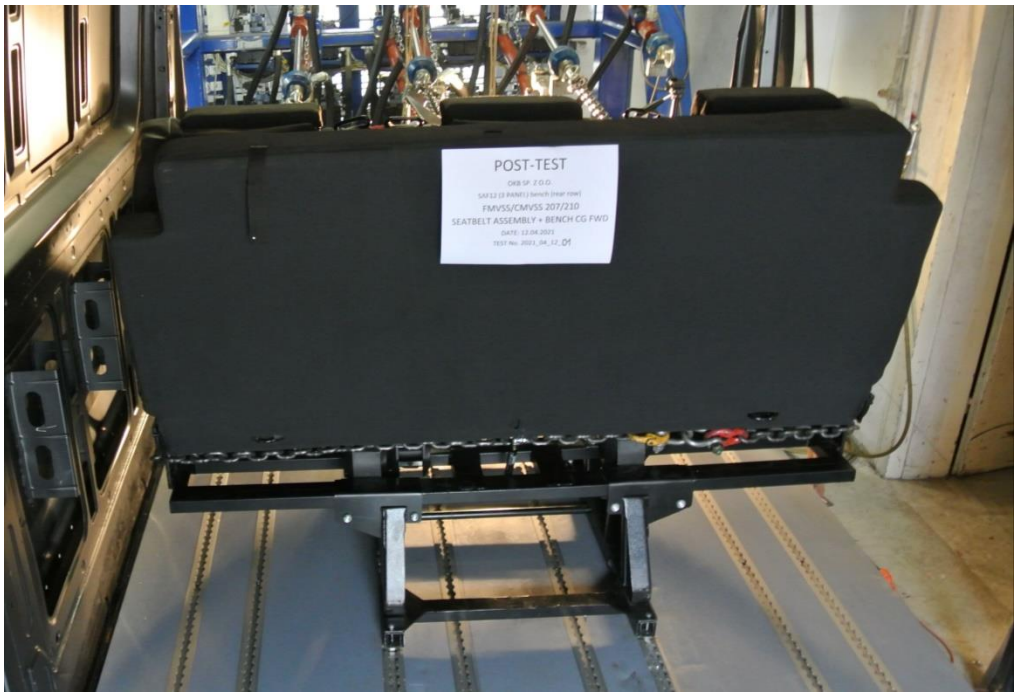

POST-TEST
OKB SP. Z O.O.
SAF12 (3 PANEL) bench (rear row)
FMVSS/CMVSS 207/210
SEATBELT ASSEMBLY + BENCH CG FWD
DATE: 12.04.2021
TEST No. 2021_04_12_01

Before test:


PRE-TEST
FMVSS/CMVSS 207/210
SEATBELT ASSEMBLY + BENCH CG FWD

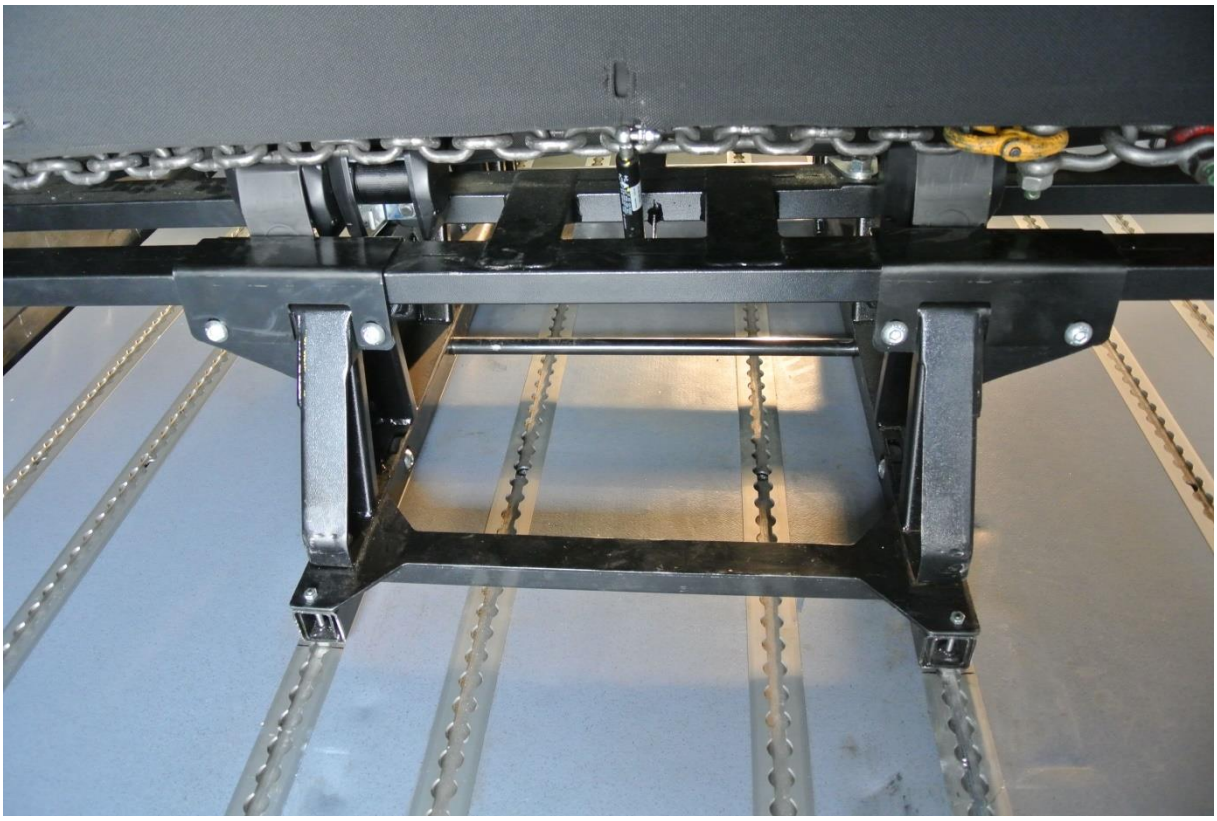

PRE-TEST
OKB SP. Z O.O.
SAF12 (3 PANEL) bench (rear row)
FMVSS/CMVSS 207/210
SEATBELT ASSEMBLY + BENCH CG FWD
DATE: 12.04.2021
TEST No. 2021_04_12_01

After test:


POST-TEST
FMVSS/CMVSS 207/210
SEATBELT ASSEMBLY + BENCH CG FWD


POST-TEST
OKB SP. Z O.O.
SAF12 (3 PANEL) bench (rear row)
FMVSS/CMVSS 207/210
SEATBELT ASSEMBLY + BENCH CG FWD
DATE: 12.04.2021
TEST No. 2021_04_12_01

Before test:



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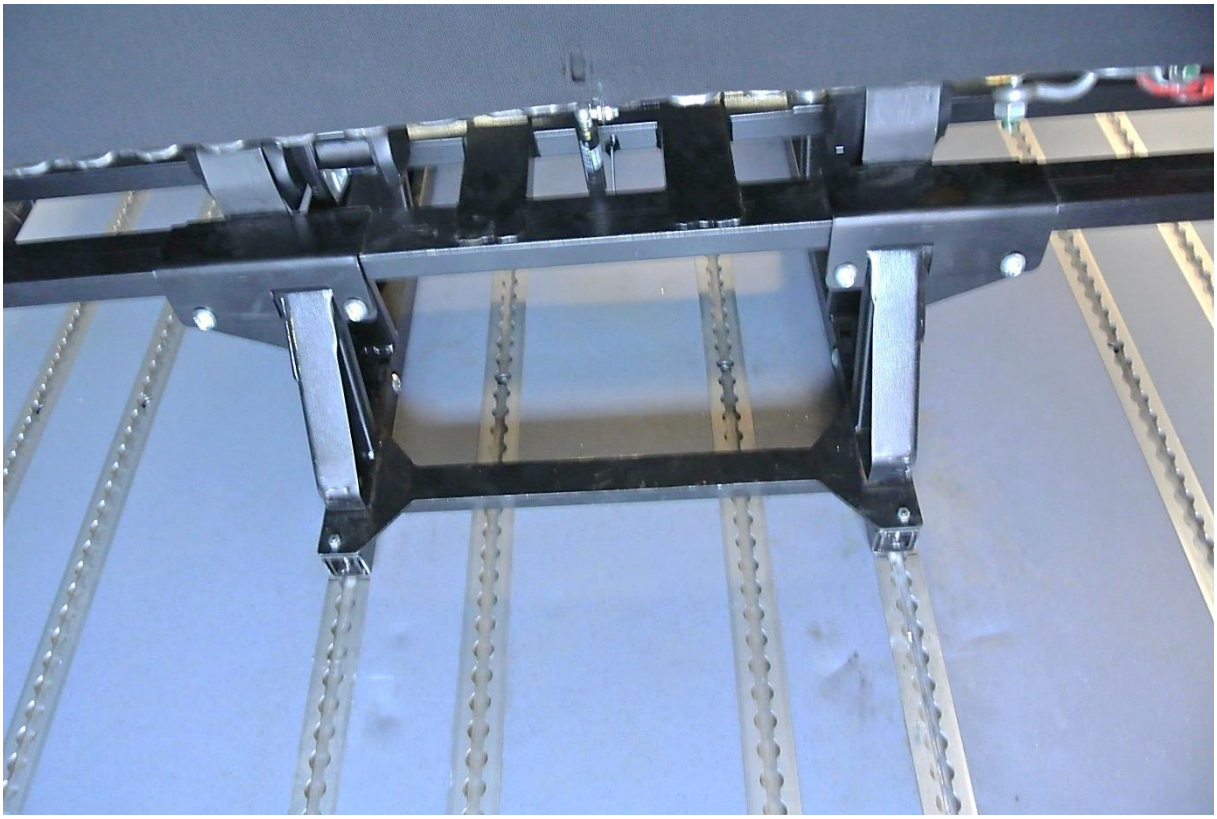

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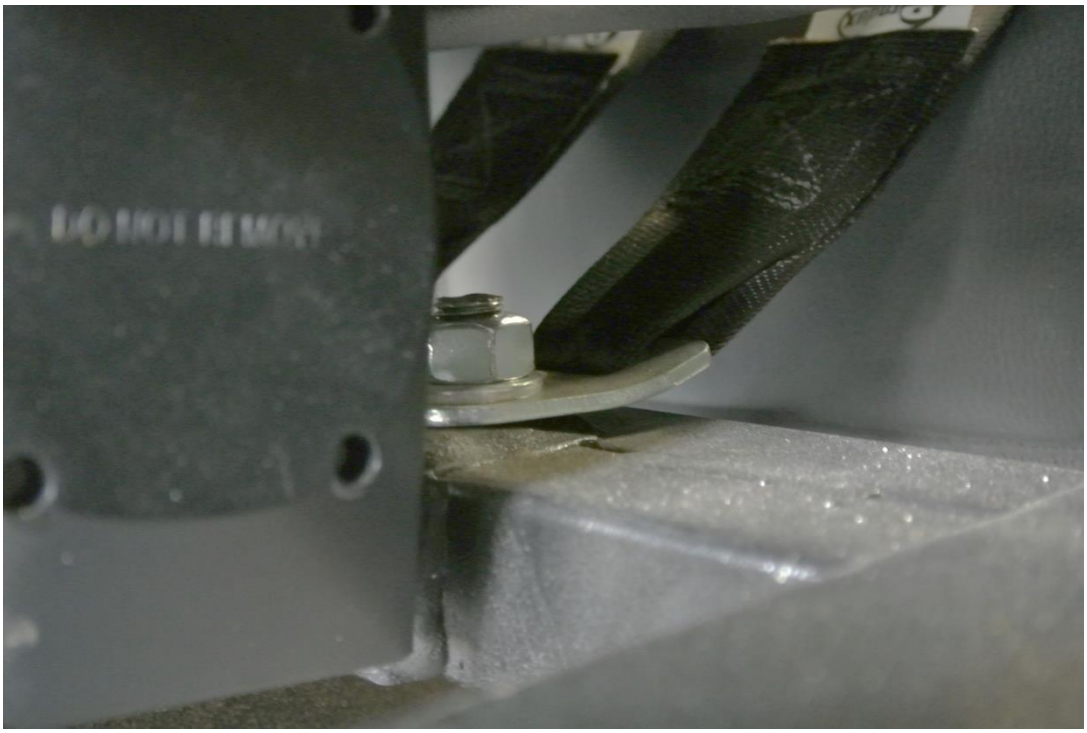

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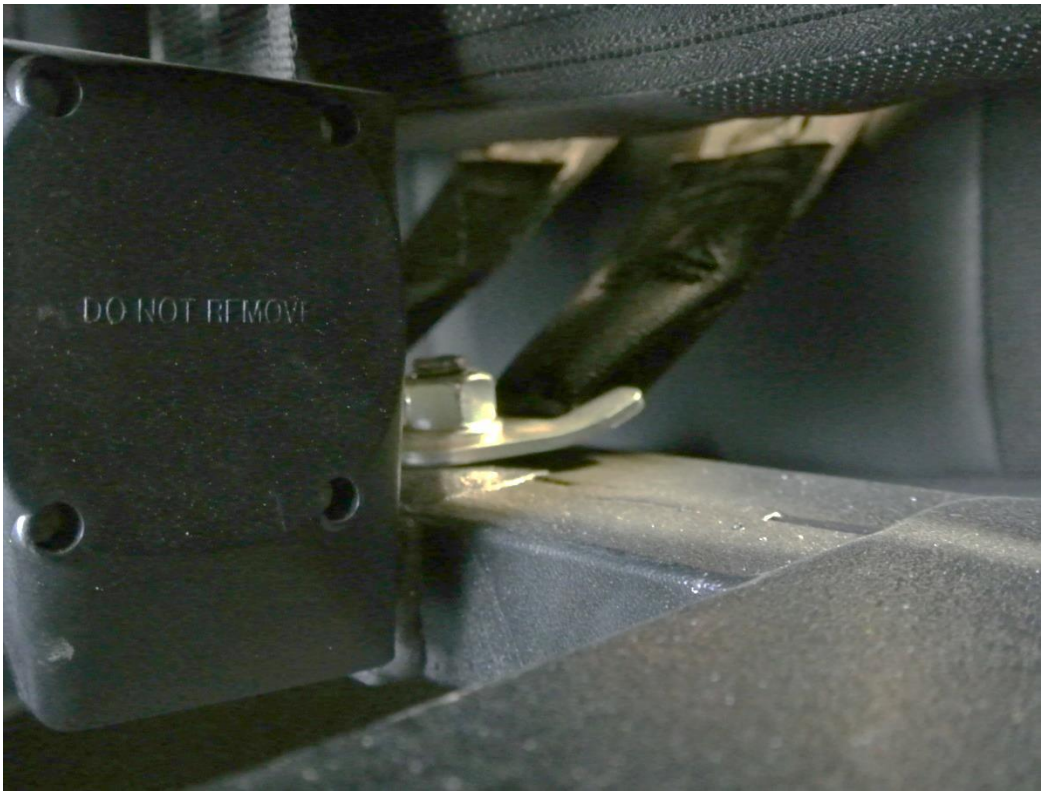
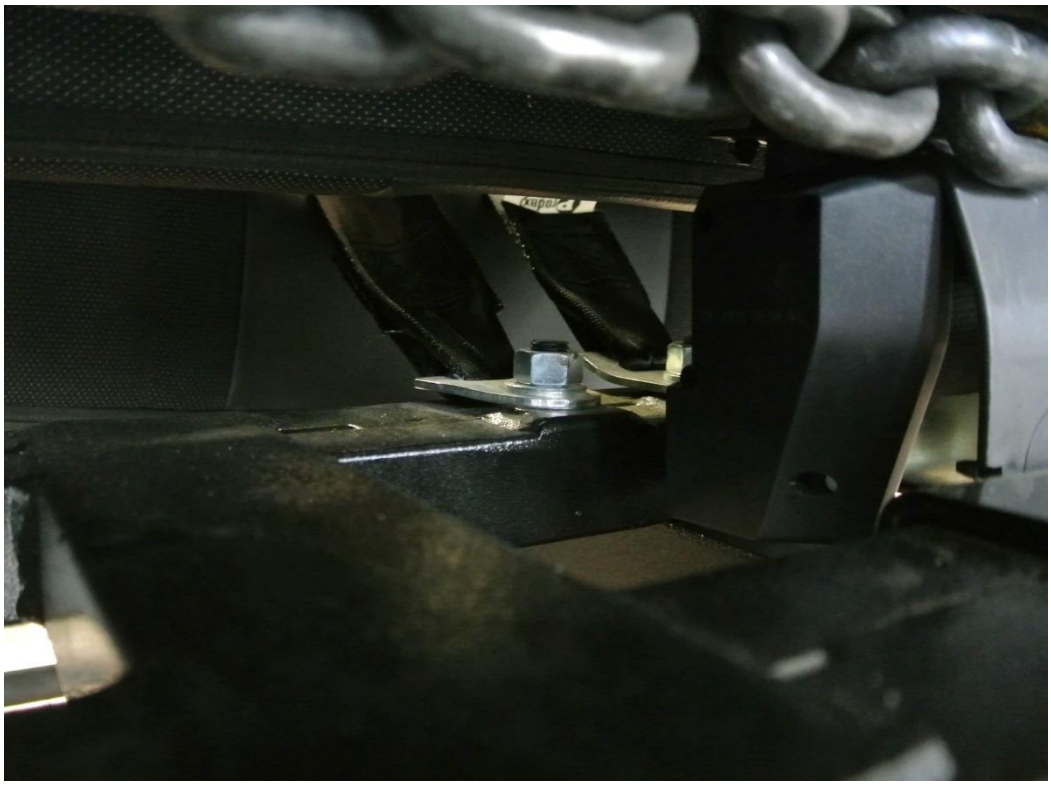


Before test:



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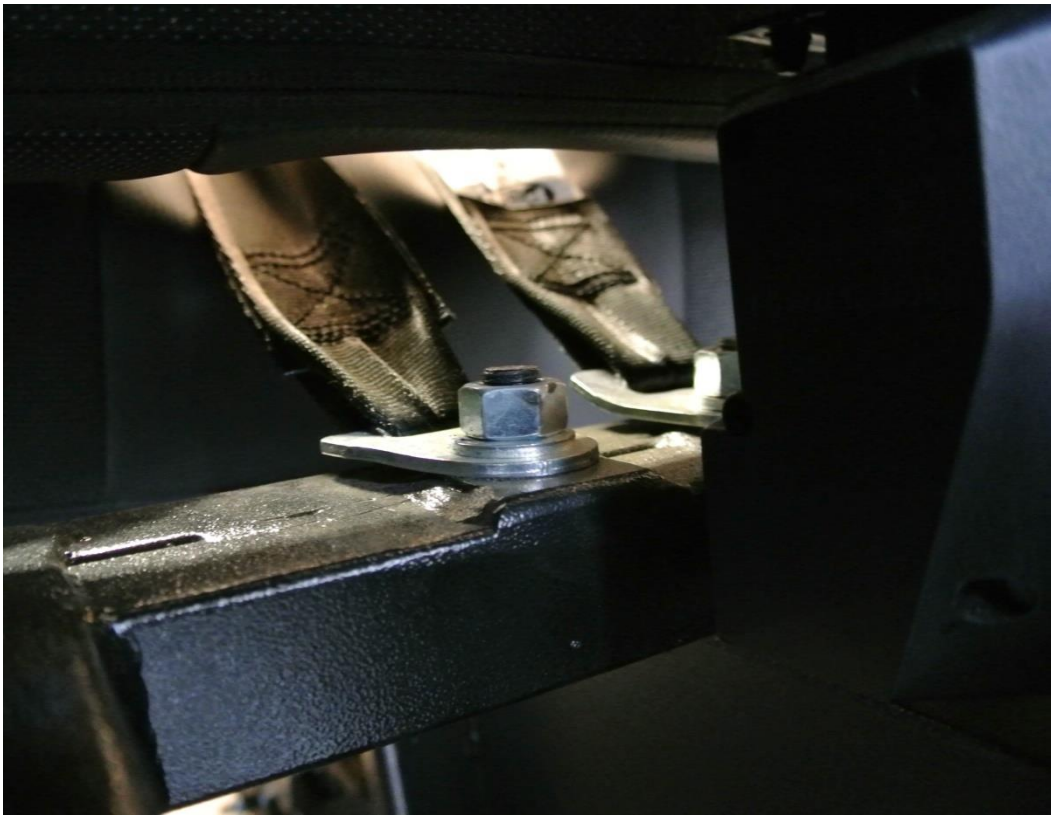

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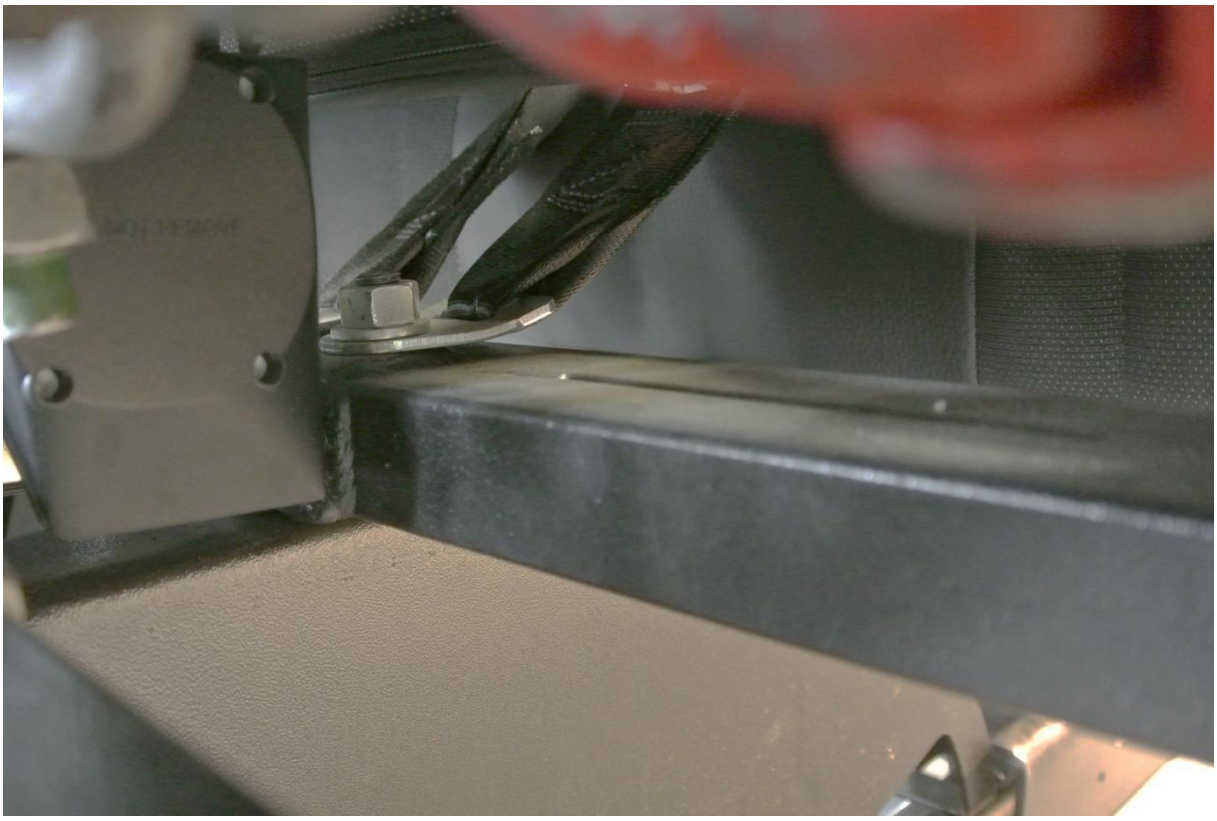

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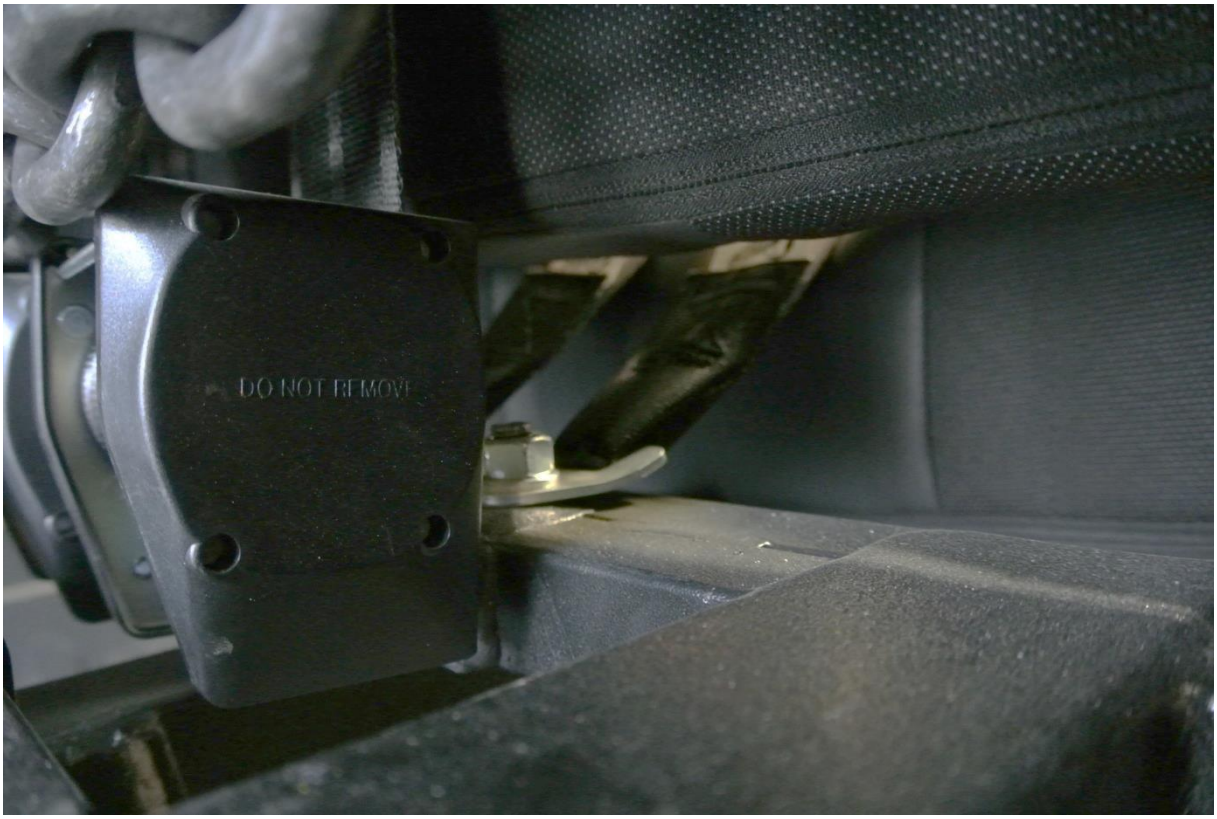

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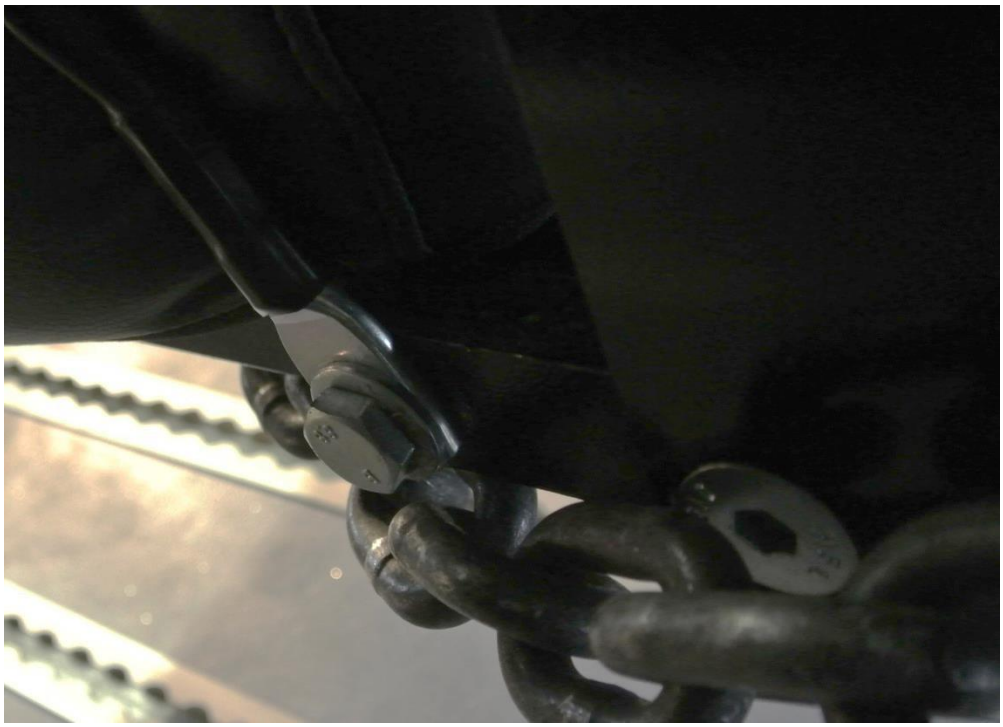

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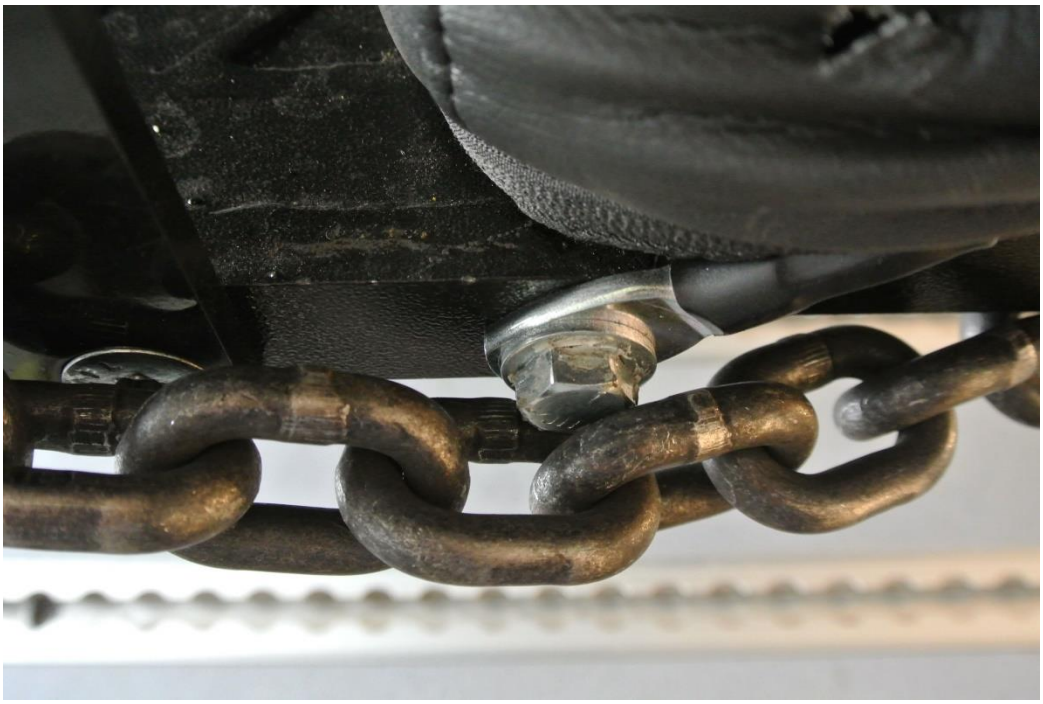

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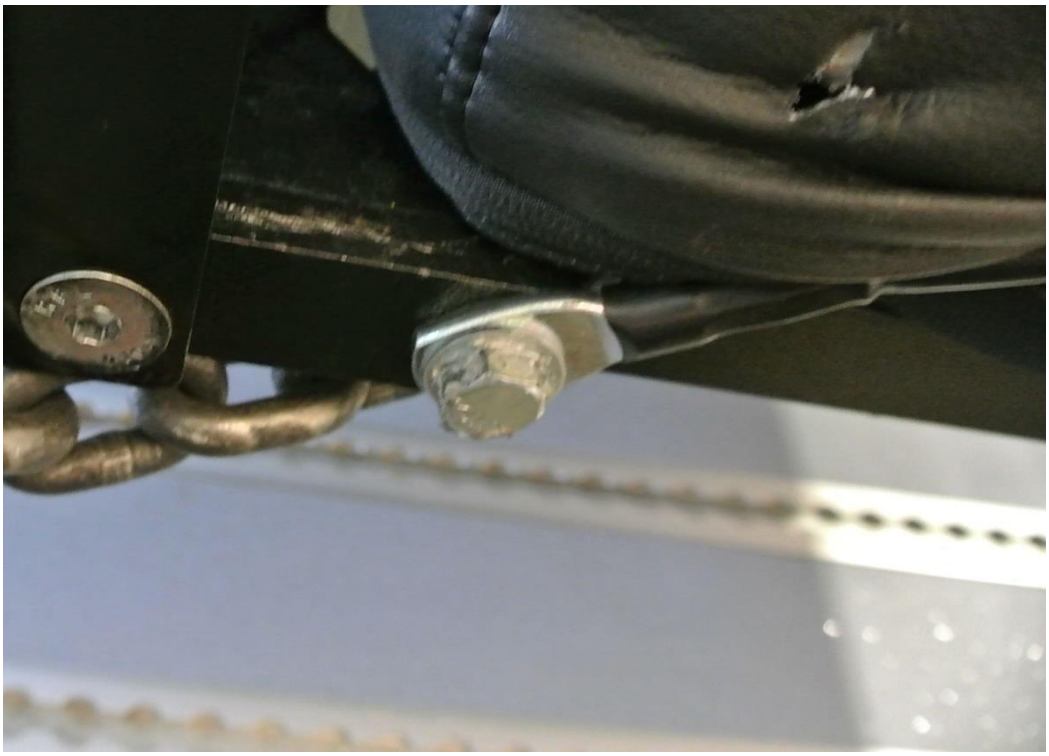
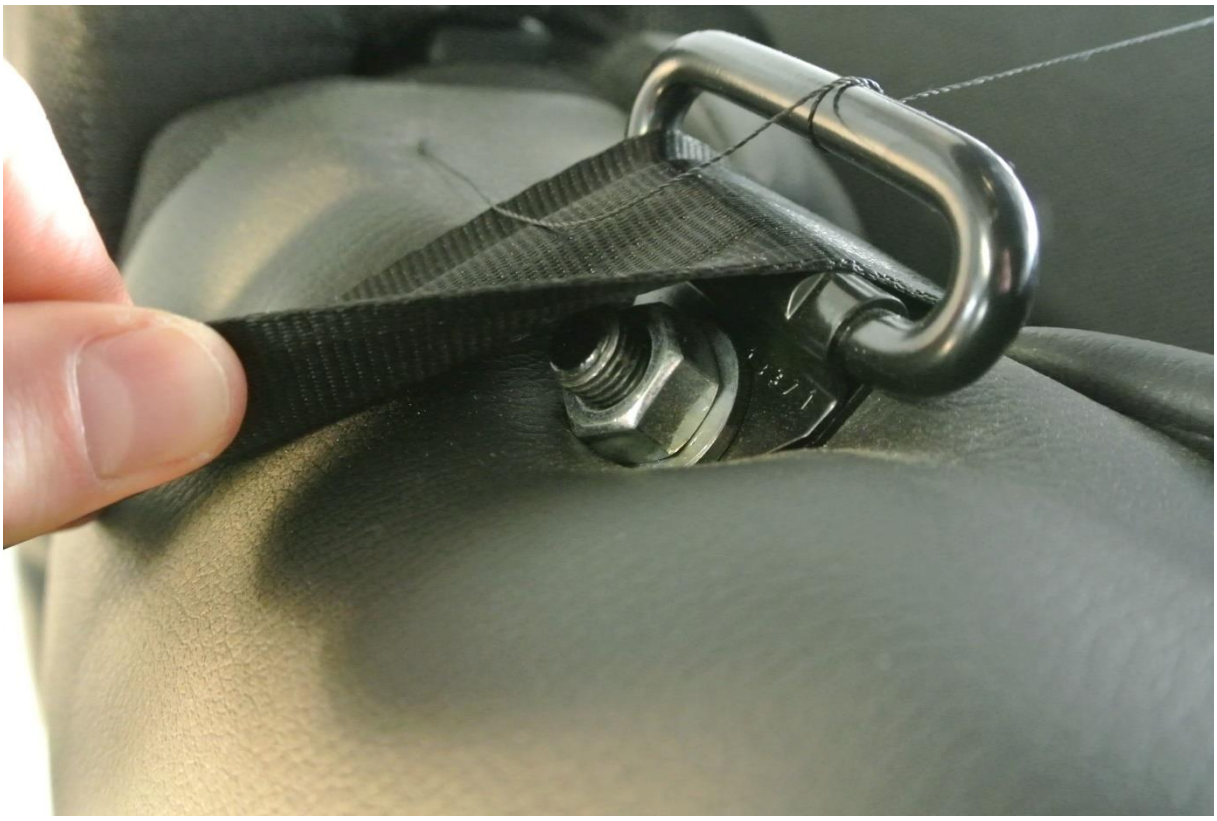


Before test:

After test:

Before test:

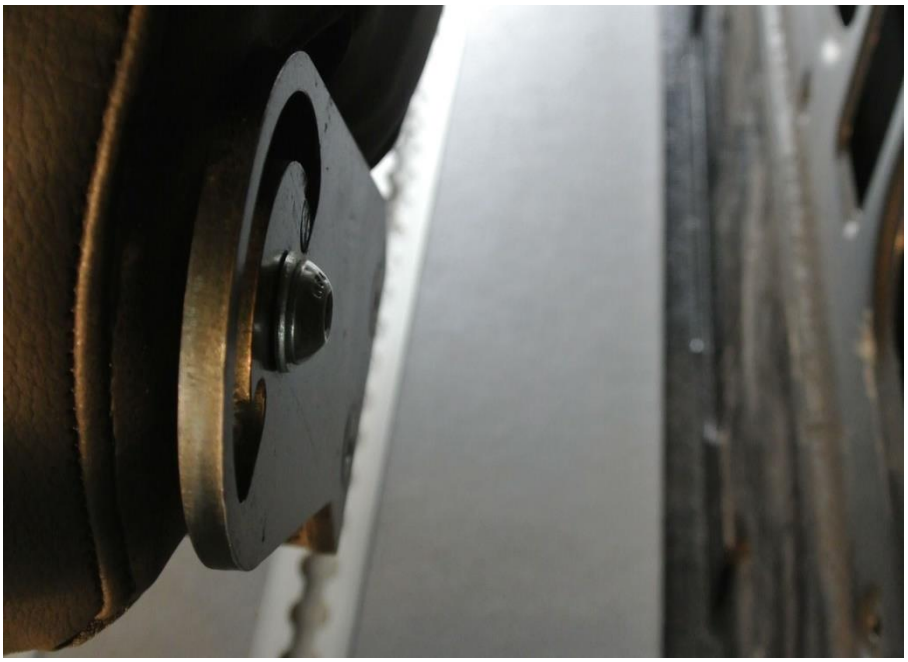


After test:

Before test:

After test:

Before test:



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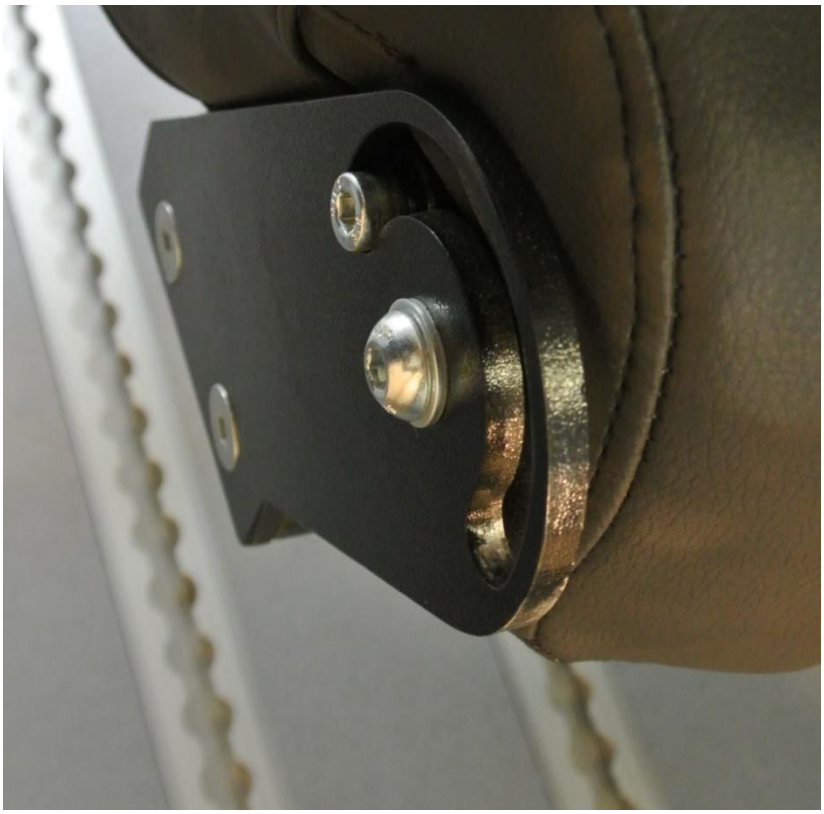
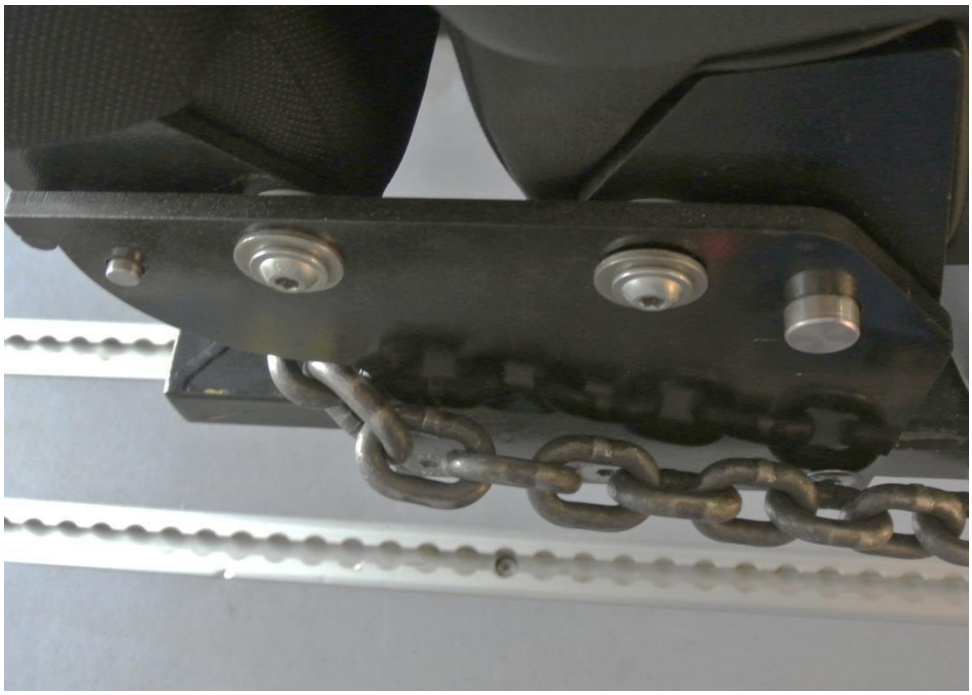
Before test:



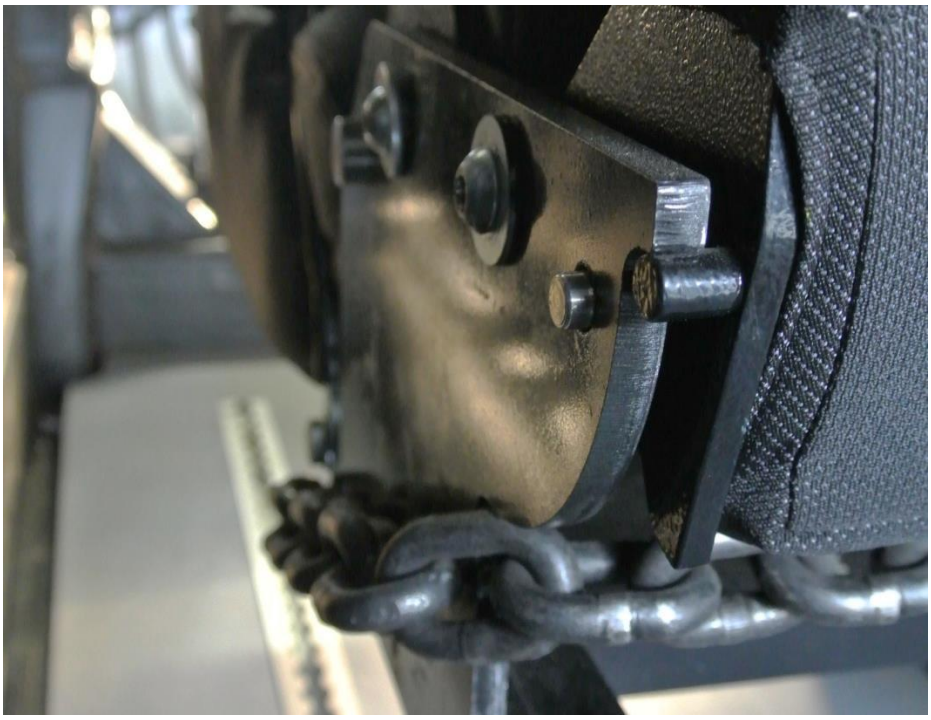
After test:

Before test:



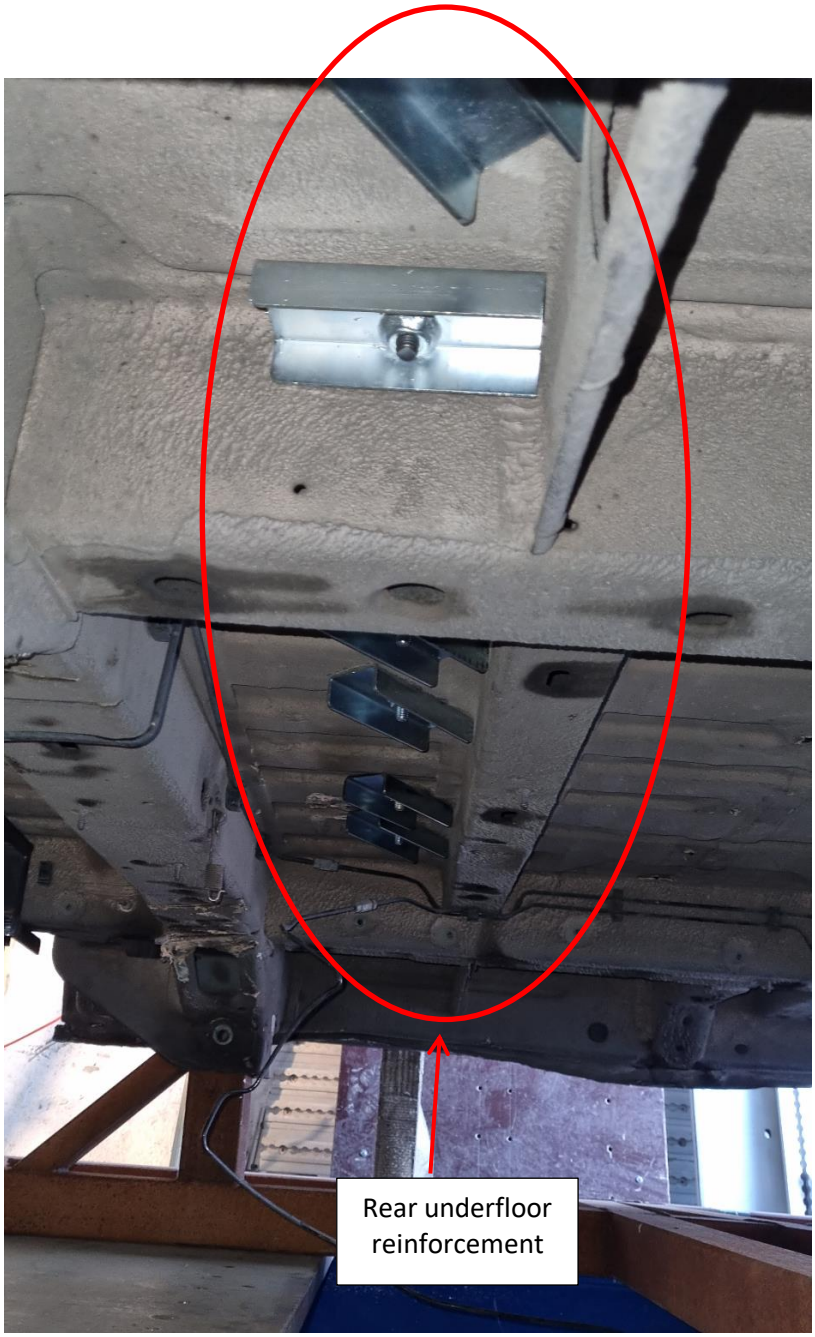
After test:

Before test:



After test:

Front underfloor reinforcement


Rear underfloor reinforcement

MOMENT 373 NM ABOUT SEATING REFERENCE POINT (IN THE REAR DIRECTION)

TEST INFORMATION

Test Date:	07.04.2021
Requirement:	FMVSS 207 4.2.(d)
Test Article Seating Position:	2nd and/or next rows
SRP to Upper Cross member [mm/in]	456 mm / 17,85”
Required load:	818 N / 183,89 lbs Per 1 Designated Seating Position 2454 N (245,4 daN) / 550,17 lbs Per 3 Designated Seating Positions
Required moment:	373 N*m / 183,89 lbs*in Per 1 Designated Seating Position 2454 N (245,4 daN) / 550,17 lbs Per 3 Designated Seating Positions
Seat Back Angle:	14° (fixed)

TEST SETUP:

The seat was installed in the 2nd row seating position in the vehicle. The vehicle was secured to test stand. The test load was applied through additional upper cross member.

A load cell was placed inline with the hydraulic cylinder and the load attachment point to the seat. A preload of the test load force was placed on the cylinder, and a check was made to make sure all anchor points were secure and the load angle was within tolerance

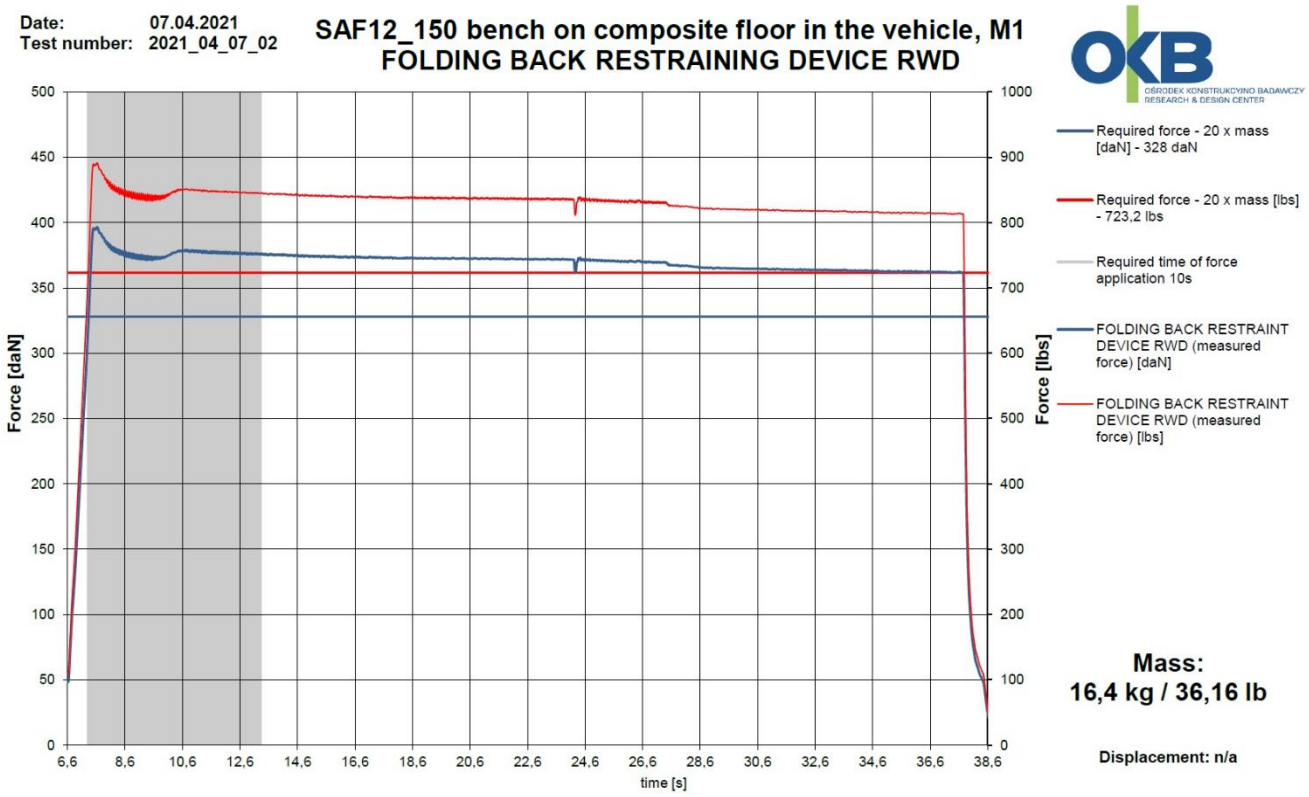
This test was to be performed to slightly above the Minimum Target Loads. The Minimum Target Loads were to be held for minimum 10 seconds.

TEST RESULTS:
The test article was able to achieve and maintain the minimum required loads. All the seat anchorages were intact after the test was complete.

APPLIED LOAD DATA

Controller Channel:	7	
Load Cell S/N:	380511A	
Cylinder Angle (0±3°)	0,9°	
TEST PROFILE	Time [sec]	Load [daN/lbs]
	13,3	~110 daN /~247 lbs
	8,5	~430 daN /~967 lbs
	37,0	~416 daN /~935 lbs
	37,3	~400 daN /~899 lbs
Actual Max Load [daN/lb]	~416 daN /~935 lbs	
Minimum Target Load [daN/lb]	245,4 daN / 554,6 lbs	
% of Minimum Target Load Achieved	169,5%	
Time Above Minimum Target Load [sec]	23,2	
Anchorage Failures	None	
Adjustment Mechanism Movement	None	
Notes	None	

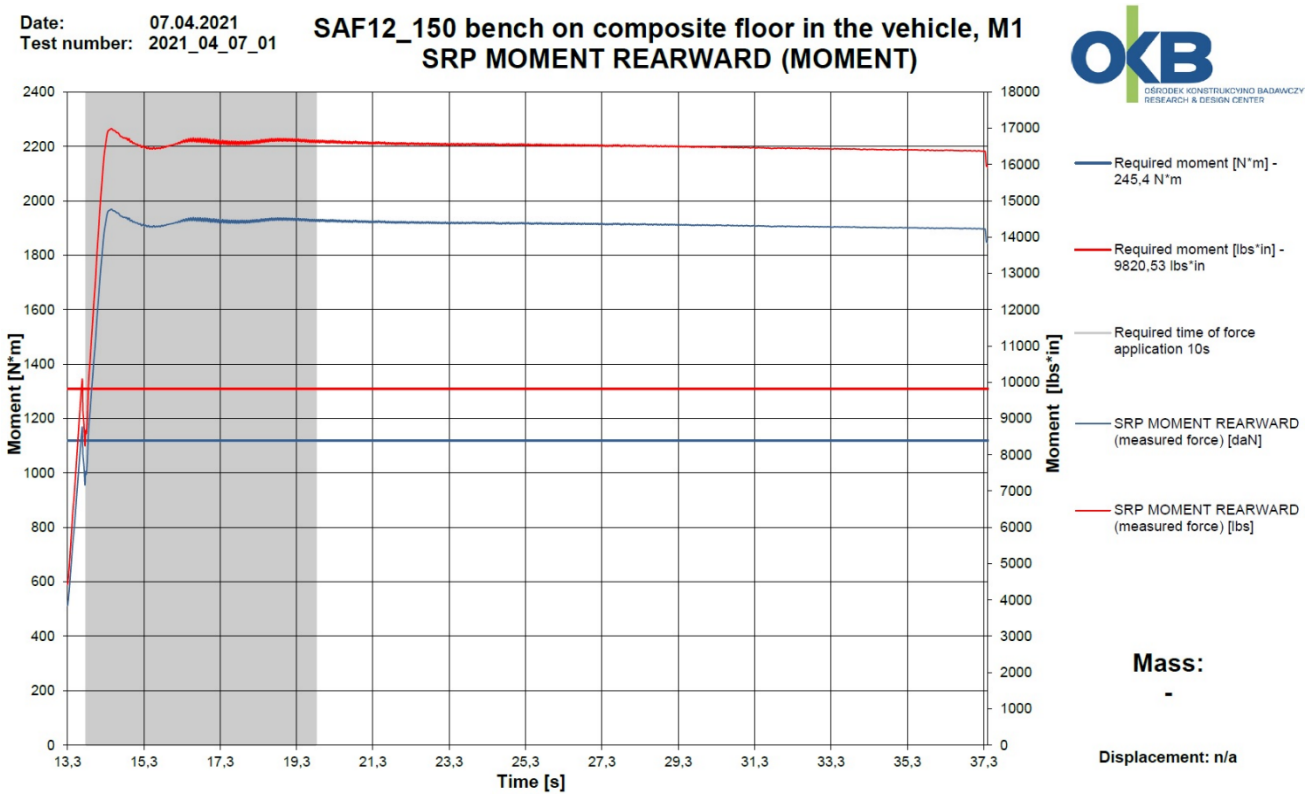
APPLIED LOAD GRAPH



APPLIED MOMENT DATA

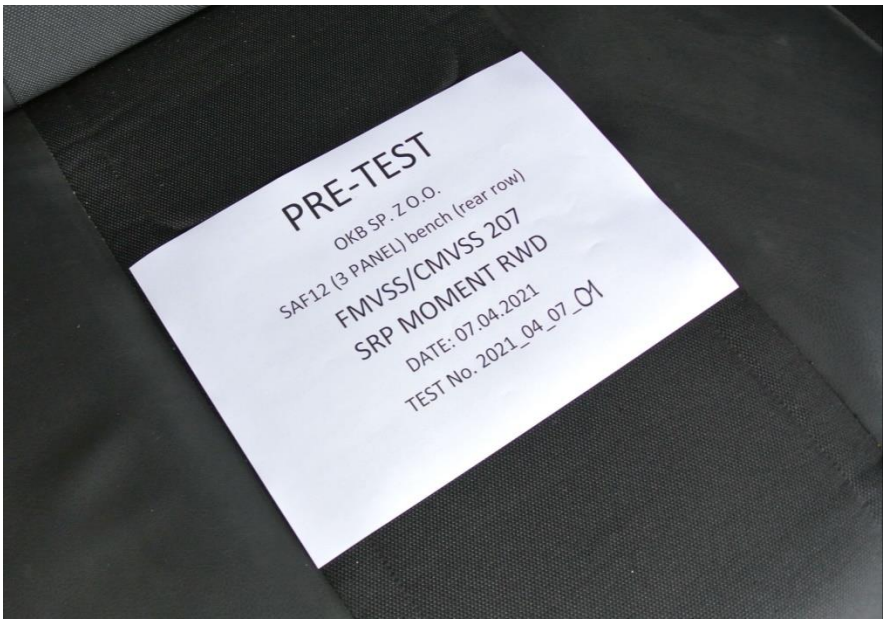
Controller Channel:	7	
Load Cell S/N:	380511A	
Cylinder Angle (0±3°)	0,9°	
TEST PROFILE	Time [sec]	Moment [N*m/lbs*in]
	13,3	~502 N*m/~4443 lbs*in
	13,8	~1961 N*m/~17356 lbs*in
	37,0	~1897 N*m/~16790 lbs*in
	37,3	~1824 N*m/~16144 lbs*in
Actual Max Moment [N*m/lbs*in]	~1897 N*m/~16790 lbs*in	
Minimum Target Moment [N*m/lbs*in]	1119 N*m/9900 lbs*in	
% of Minimum Target Moment Achieved	169,5%	
Time Above Minimum Target Moment [sec]	23,2	
Anchorage Failures	None	
Adjustment Mechanism Movement	None	
Notes	None	

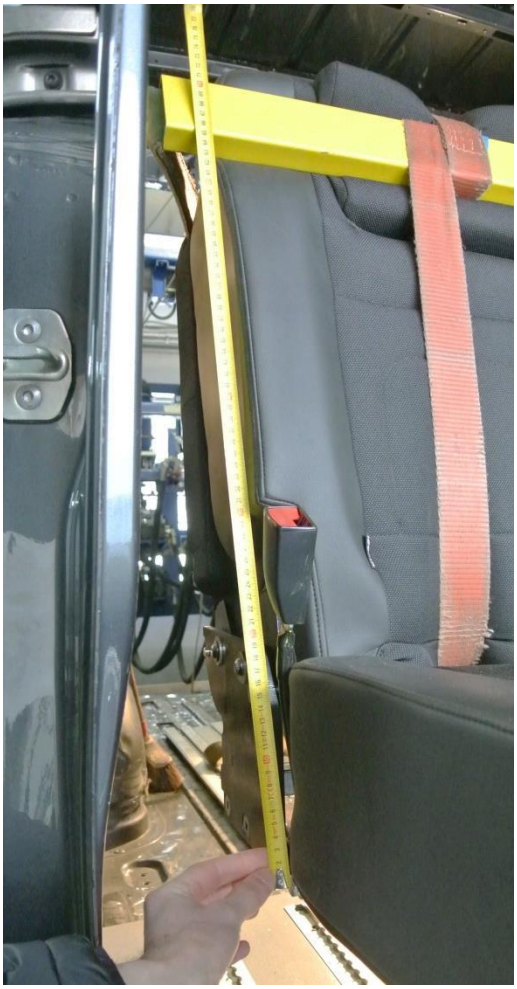
APPLIED MOMENT GRAPH



PHOTOGRAPHS

Before test:





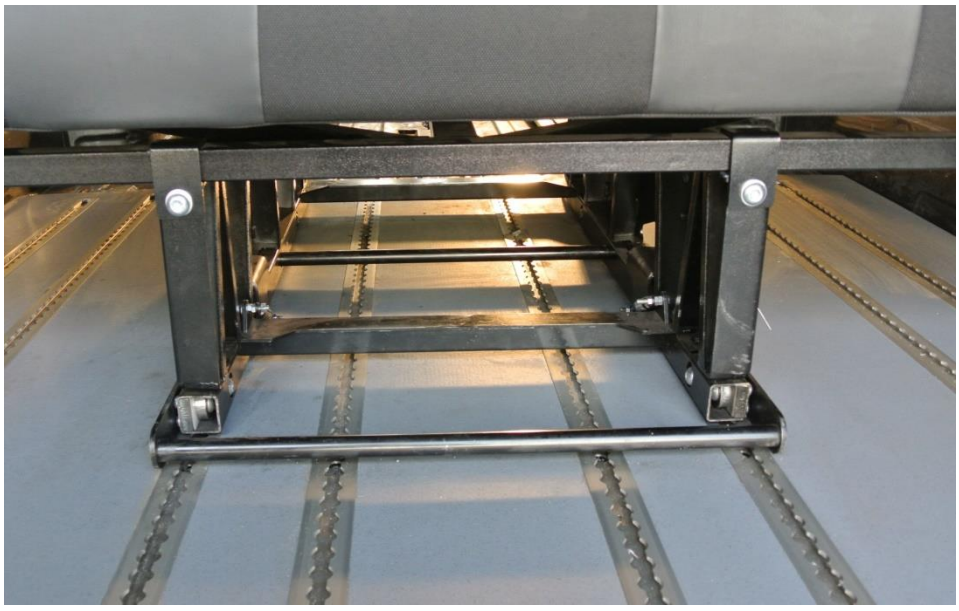
After test:


POST-TEST

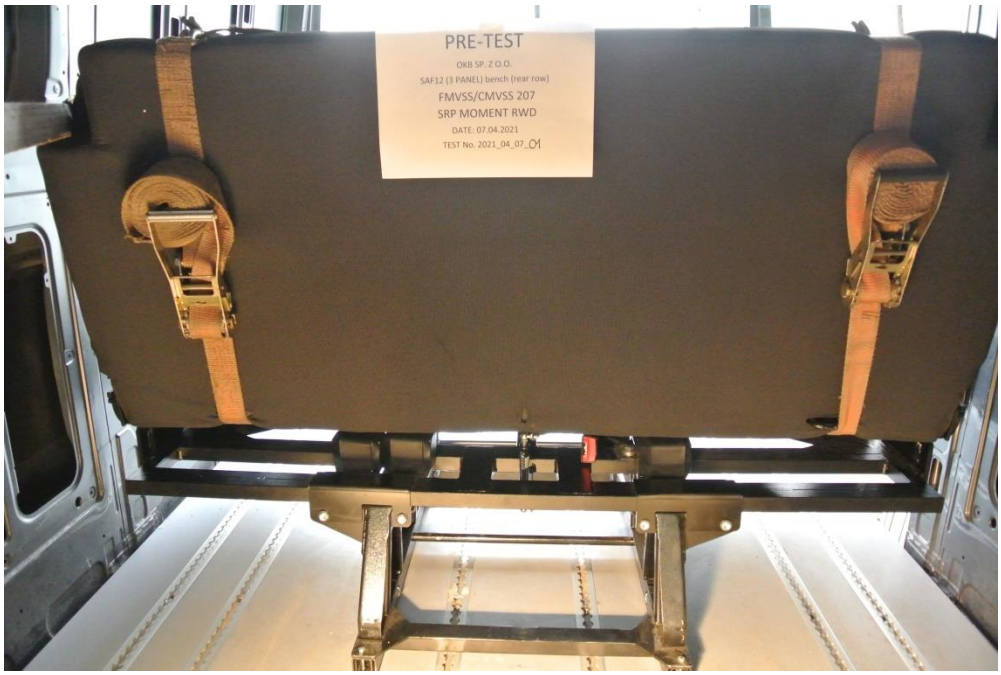

POST-TEST
OKB SP. Z O.O.
SAF12 (3 PANEL) bench (rear row)
FMVSS/CMVSS 207
SRP MOMENT RWD
DATE: 07.04.2021
TEST No. 2021_04_07_01

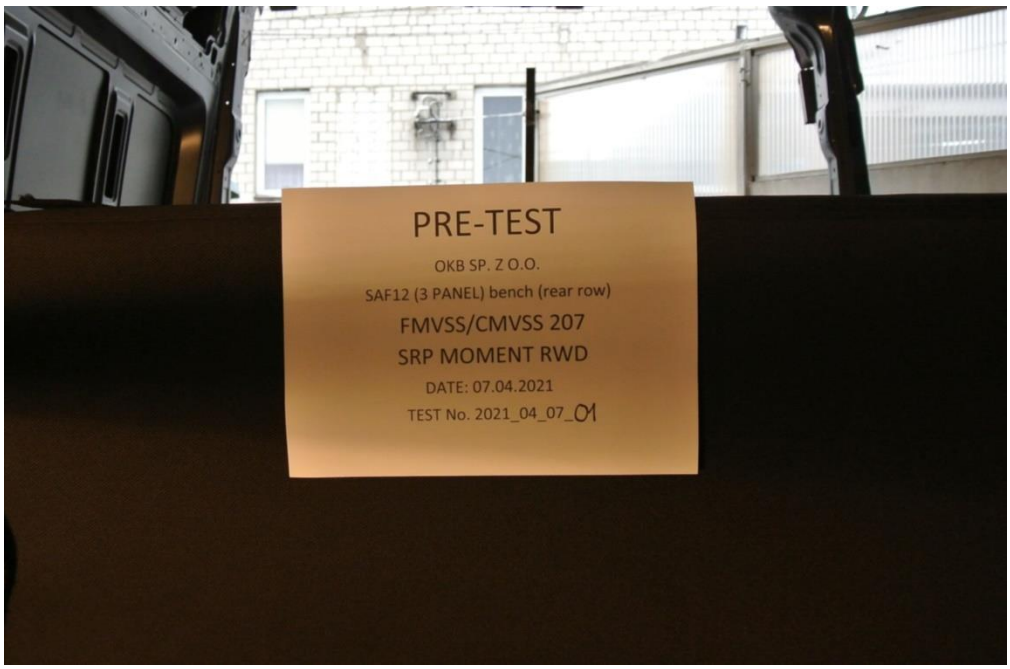
Before test:

After test:



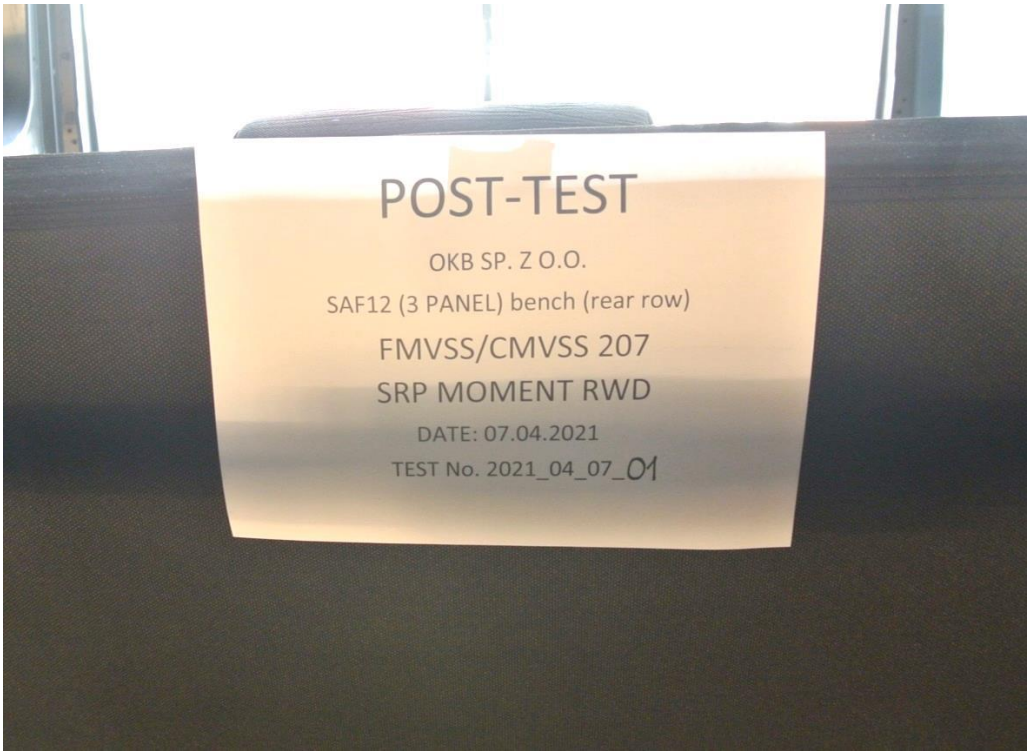
Before test:


PRE-TEST
OKB SP. Z O.O.
SAF12 (3 PANEL) bench (rear row)
FMVSS/CMVSS 207
SRP MOMENT RWD
DATE: 07.04.2021
TEST No. 2021_04_07_01

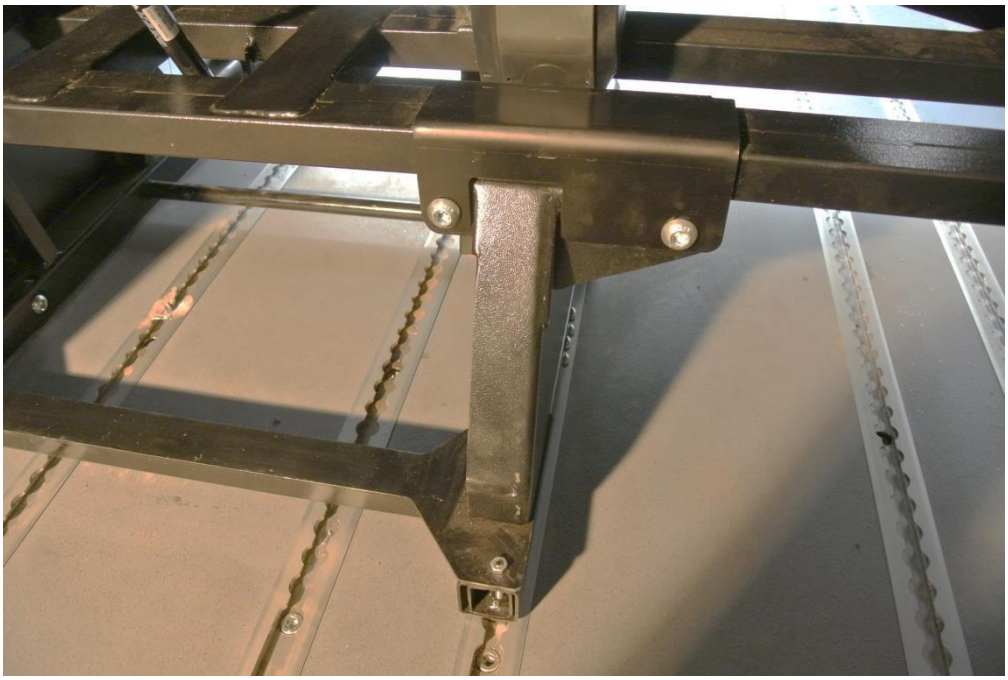

PRE-TEST
OKB SP. Z O.O.
SAF12 (3 PANEL) bench (rear row)
FMVSS/CMVSS 207
SRP MOMENT RWD
DATE: 07.04.2021
TEST No. 2021_04_07_01

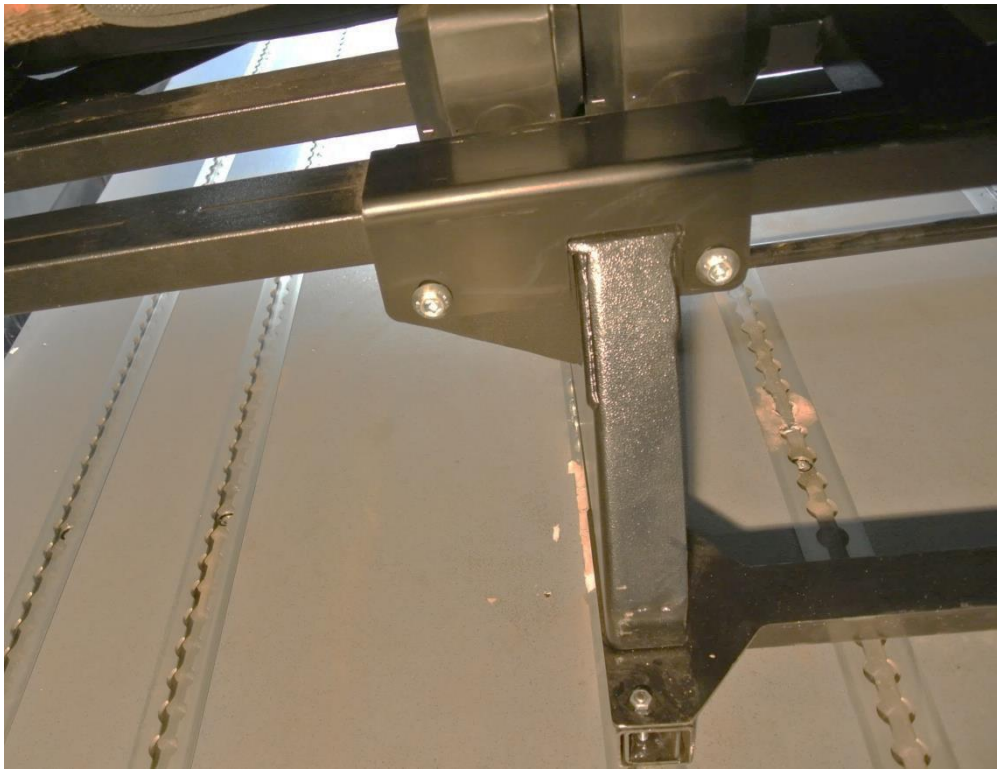
After test:


POST-TEST


POST-TEST
OKB SP. Z O.O.
SAF12 (3 PANEL) bench (rear row)
FMVSS/CMVSS 207
SRP MOMENT RWD
DATE: 07.04.2021
TEST No. 2021_04_07_01

Before test:





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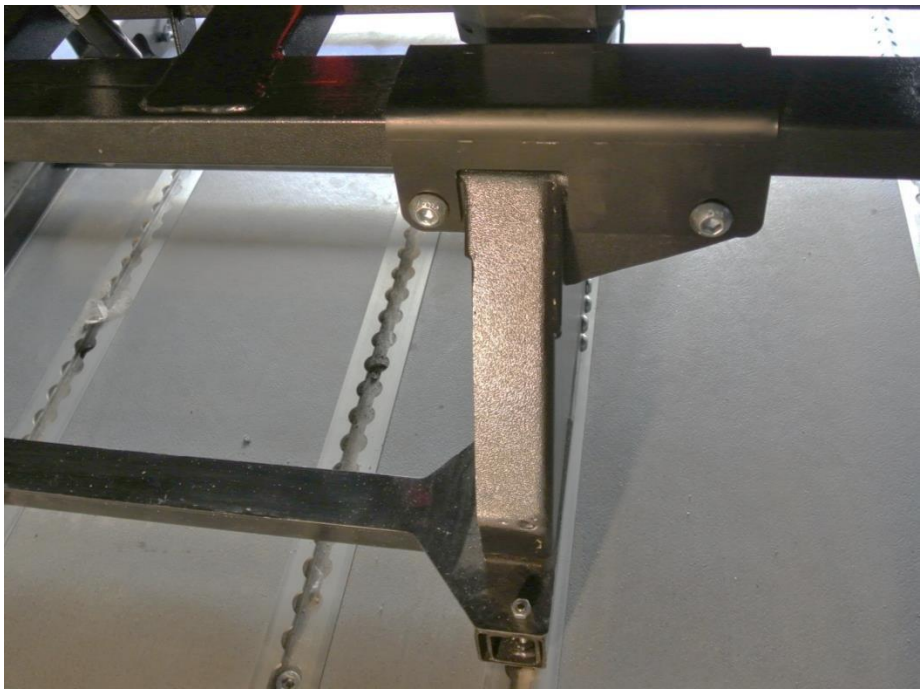

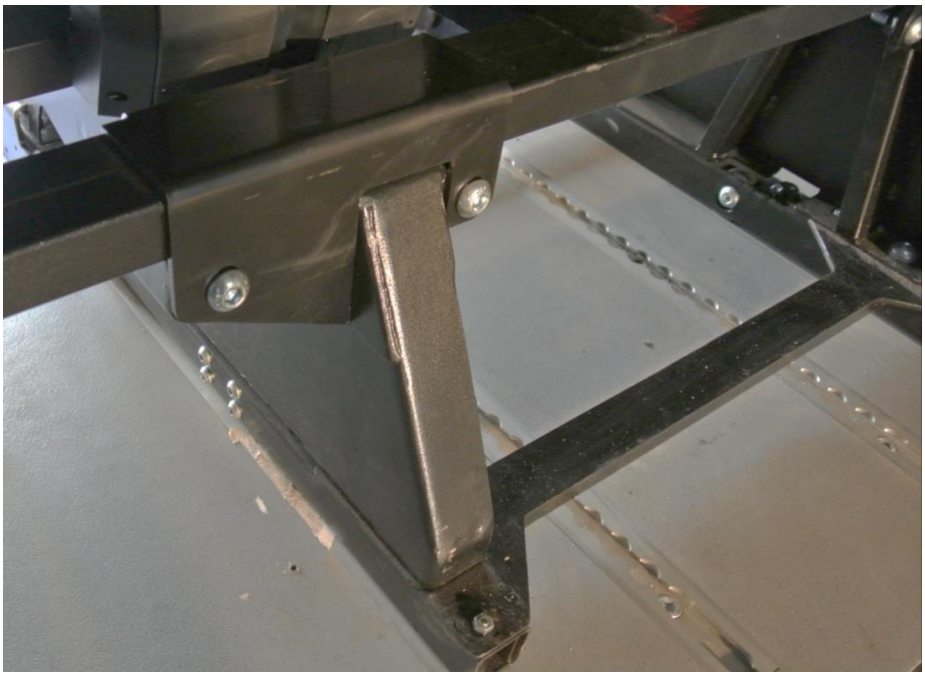

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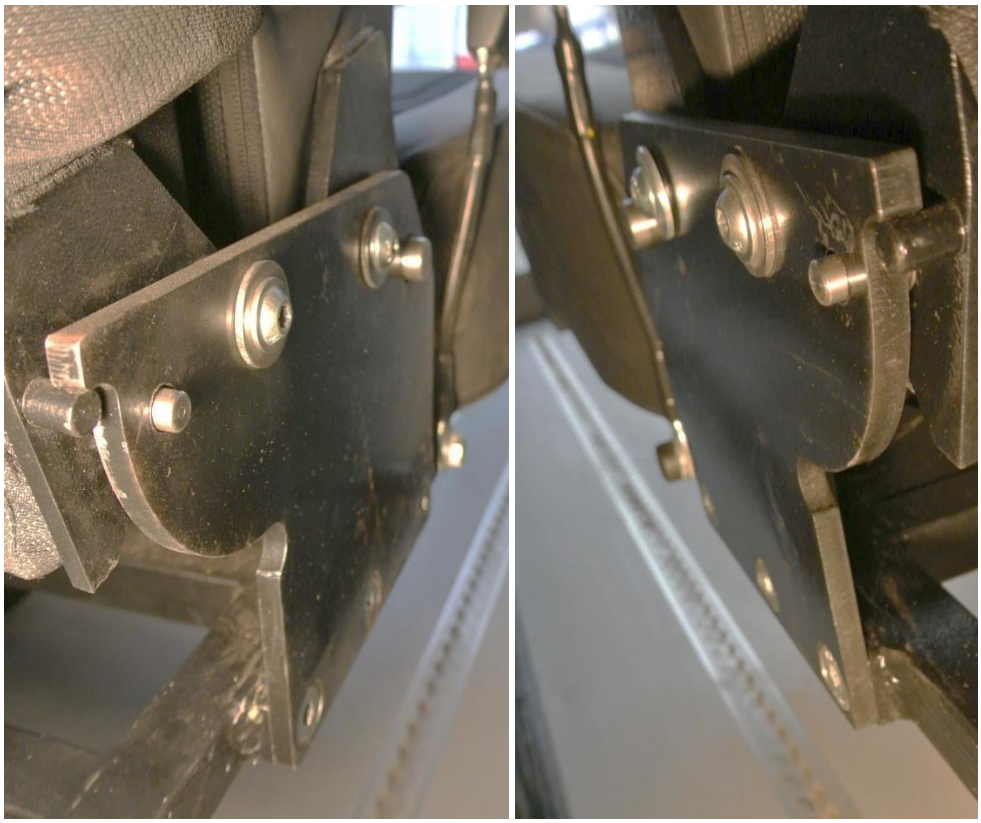

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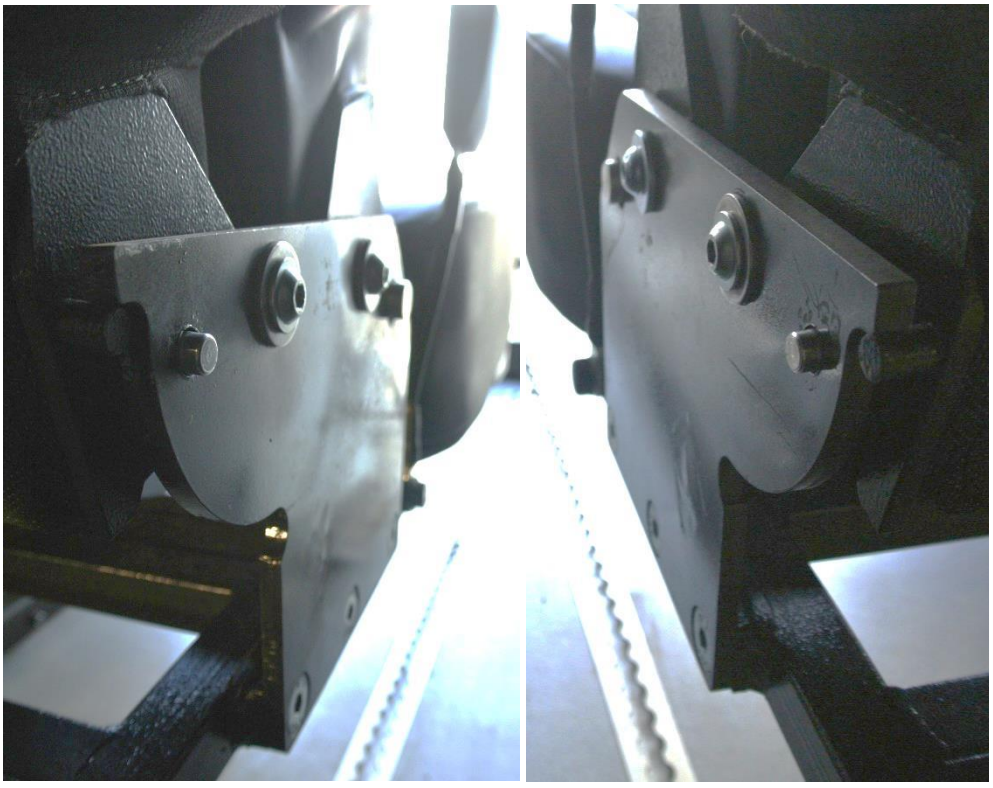
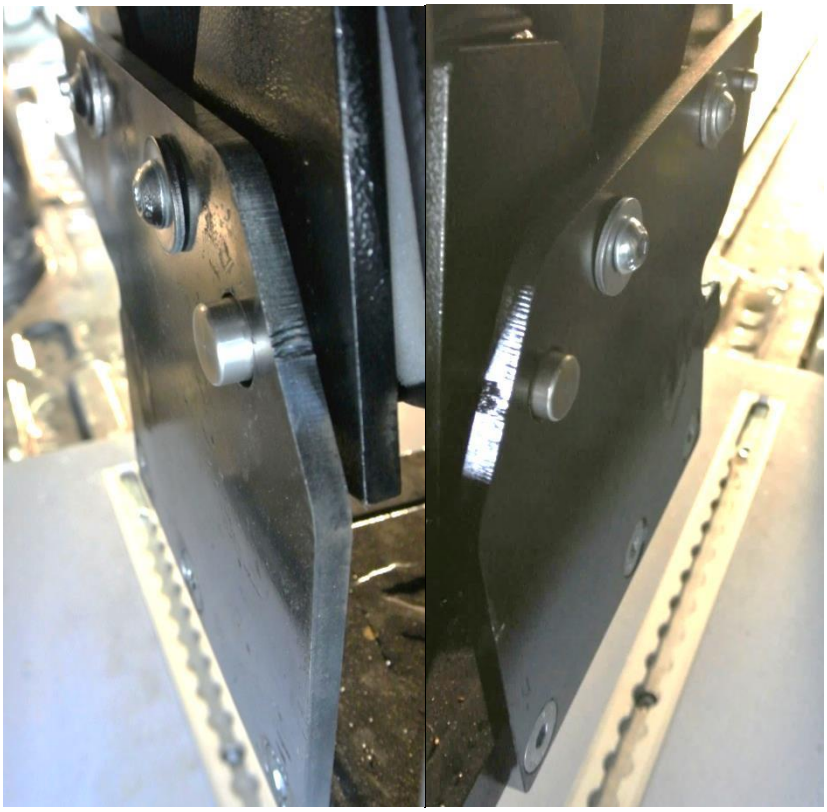
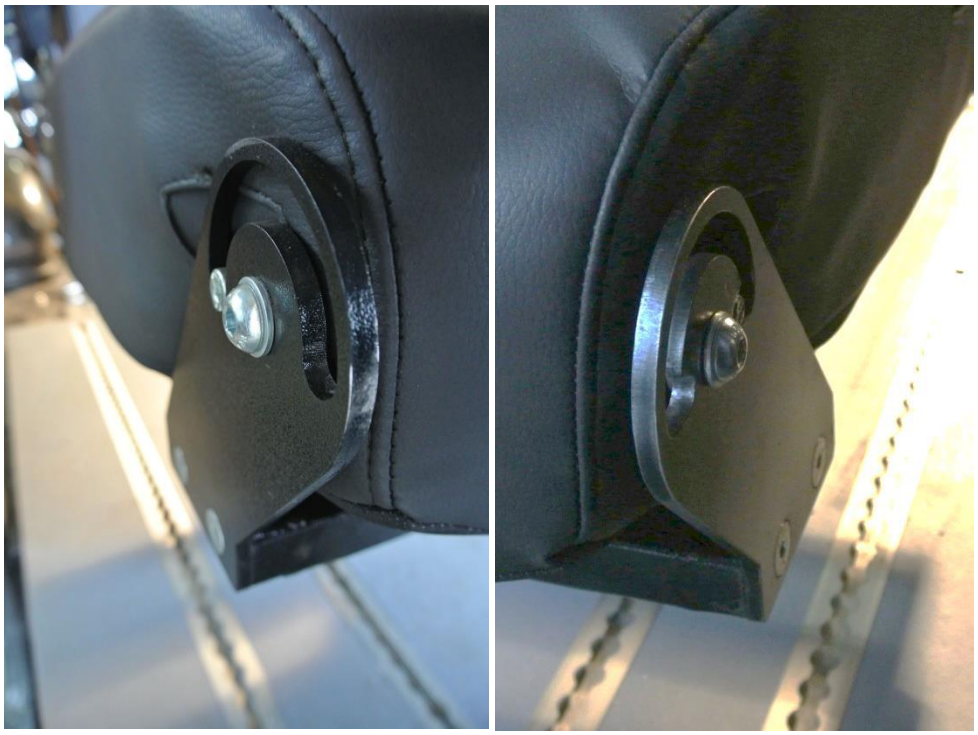


Before test:

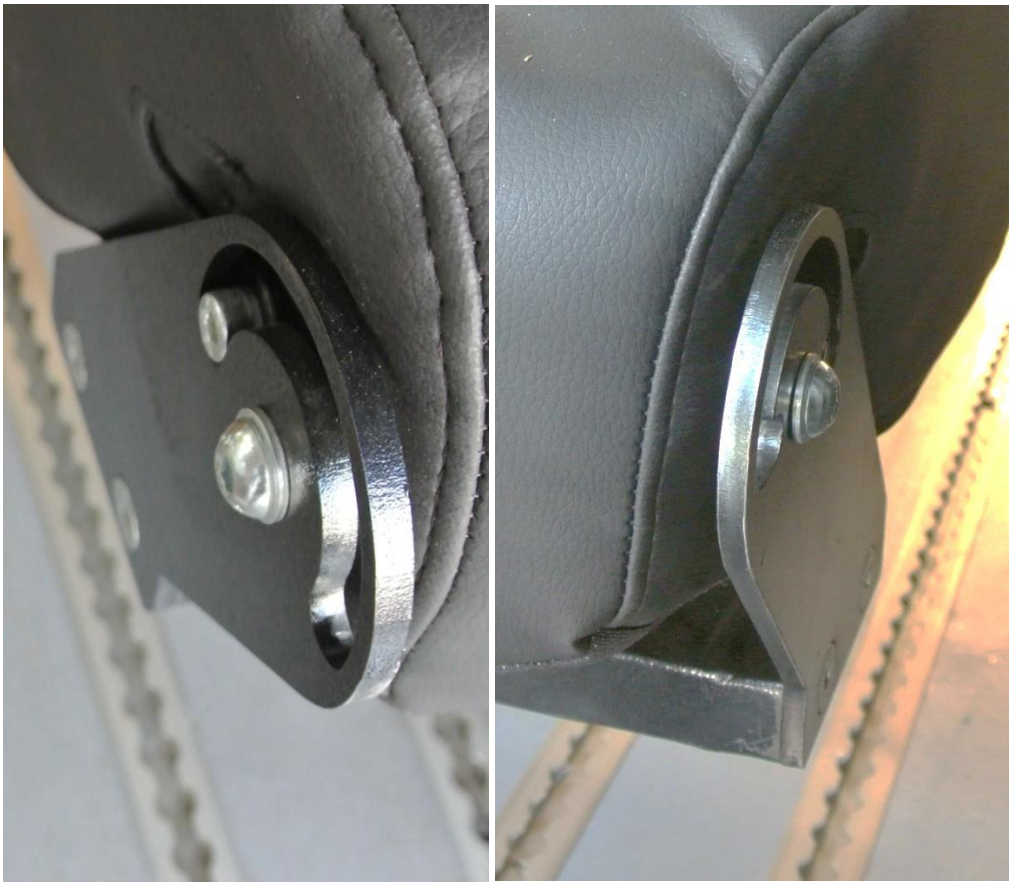
After test:



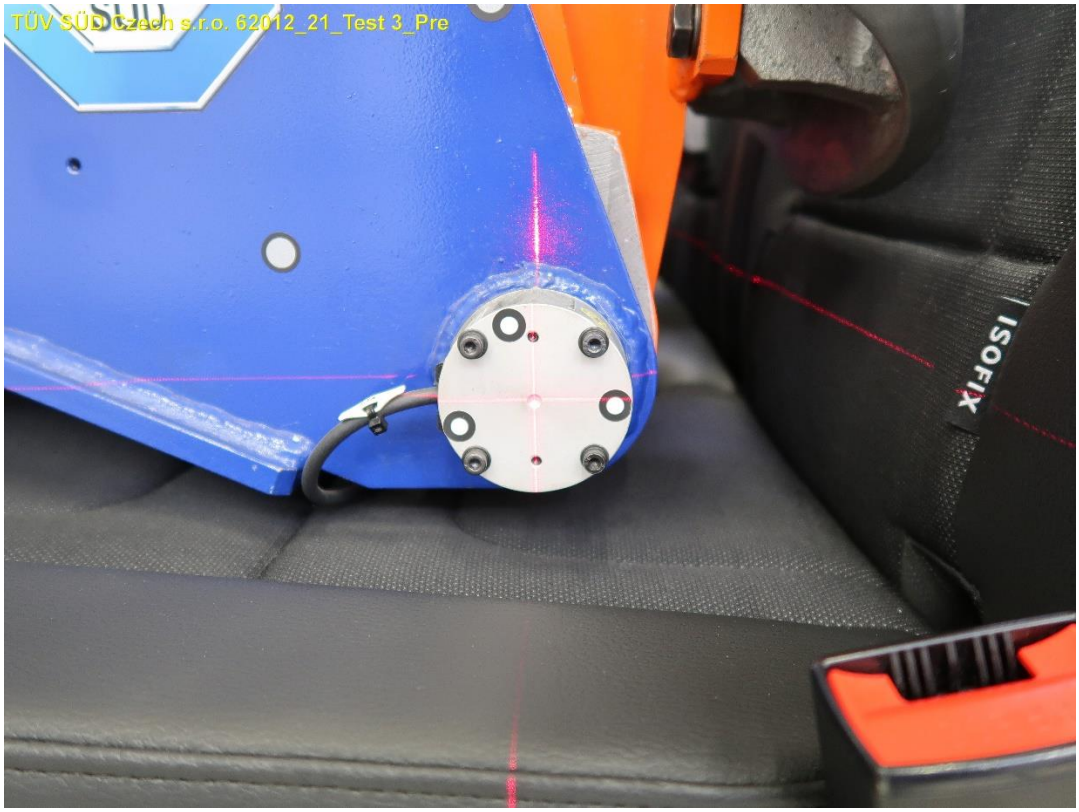
Before test:



After test:

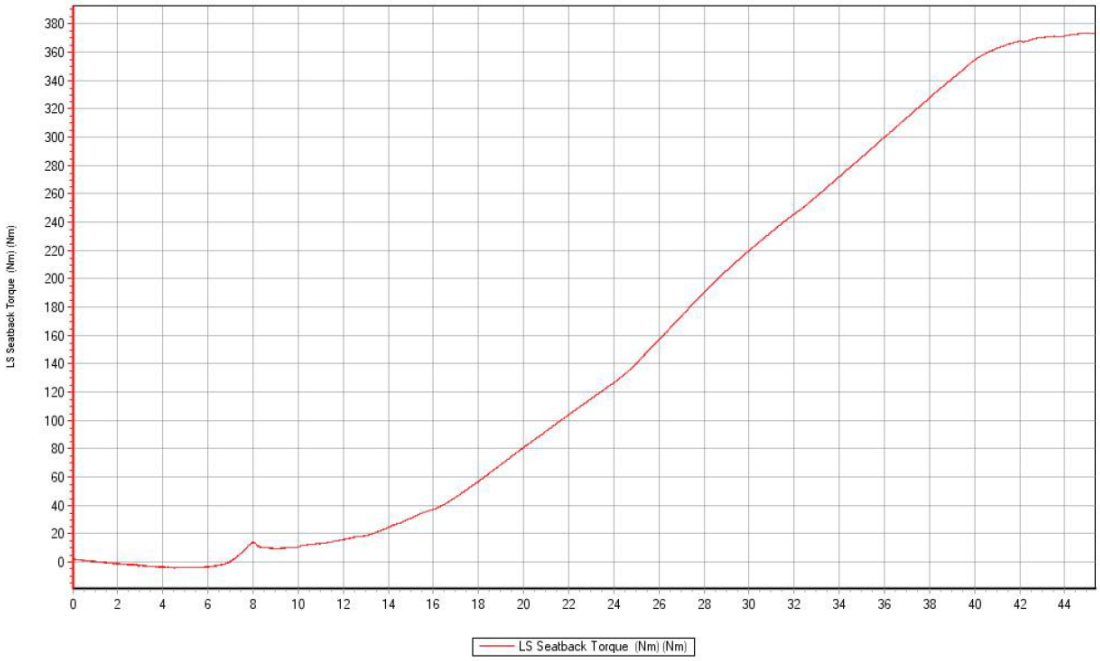


ADDITIONAL TEST (PROCEDURE ACCORDING TO ECE R17)

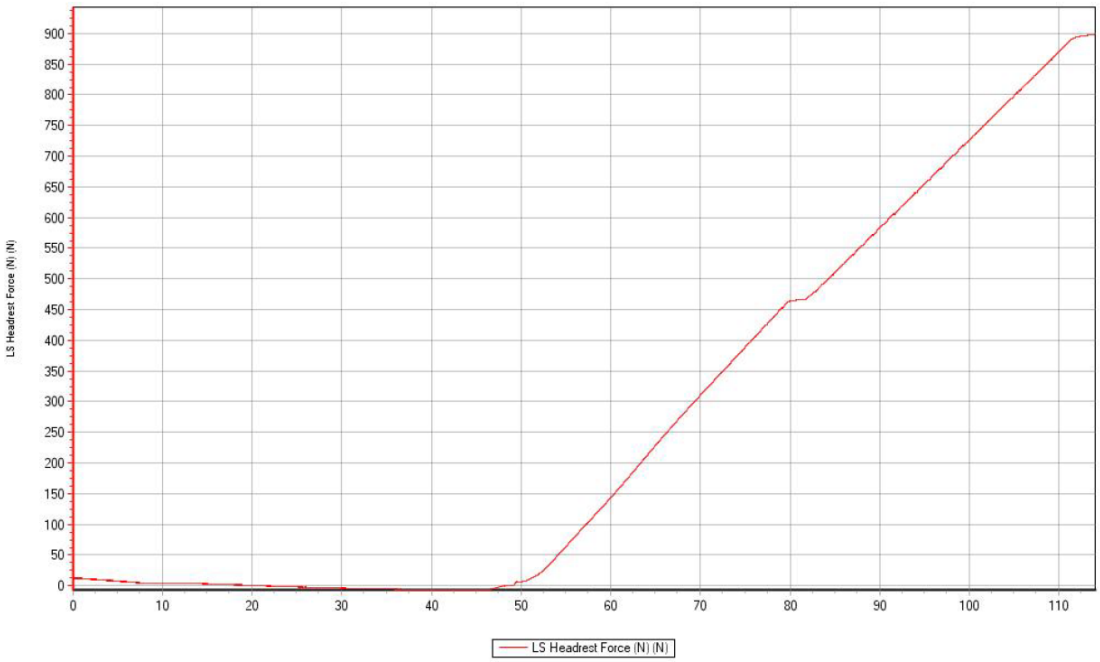


Left Seat

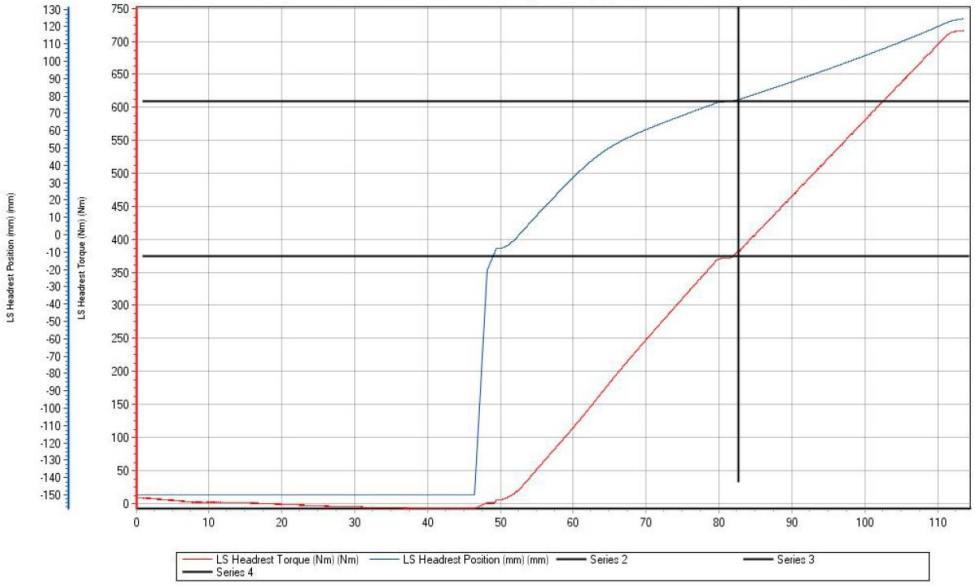
Torque around R point applied to the seat back



Force applied to the head restraint



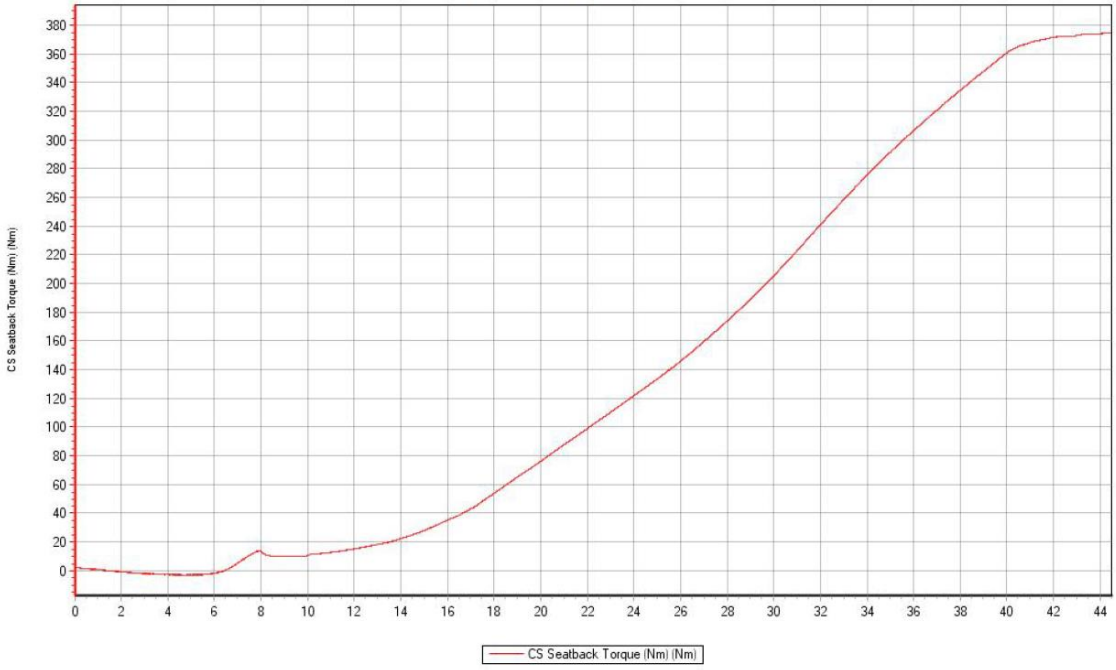
Rearward head displacement and torque applied to the head restraint



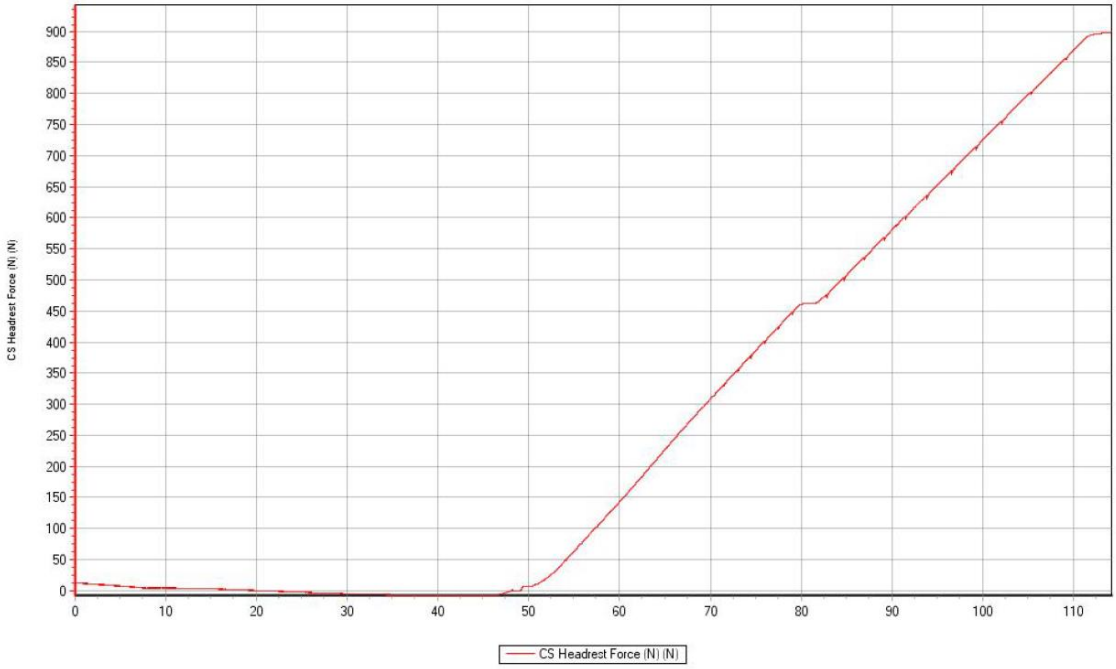
Maximum torque around R point applied to the seat back	374.3
Rearward head displacement when the head restraint is loaded with a torque of 373Nm around R point [mm]	77.2
Maximum loading force at head restraint [N]	898.6
Comments:	

Central Seat

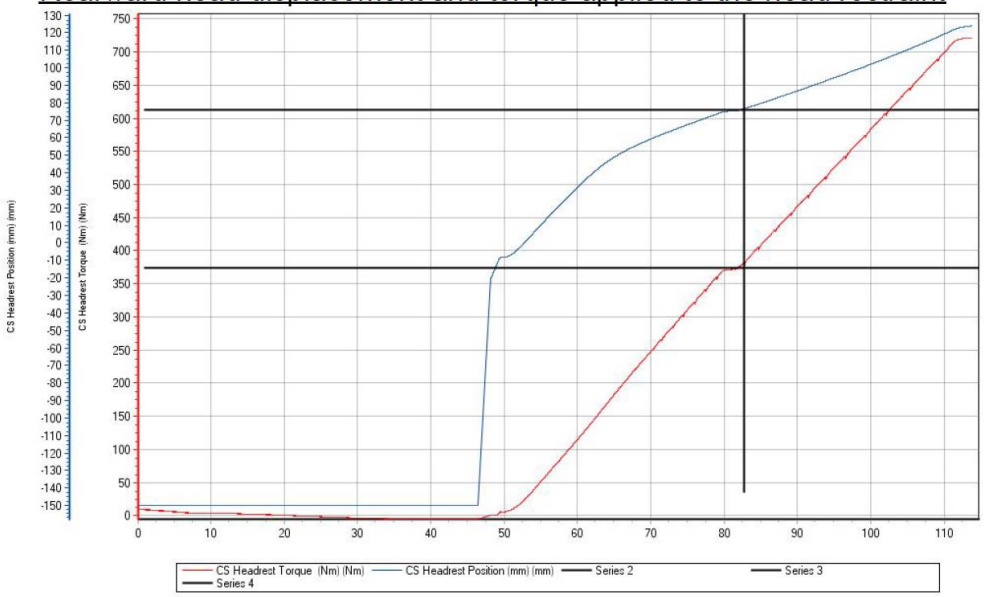
Torque around R point applied to the seat back



Force applied to the head restraint



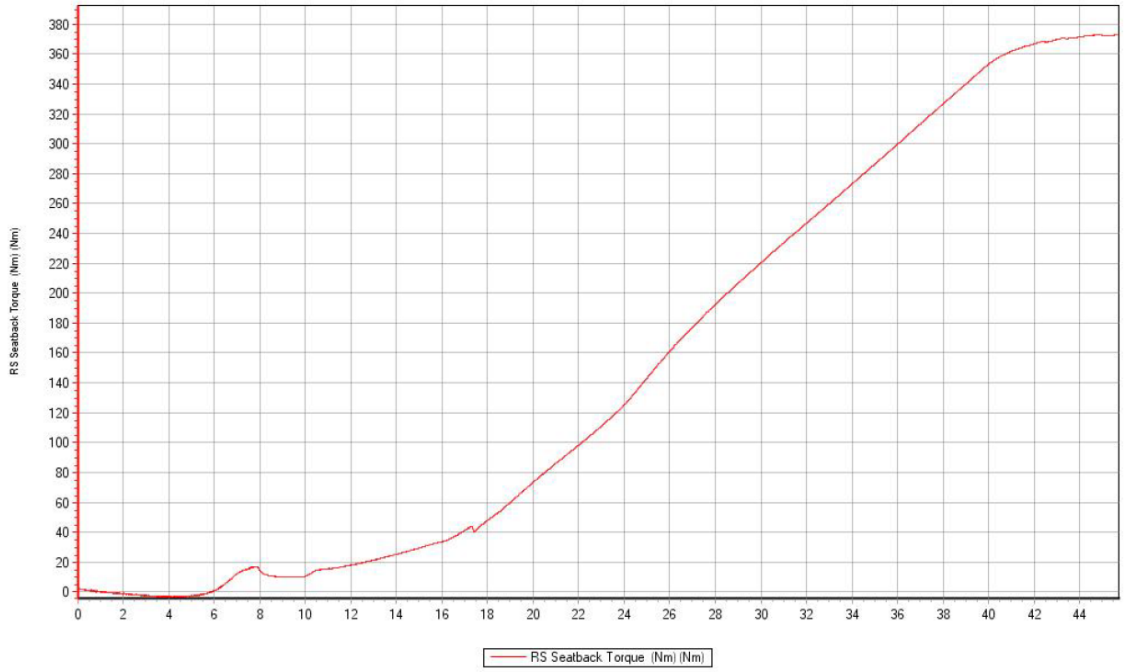
Rearward head displacement and torque applied to the head restraint



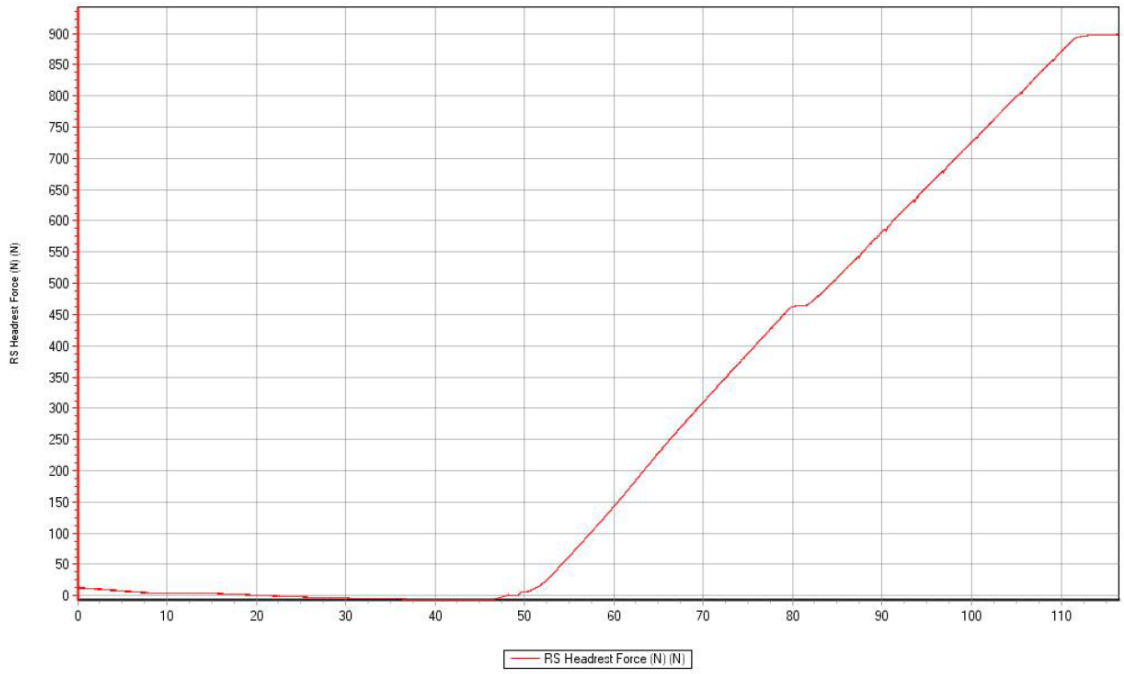
Maximum torque around R point applied to the seat back	375.7
Rearward head displacement when the head restraint is loaded with a torque of 373Nm around R point [mm]	75.7
Maximum loading force at head restraint [N]	898.4
Comments:	

Right Seat

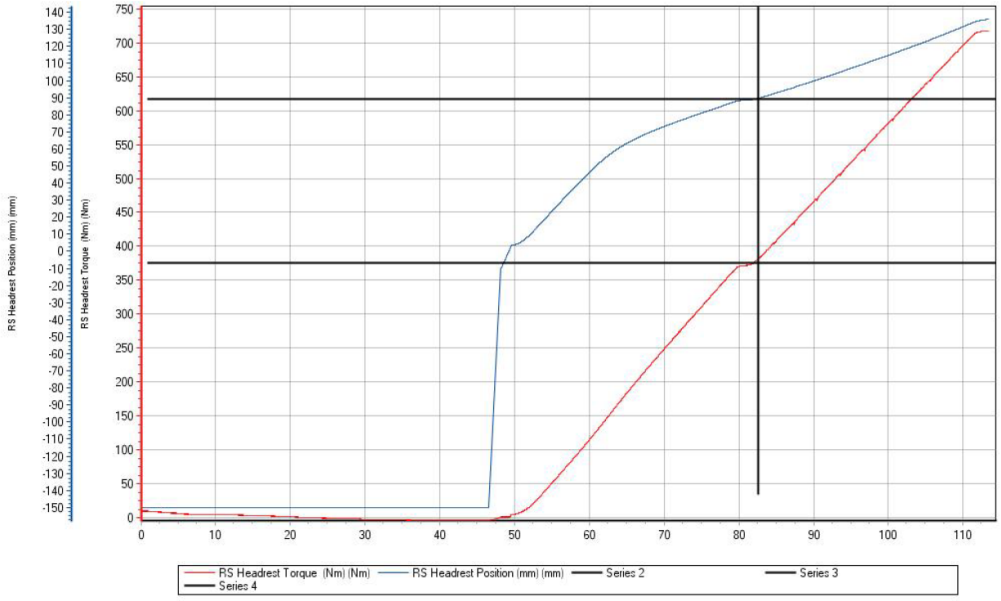
Torque around R point applied to the seat back



Force applied to the head restraint



Rearward head displacement and torque applied to the head restraint



Maximum torque around R point applied to the seat back	374.3
Rearward head displacement when the head restraint is loaded with a torque of 373Nm around R point [mm]	89
Maximum loading force at head restraint [N]	898.4
Comments:	

"STATIC" TEST OF RESTRAINING DEVICE

FOLDING BACK RESTRAINING DEVICE (REARWARD) – LAST PANEL

TEST INFORMATION

Test Date:	07.04.2021
Requirement:	FMVSS 207 4.3.2.1.
Test Article Seating Position:	2nd and/or next rows
Mass of hinged seat back:	16,4 kg / 36,16 lb
Required load:	328 daN / 723,2 lbs

TEST SETUP:

The seat was installed in the 2nd row seating position in the vehicle. The vehicle was secured to test stand. A chain was attached to the seat at the CG height. CG vertical height was determined using a "Knife's Edge" method.

A load cell was placed inline with the hydraulic cylinder and the load attachment point to the seat. A preload of the test load force was placed on the cylinder, and a check was made to make sure all anchor points were secure and the load angle was within tolerance

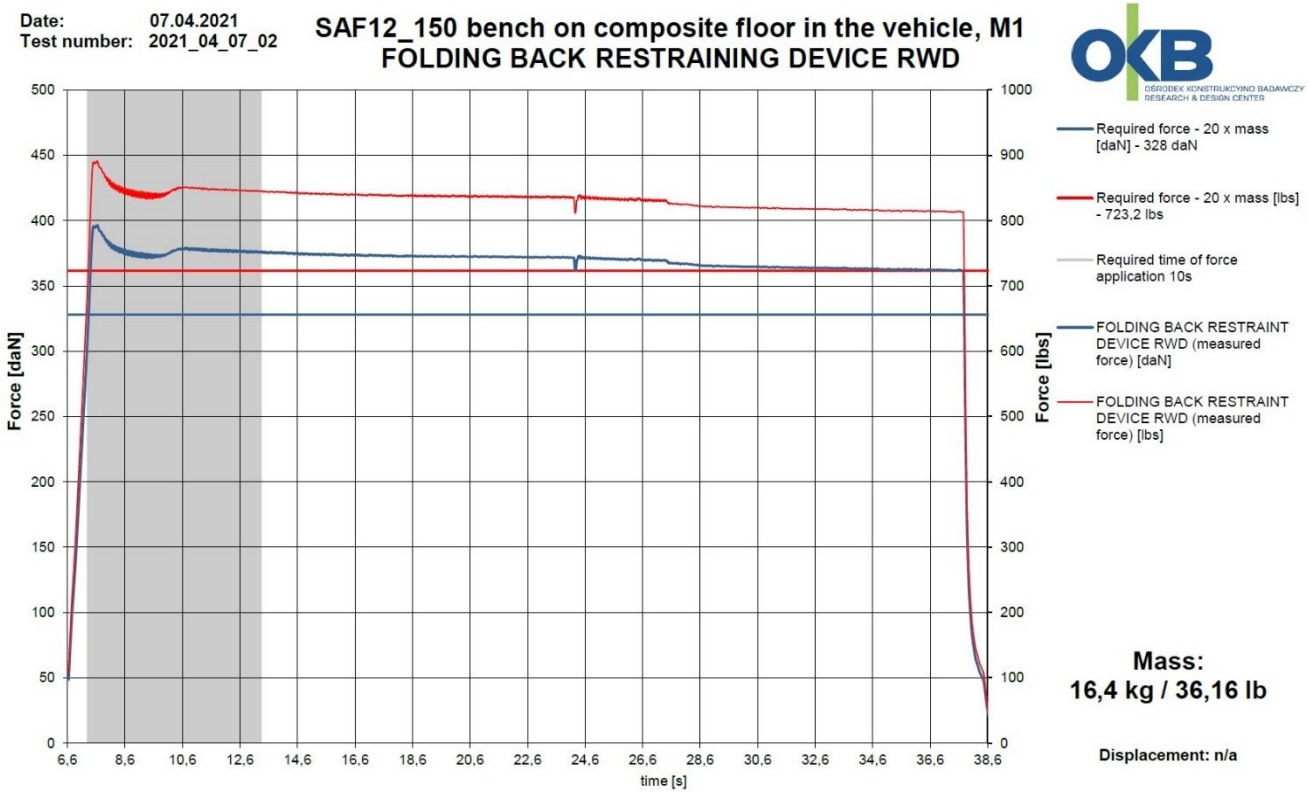
This test was to be performed to slightly above the Minimum Target Loads. The Minimum Target Loads were to be held for minimum 10 seconds.

TEST RESULTS:
The test article was able to achieve and maintain the minimum required loads. All the seat anchorages were intact after the test was complete.

APPLIED LOAD DATA

Controller Channel:	7	
Load Cell S/N:	380511A	
Cylinder Angle (0±3°)	1,1°	
TEST PROFILE	Time [sec]	Load [daN/lbs]
	6,6	~ 50 daN / ~112 lbs
	7,3	~385 daN /~866 lbs
	37,7	~360 daN /~809 lbs
	38,6	~25 daN /~56 lbs
Actual Max Load [daN/lb]	~360 daN /~809 lbs	
Minimum Target Load [daN/lb]	328 daN / 723,2 lbs	
% of Minimum Target Load Achieved	~109,8%	
Time Above Minimum Target Load [sec]	30,4	
Anchorage Failures	None	
Adjustment Mechanism Movement	None	
Notes	None	

APPLIED LOAD GRAPH



PHOTOGRAPHS

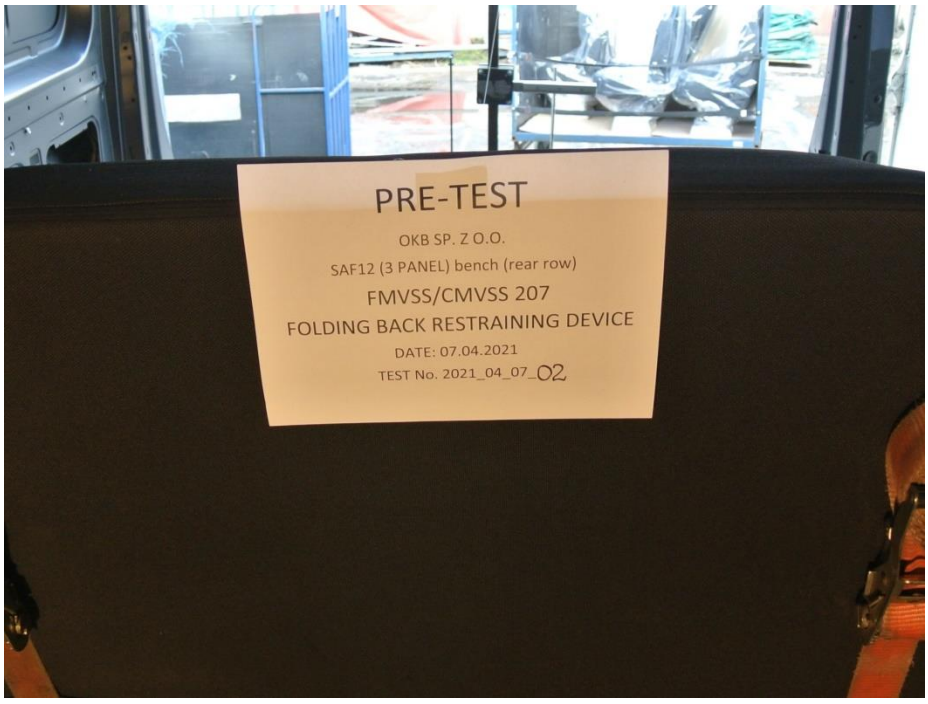
Before test:

After test:


POST-TEST
OKB SP. Z O.O.
SAF12 (3 PANEL) bench (rear row)
FMVSS/CMVSS 207
FOLDING BACK RESTRAINING DEVICE
DATE: 07.04.2021
TEST No. 2021_04_07_02

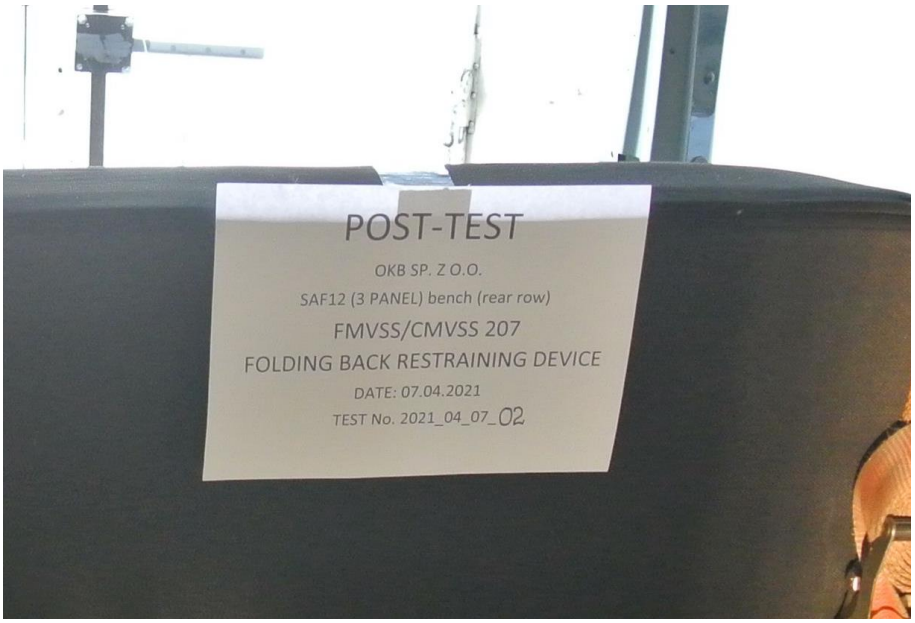
Before test:


PRE-TEST
FMVSS/CMVSS 207
FOLDING BACK RESTRAINING DEVICE

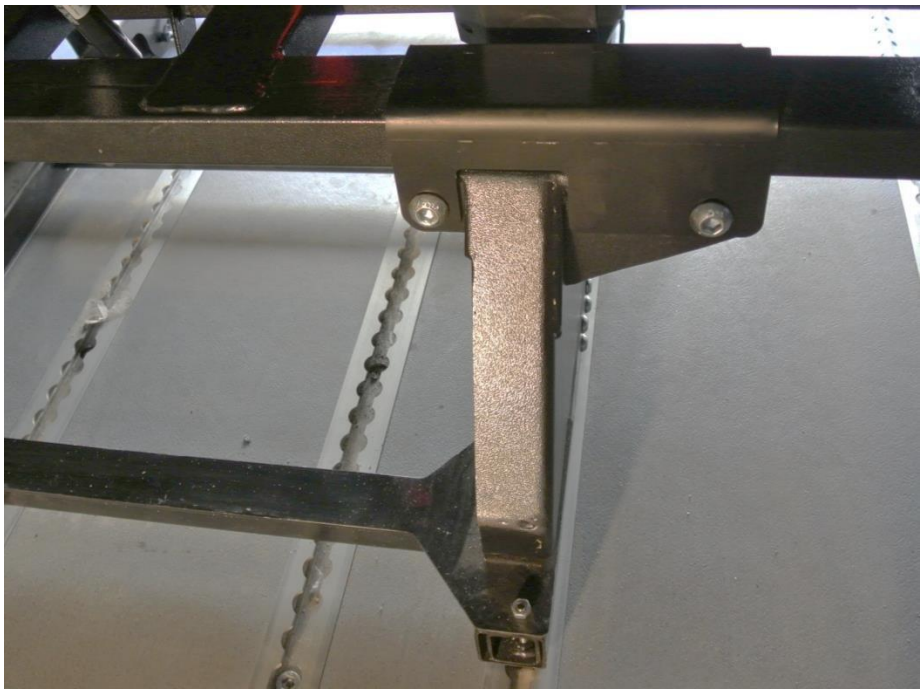

PRE-TEST
OKB SP. Z O.O.
SAF12 (3 PANEL) bench (rear row)
FMVSS/CMVSS 207
FOLDING BACK RESTRAINING DEVICE
DATE: 07.04.2021
TEST No. 2021_04_07_02

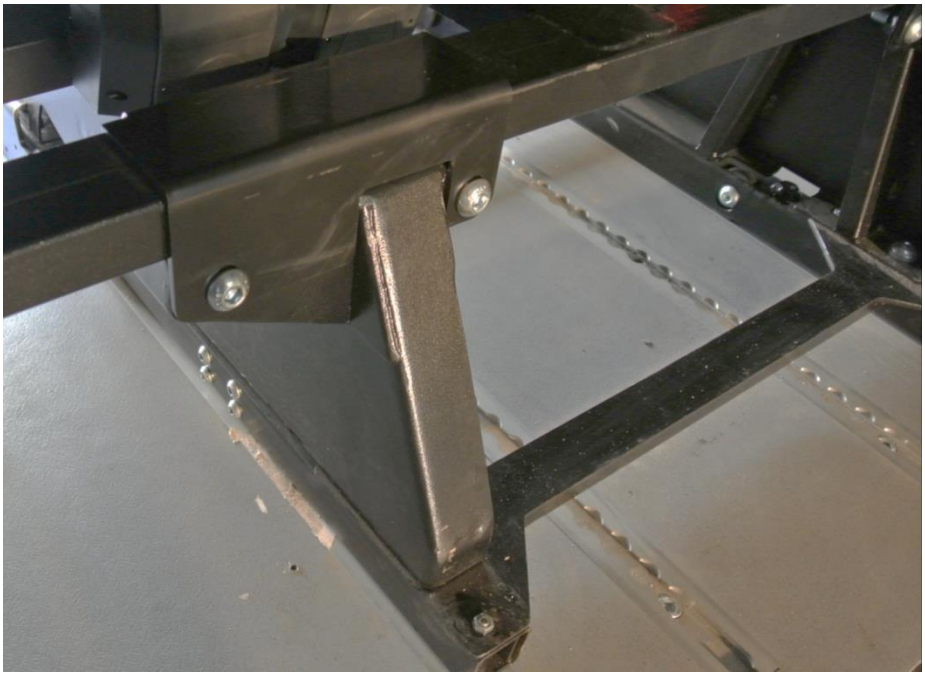
After test:


POST-TEST
FMVSS/CMVSS 207
FOLDING BACK RESTRAINING DEVICE

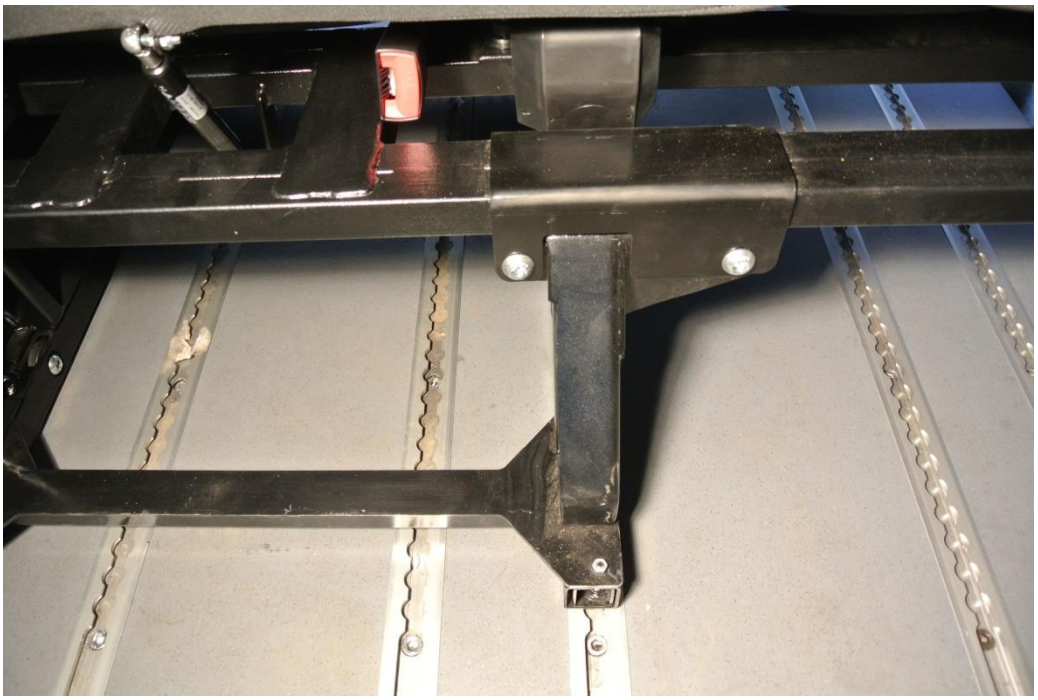

POST-TEST
OKB SP. Z O.O.
SAF12 (3 PANEL) bench (rear row)
FMVSS/CMVSS 207
FOLDING BACK RESTRAINING DEVICE
DATE: 07.04.2021
TEST No. 2021_04_07_02

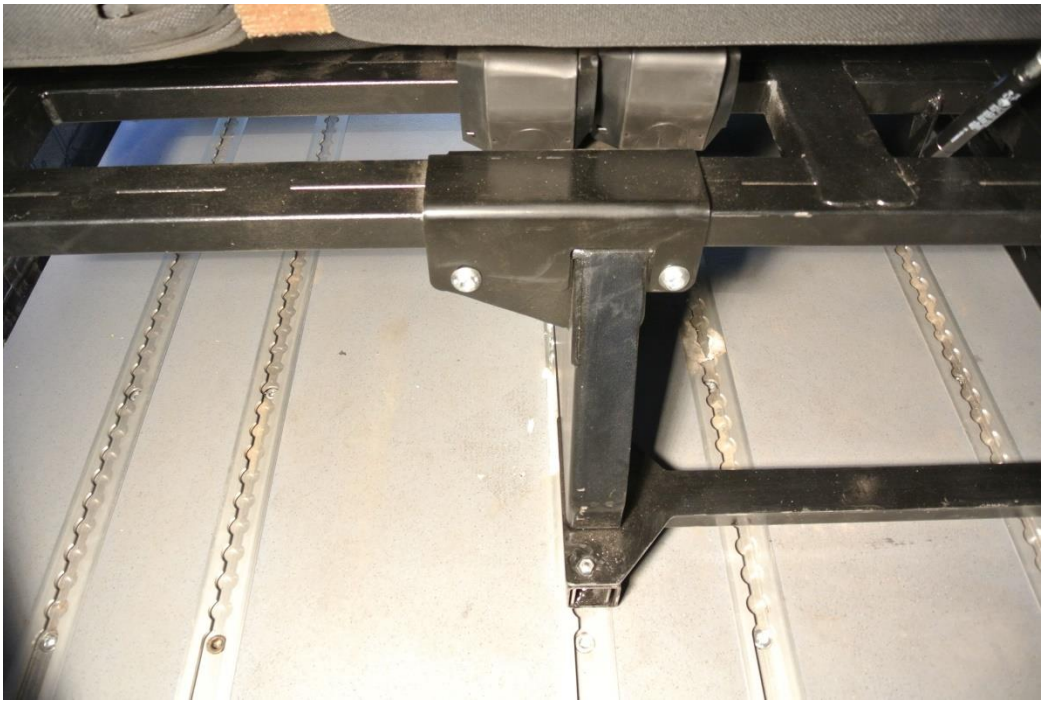
Before test:



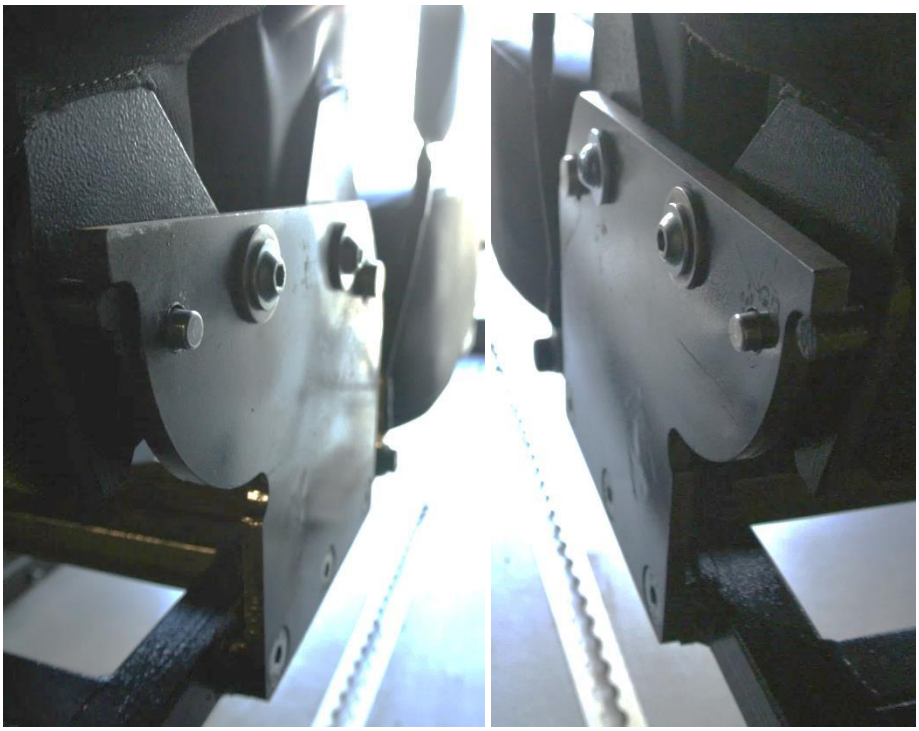


After test:





Before test:



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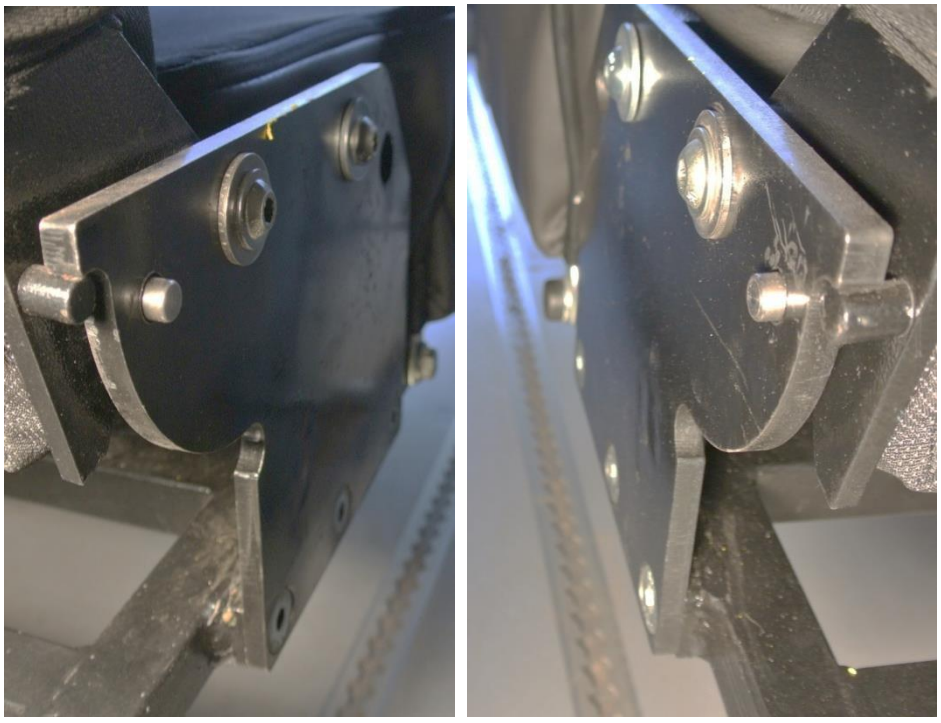


“STATIC” TEST OF RESTRAINING DEVICE

FOLDING BACK RESTRAINING DEVICE (FORWARD) – MIDDLE PANEL

TEST INFORMATION

Test Date:	08.04.2021
Requirement:	FMVSS 207 4.3.2.1.
Test Article Seating Position:	2nd and/or next rows
Mass of hinged seat back:	30,0 kg / 66,14 lb
Required load:	600 daN / 1348,85 lbs

TEST SETUP:

The seat was installed in the 2nd row seating position in the vehicle. The vehicle was secured to test stand. A chain was attached to the seat at the CG height. CG vertical height was determined using a “Knife’s Edge” method.

A load cell was placed inline with the hydraulic cylinder and the load attachment point to the seat. A preload of the test load force was placed on the cylinder, and a check was made to make sure all anchor points were secure and the load angle was within tolerance

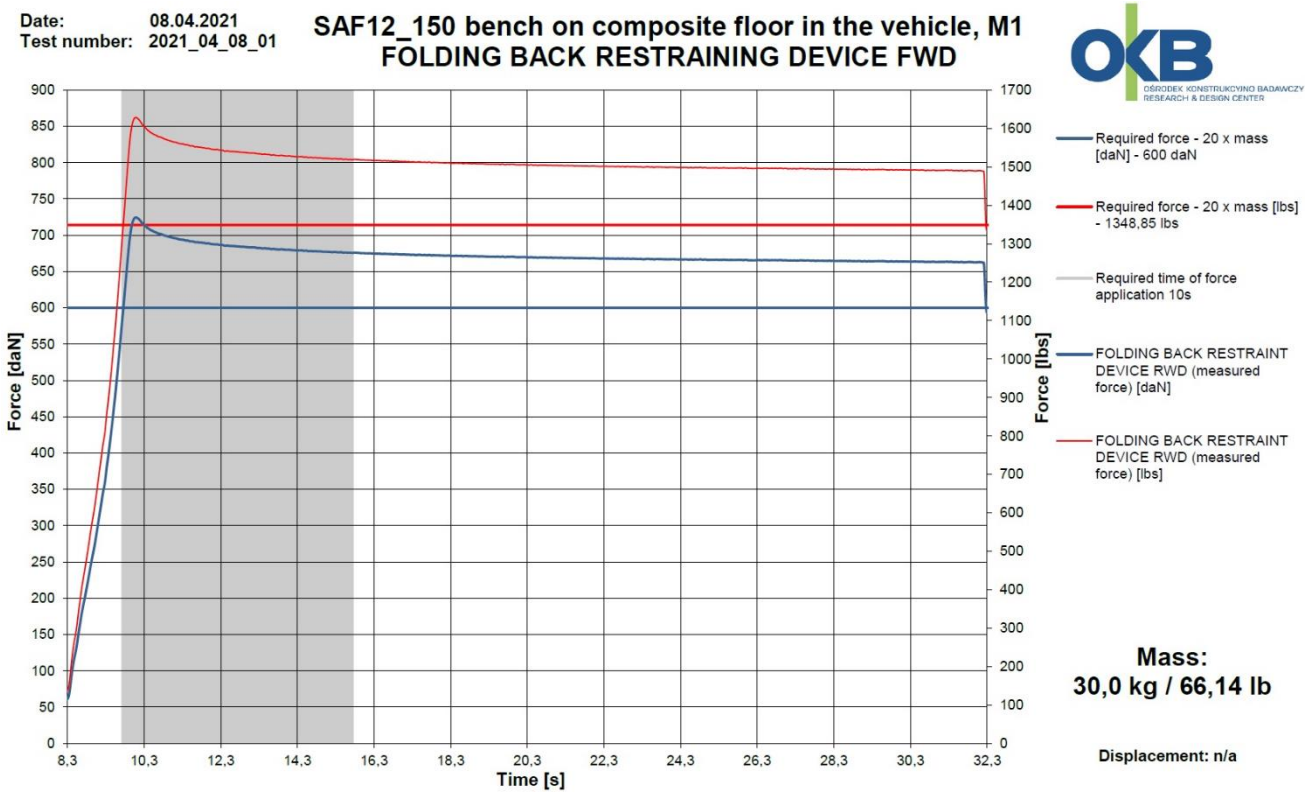
This test was to be performed to slightly above the Minimum Target Loads. The Minimum Target Loads were to be held for minimum 10 seconds.

TEST RESULTS:
The test article was able to achieve and maintain the minimum required loads. All the seat anchorages were intact after the test was complete.

APPLIED LOAD DATA

Controller Channel:	7	
Load Cell S/N:	380511A	
Cylinder Angle (0±3°)	0,8°	
TEST PROFILE	Time [sec]	Load [daN/lbs]
	8,3	~ 62 daN / ~139 lbs
	10,1	~385 daN /~866 lbs
	32,2	~657 daN /~1477 lbs
	32,3	~540 daN /~1214 lbs
Actual Max Load [daN/lb]	~660 daN /~1484 lbs	
Minimum Target Load [daN/lb]	600 daN / 1348,85 lbs	
% of Minimum Target Load Achieved	~109,5%	
Time Above Minimum Target Load [sec]	22,4	
Anchorage Failures	None	
Adjustment Mechanism Movement	None	
Notes	None	

APPLIED LOAD GRAPH



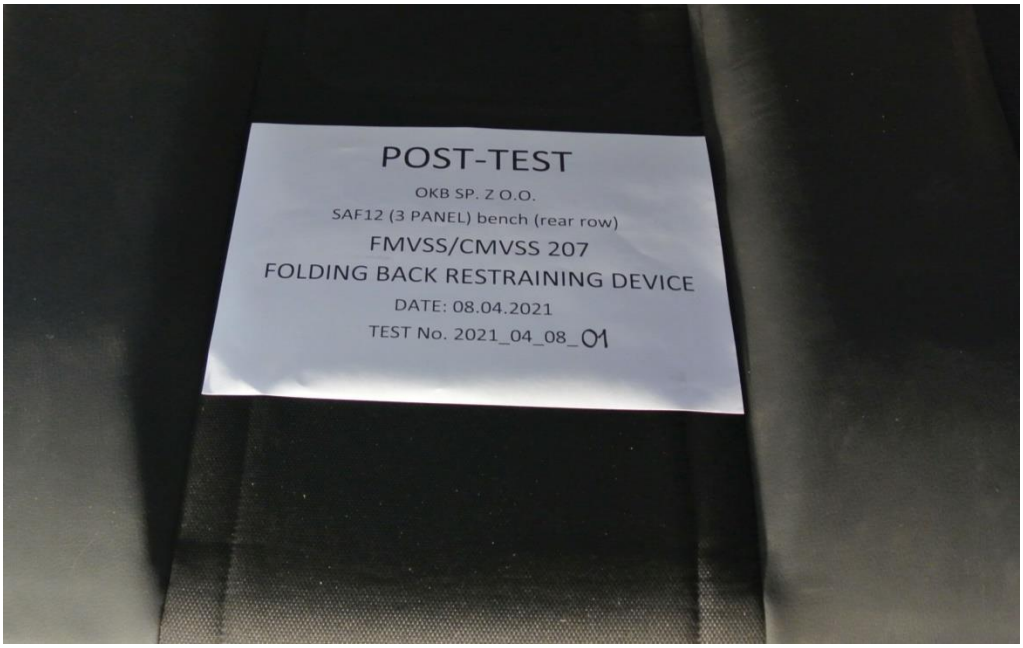
Before test:


PRE-TEST
FMVSS/CMVSS 207
FOLDING BACK RESTRAINING DEVICE


PRE-TEST
OKB SP. Z O.O.
SAF12 (3 PANEL) bench (rear row)
FMVSS/CMVSS 207
FOLDING BACK RESTRAINING DEVICE
DATE: 08.04.2021
TEST No. 2021_04_08_01

After test:


POST-TEST


POST-TEST
OKB SP. Z O.O.
SAF12 (3 PANEL) bench (rear row)
FMVSS/CMVSS 207
FOLDING BACK RESTRAINING DEVICE
DATE: 08.04.2021
TEST No. 2021_04_08_01

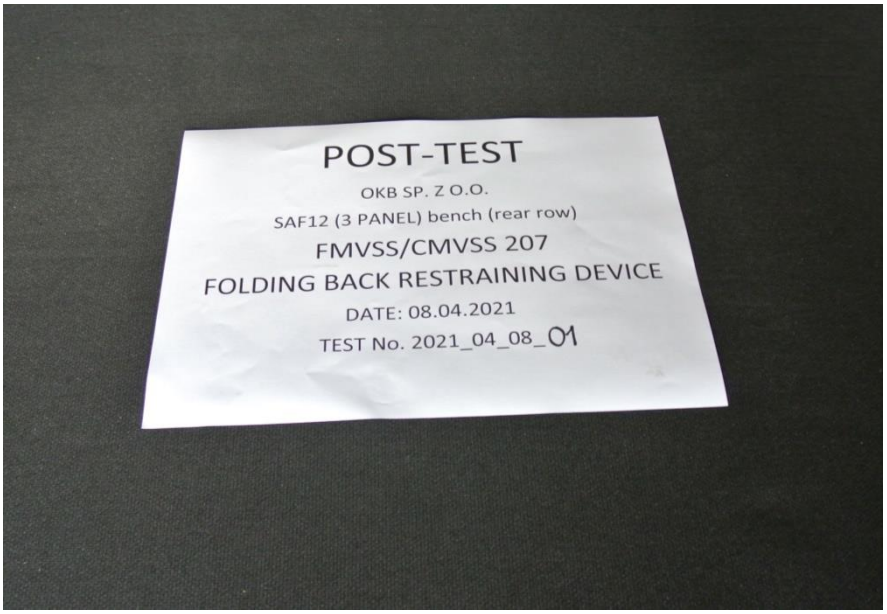
Before test:


PRE-TEST
FMVSS/CMVSS 207
FOLDING BACK RESTRAINING DEVICE

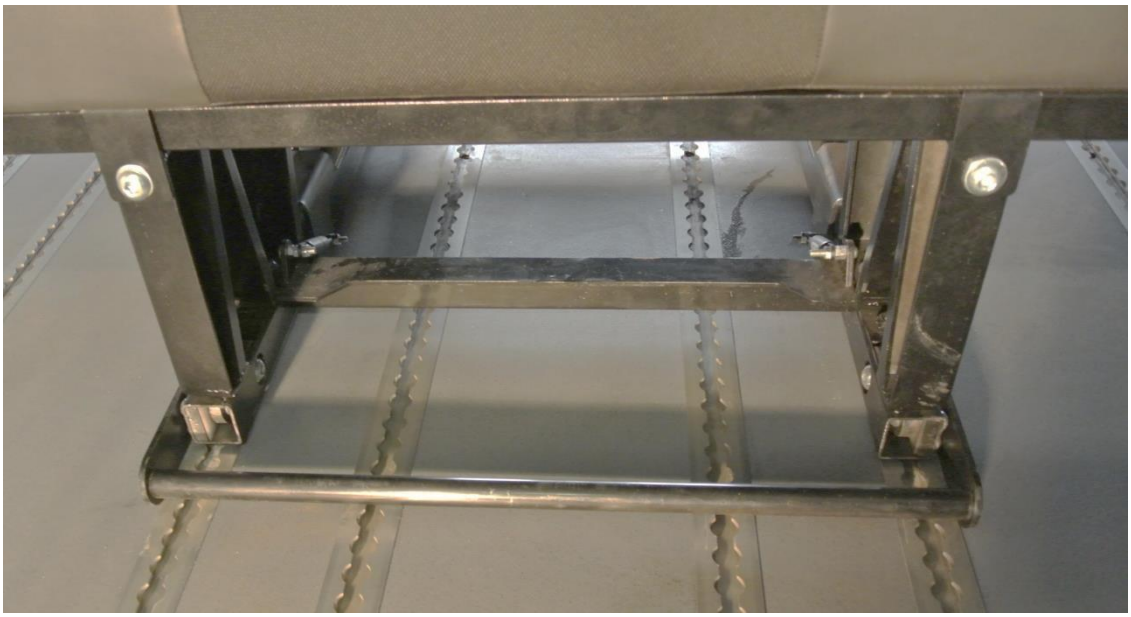

PRE-TEST
OKB SP. Z O.O.
SAF12 (3 PANEL) bench (rear row)
FMVSS/CMVSS 207
FOLDING BACK RESTRAINING DEVICE
DATE: 08.04.2021
TEST No. 2021_04_08_01

After test:


POST-TEST
FMVSS/CMVSS 207
FOLDING BACK RESTRAINING DEVICE


POST-TEST
OKB SP. Z O.O.
SAF12 (3 PANEL) bench (rear row)
FMVSS/CMVSS 207
FOLDING BACK RESTRAINING DEVICE
DATE: 08.04.2021
TEST No. 2021_04_08_01

Before test:



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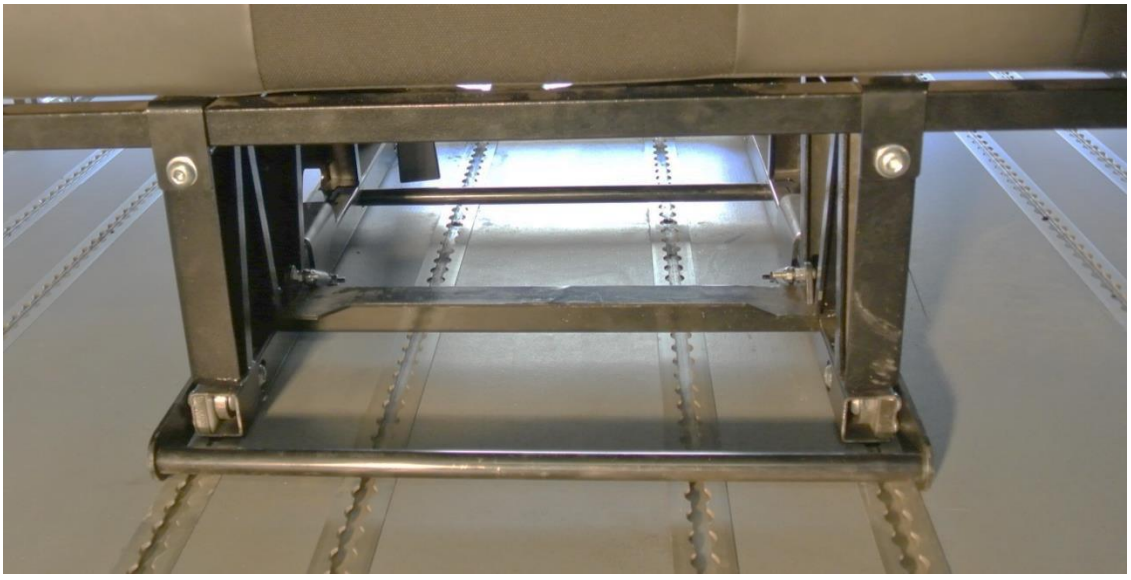

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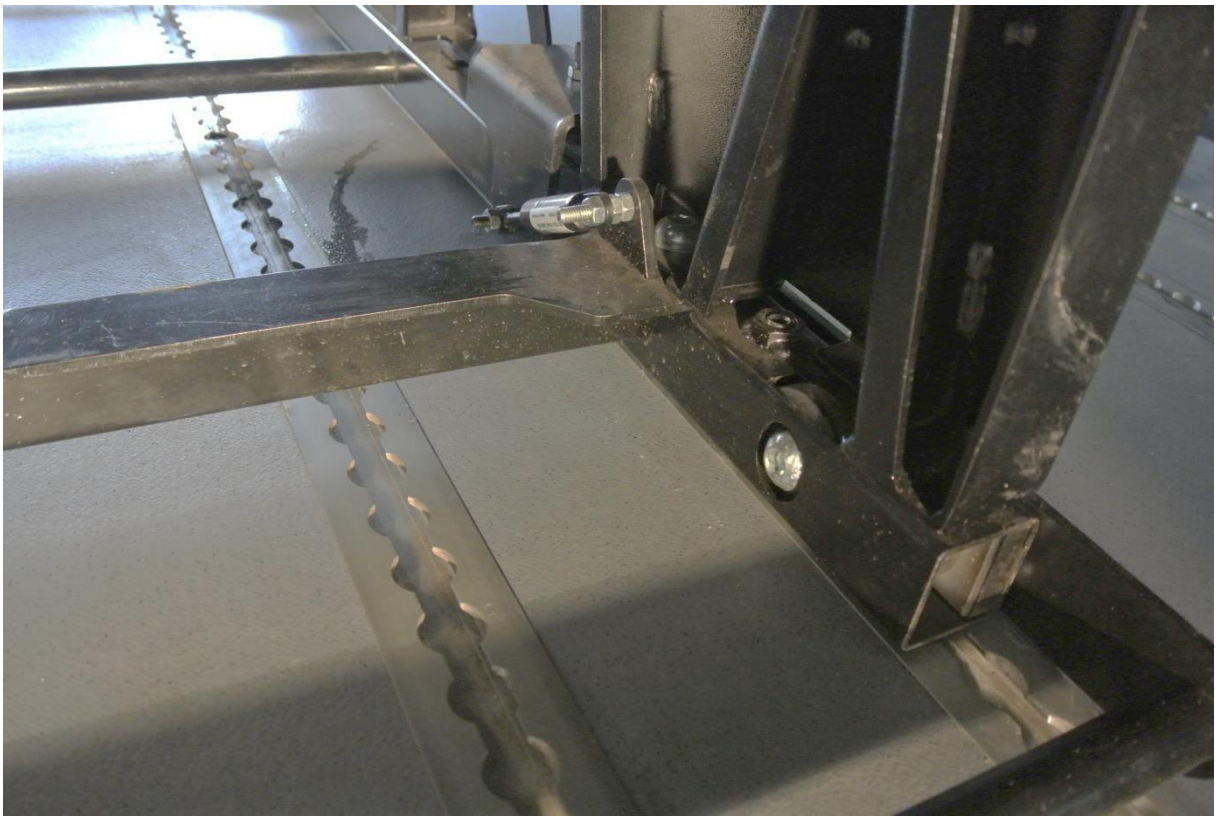
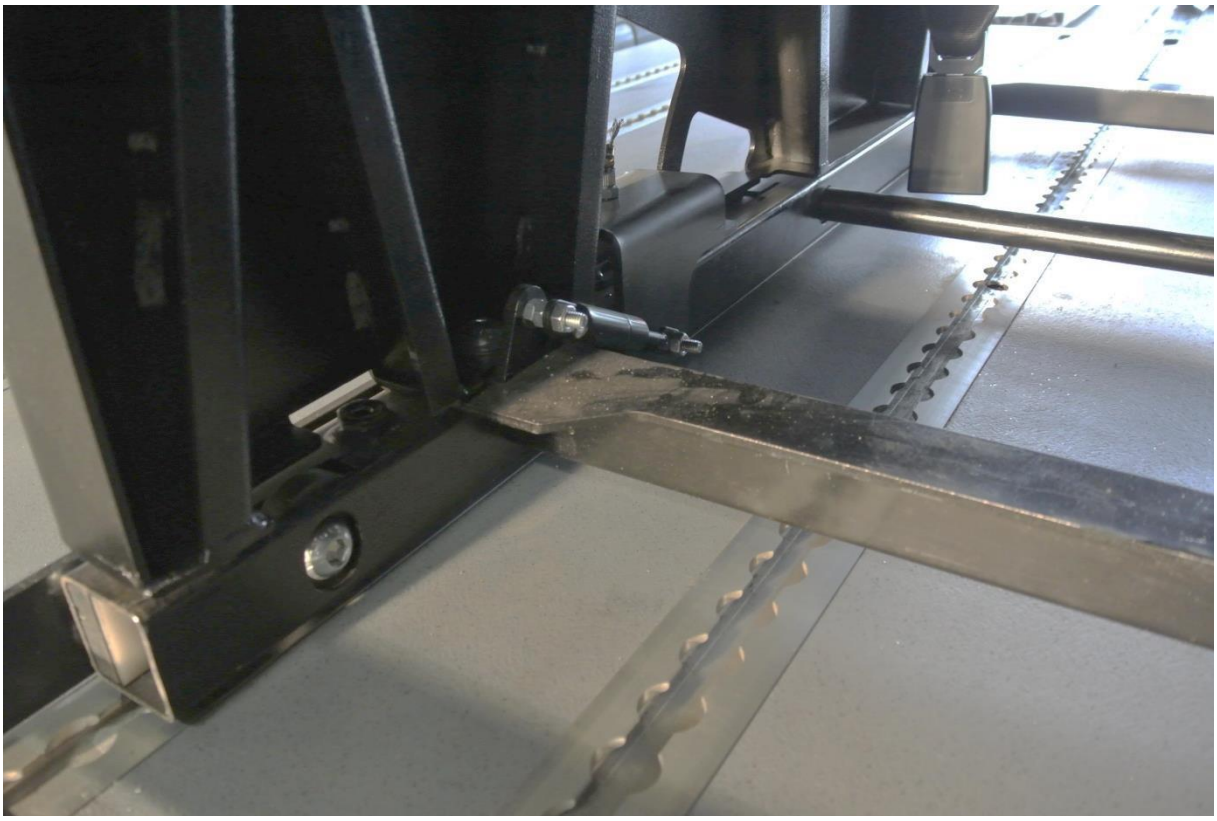


After test:

Before test:



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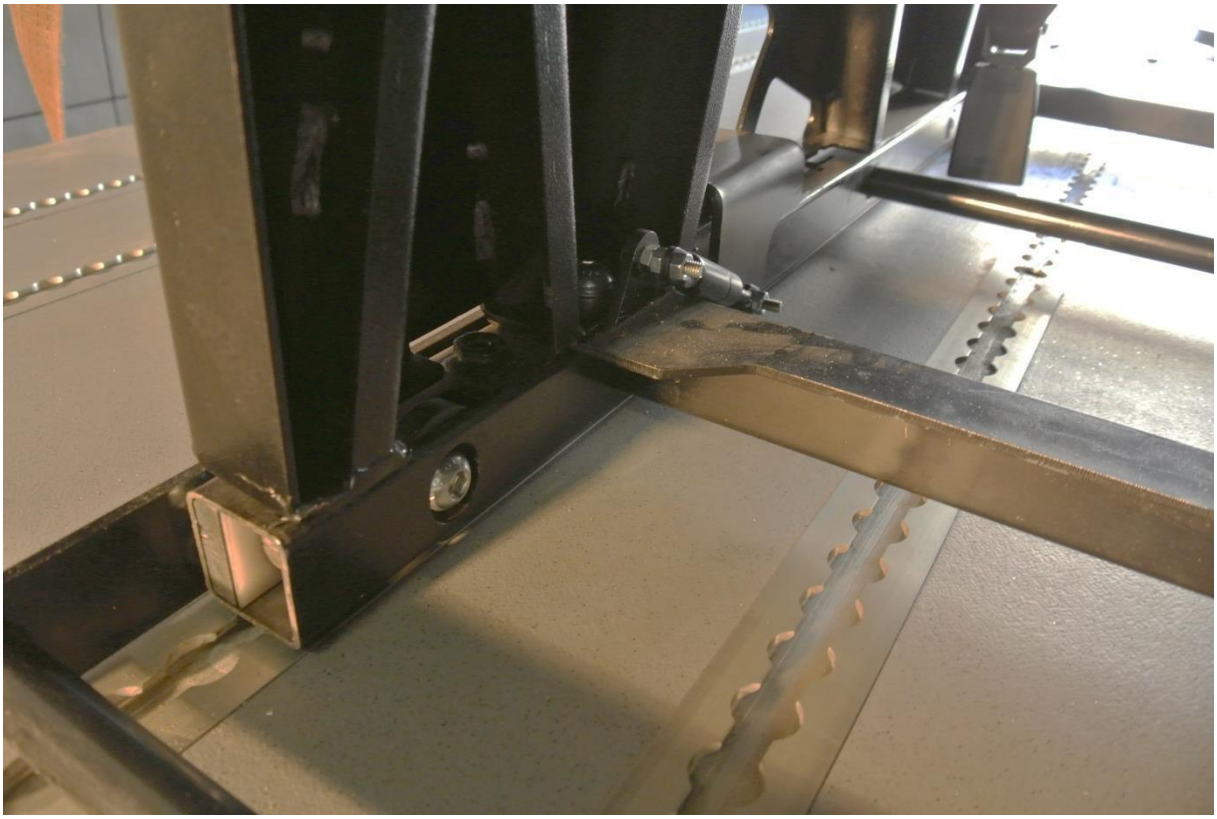


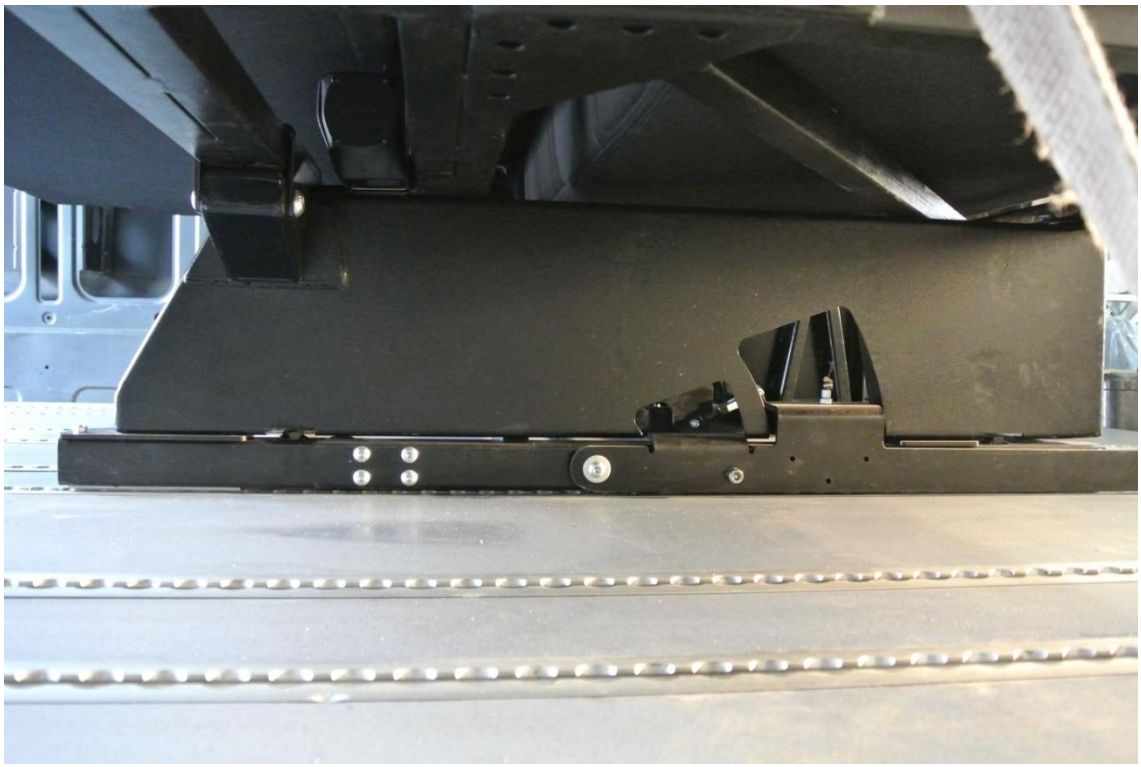
Before test:

After test:

Before test:

After test:

Before test:



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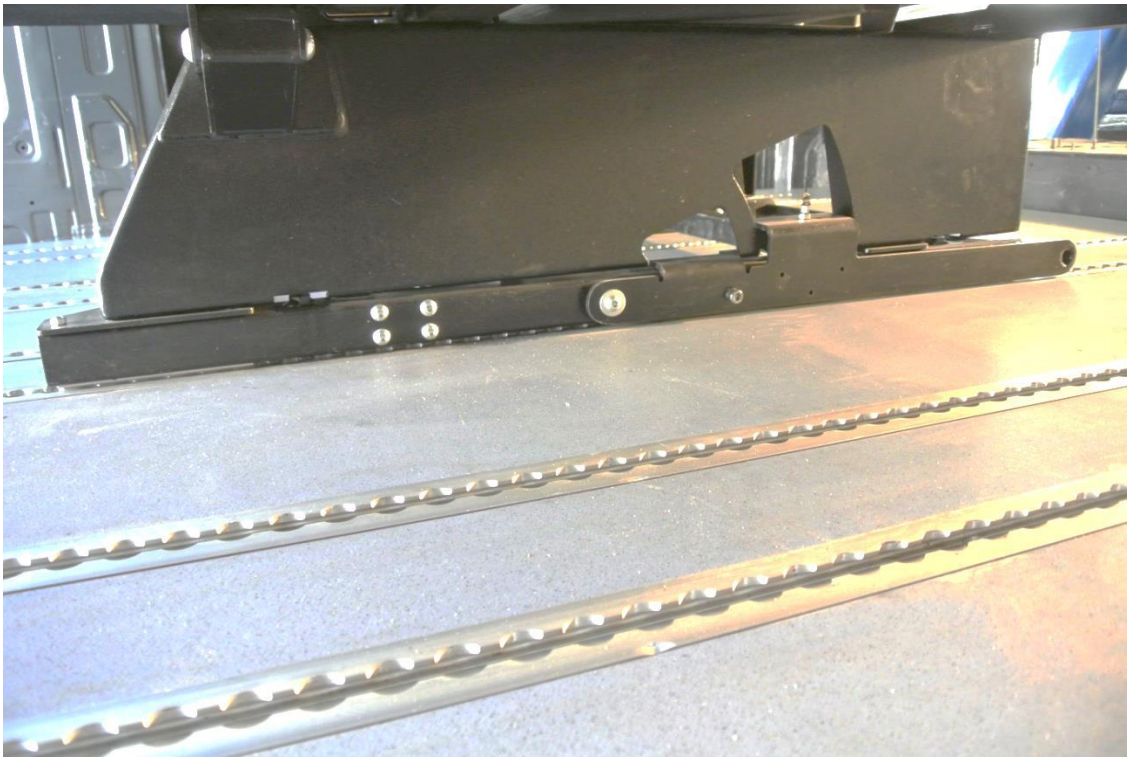
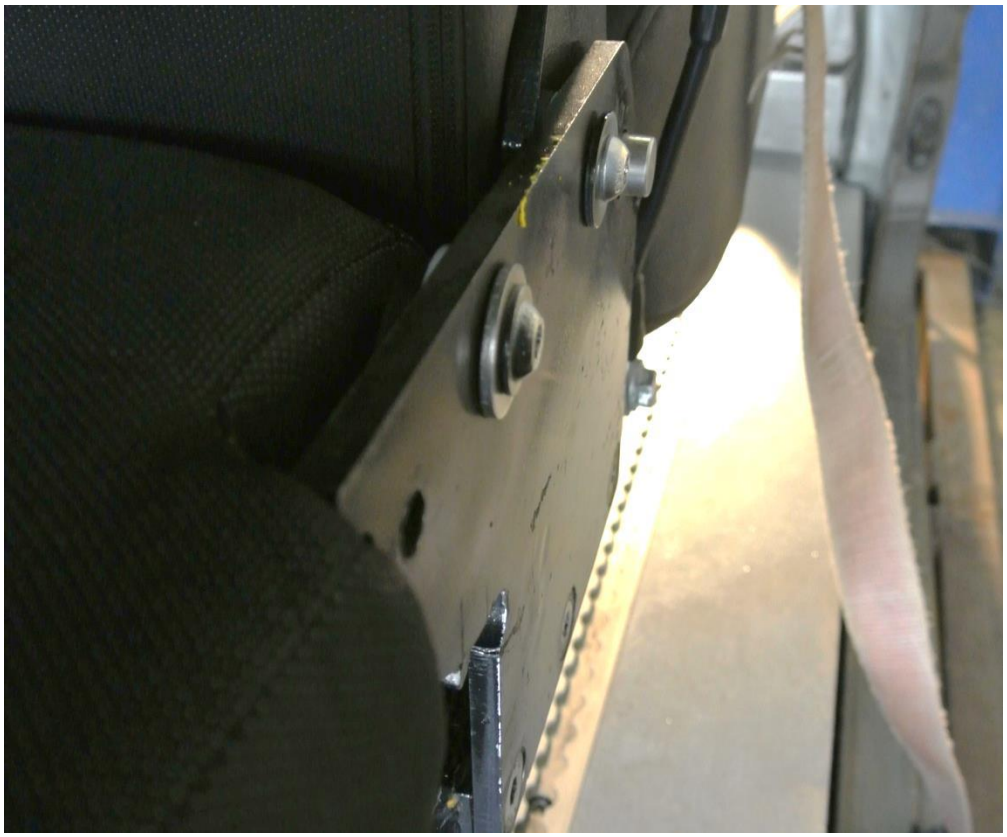
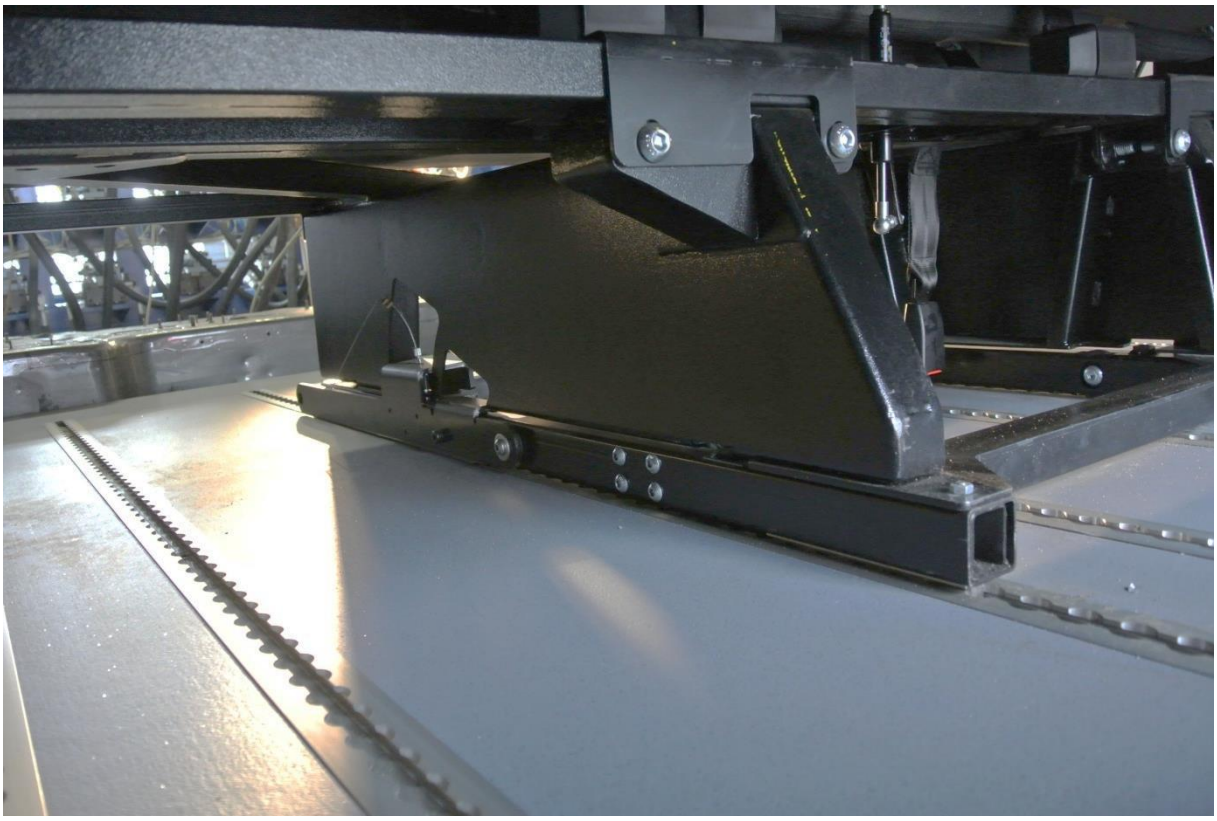


Before test:

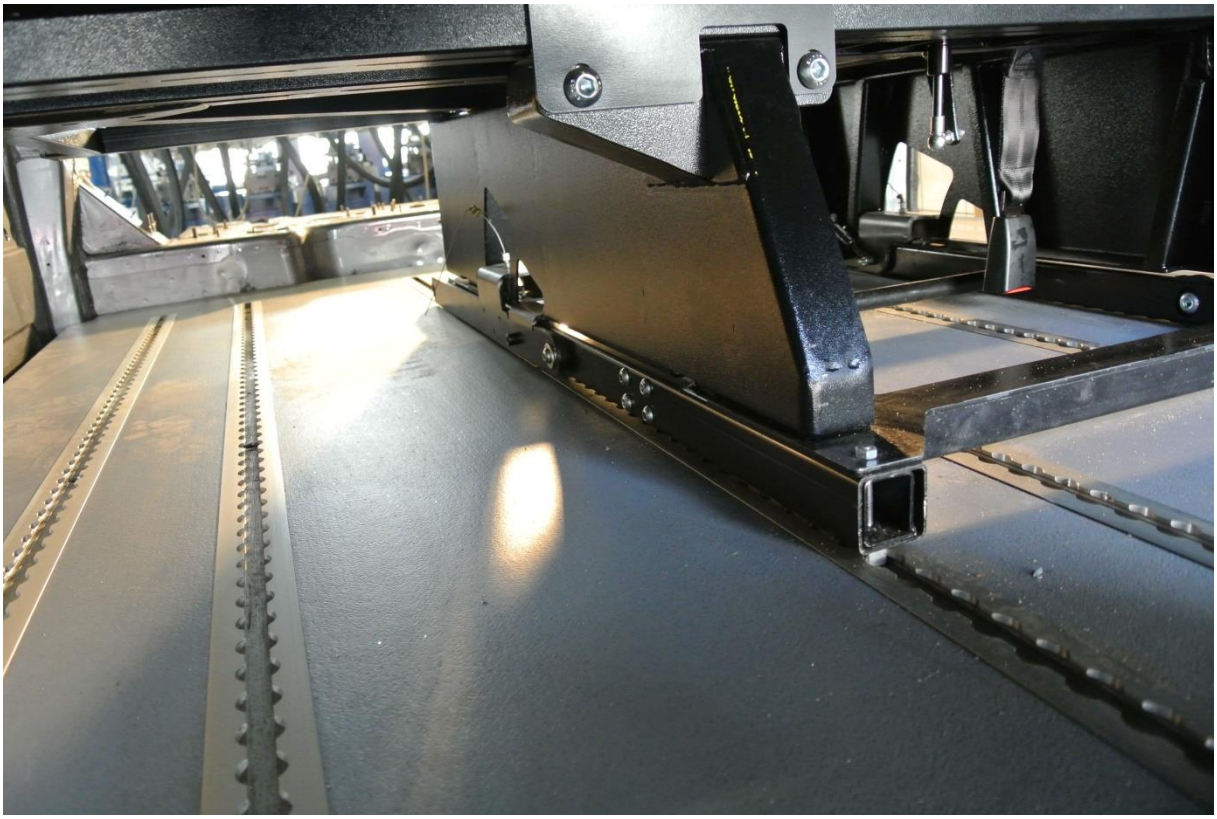
After test:



Before test:



After test:

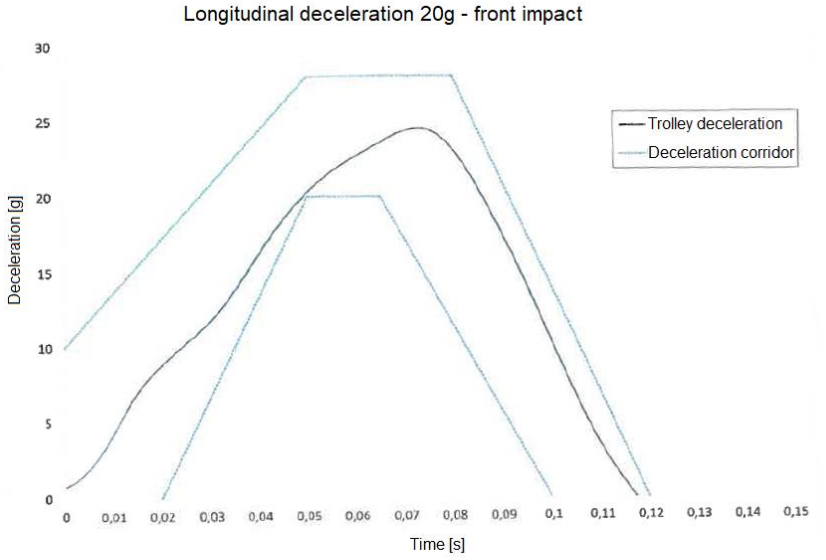


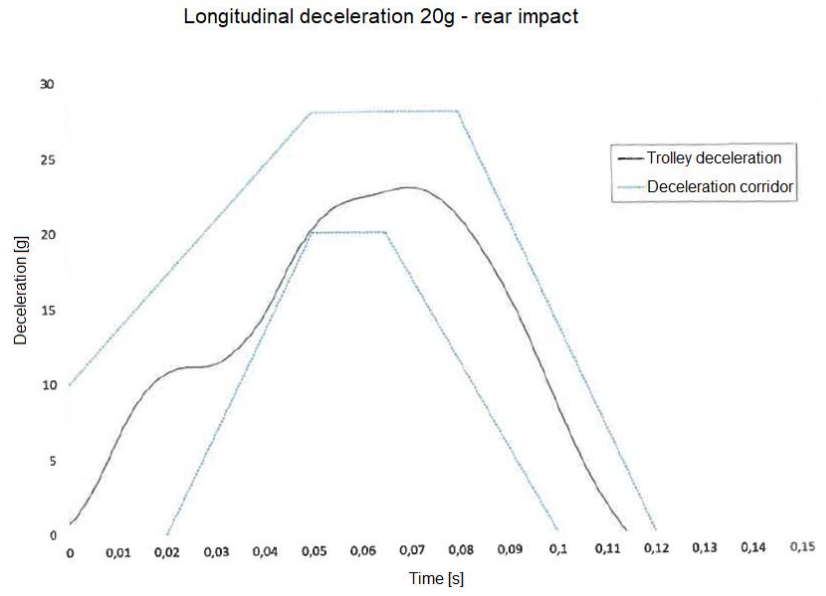
Before test:

After test:

DYNAMIC ACCELERATION TEST (20 G)

Test Date:	29-30.03.2021
Requirement:	FMVSS 207 4.3.2.2.
Test Article Seating Position:	2nd and/or next rows
Mass of complete seat:	132,8 kg / 293,21 lb
Mass of hinged seat back (middle panel):	30,0 kg / 66,14 lb
Mass of hinged seat back (last panel):	16,4 kg / 36,16 lb
Required load:	Deceleration 20g
Direction of pulse application:	Forward and Rearward





Forward “dynamic” 20G – before

Forward “dynamic” 20G – after

Rearward “dynamic” 20G – before

Rearward “dynamic” 20G – after

Test methodology: FMVSS 207 S4.3
Date of test: 29-30.03.2021
Seat under test: 3-panel (SAF12)

Before

After X+

After X-

Test methodology: FMVSS 207 S4.3
Date of test: 29-30.03.2021
Seat under test: 3-panel (SAF12)

Before

After X+

After X-

Test methodology: FMVSS 207 S4.3
Date of test: 29-30.03.2021
Seat under test: 3-panel (SAF12)

Before

After X+

After X-

Test methodology: FMVSS 207 S4.3
Date of test: 29-30.03.2021
Seat under test: 3-panel (SAF12)

Before

After X+

After X-

Test methodology: FMVSS 207 S4.3
Date of test: 29-30.03.2021
Seat under test: 3-panel (SAF12)

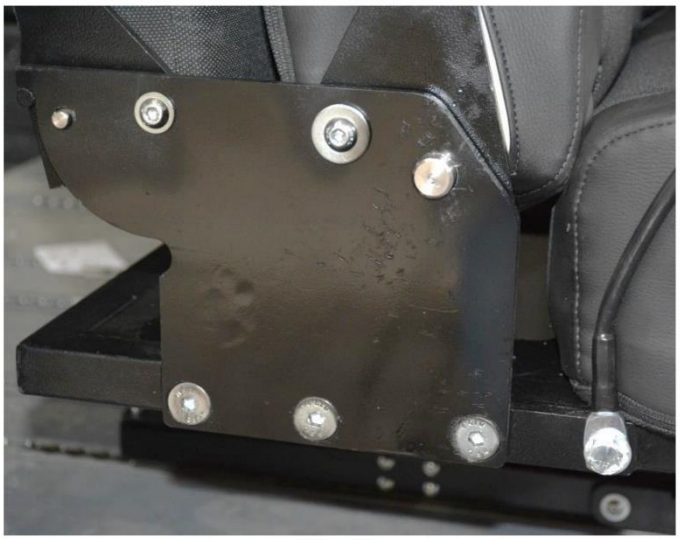
Before

After X+

After X-

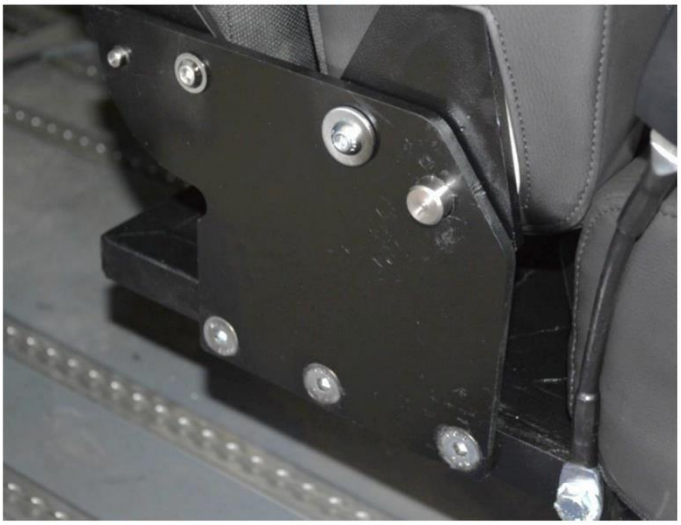
Test methodology: FMVSS 207 S4.3
Date of test: 29-30.03.2021
Seat under test: 3-panel (SAF12)

Before



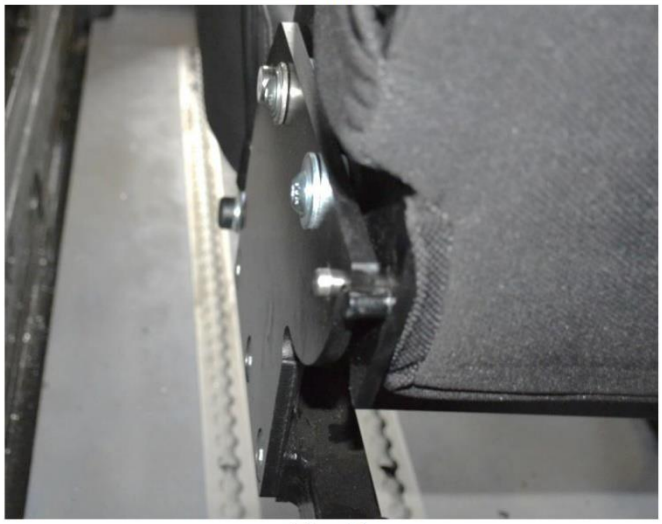
After X+

After X-

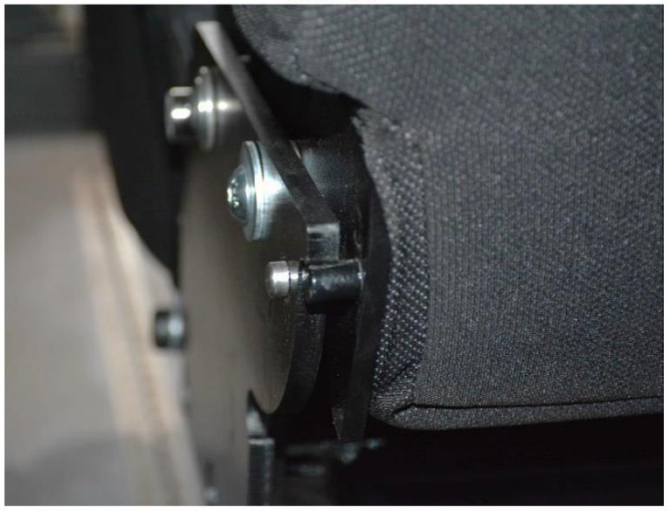


Test methodology: FMVSS 207 S4.3
Date of test: 29-30.03.2021
Seat under test: 3-panel (SAF12)

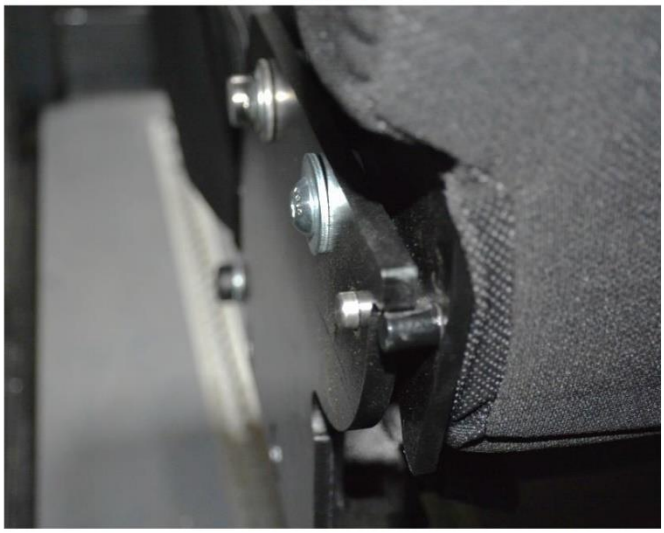
Before



After X+

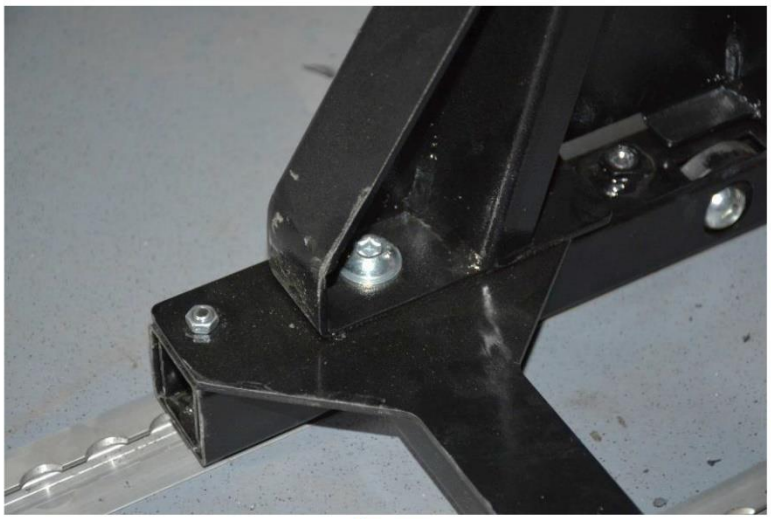


After X-

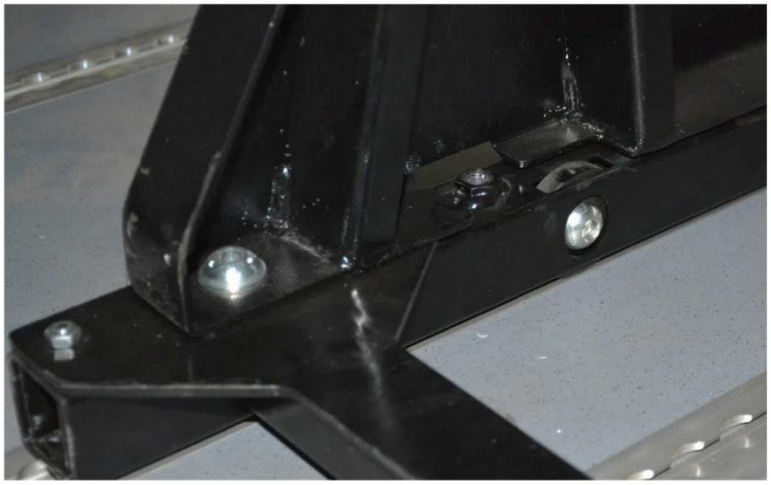


Test methodology: FMVSS 207 S4.3
Date of test: 29-30.03.2021
Seat under test: 3-panel (SAF12)

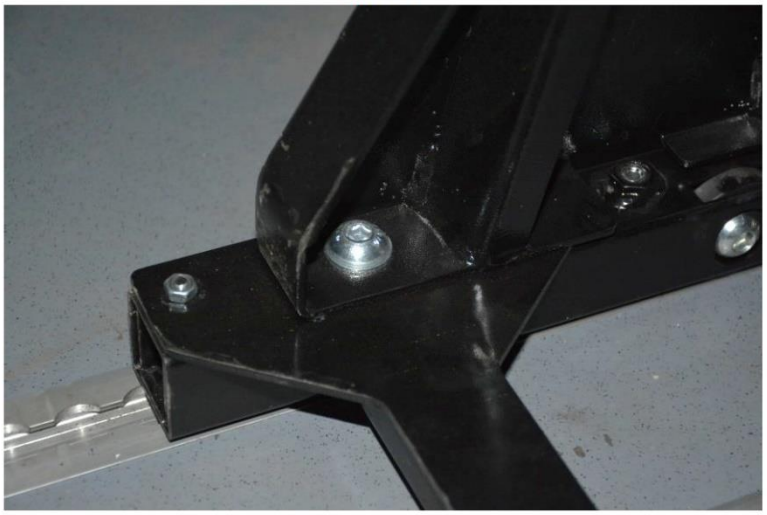
Before



After X+

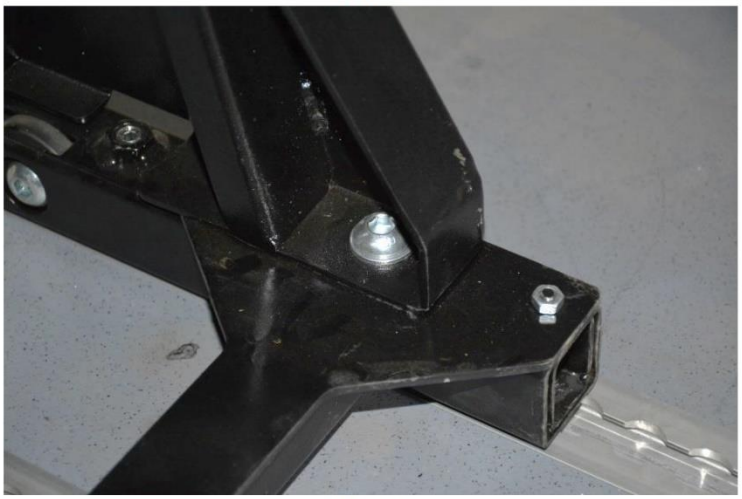


After X-

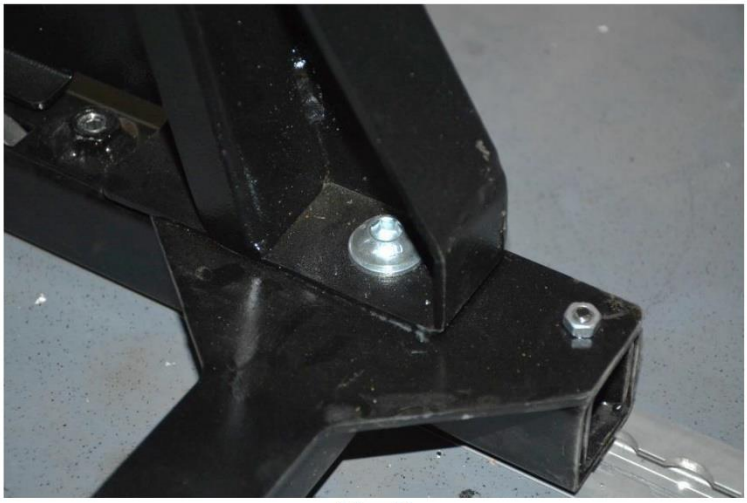


Test methodology: FMVSS 207 S4.3
Date of test: 29-30.03.2021
Seat under test: 3-panel (SAF12)

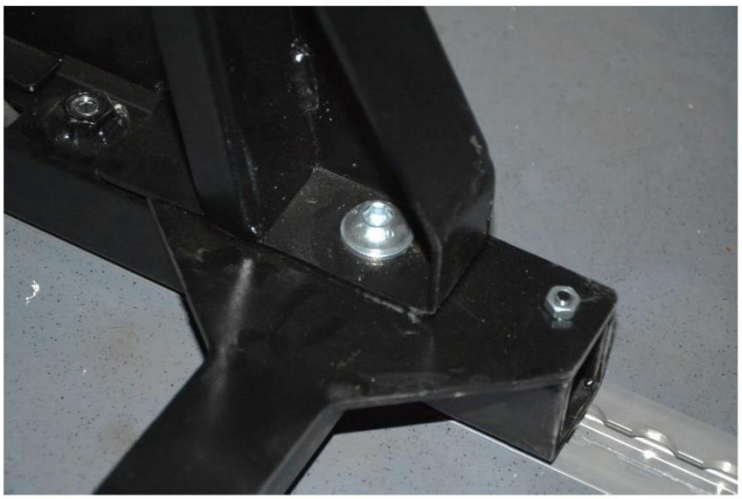
Before



After X+

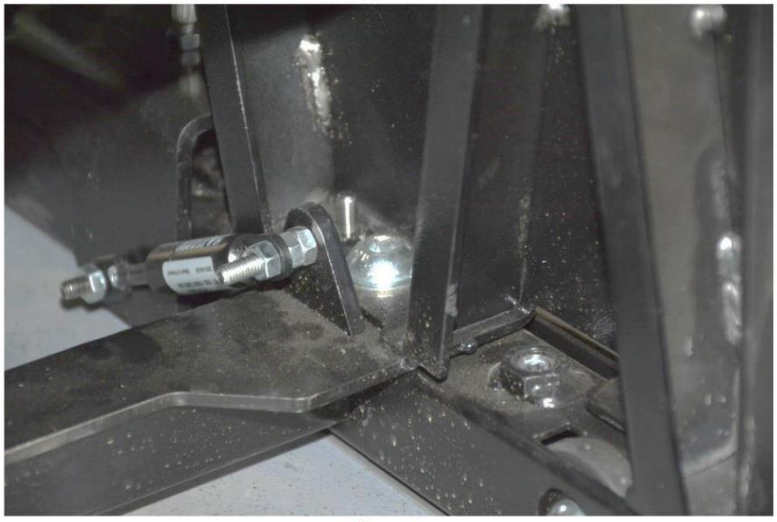


After X-



Test methodology: FMVSS 207 S4.3
Date of test: 29-30.03.2021
Seat under test: 3-panel (SAF12)

Before

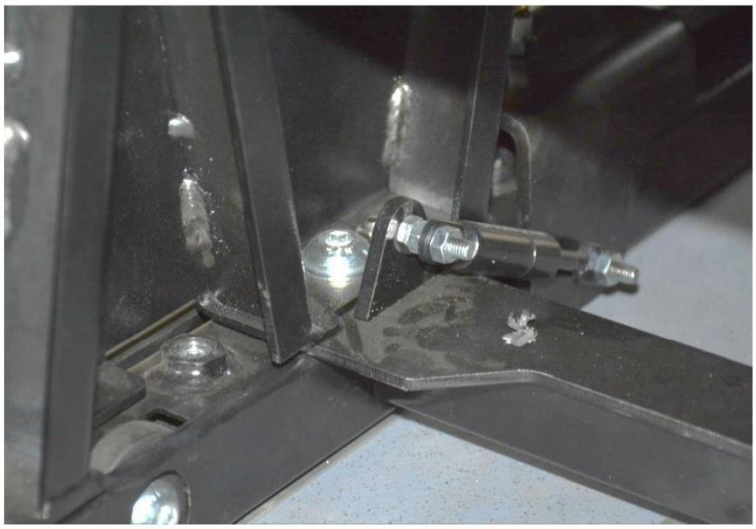


After X+

After X-

Test methodology: FMVSS 207 S4.3
Date of test: 29-30.03.2021
Seat under test: 3-panel (SAF12)

Before

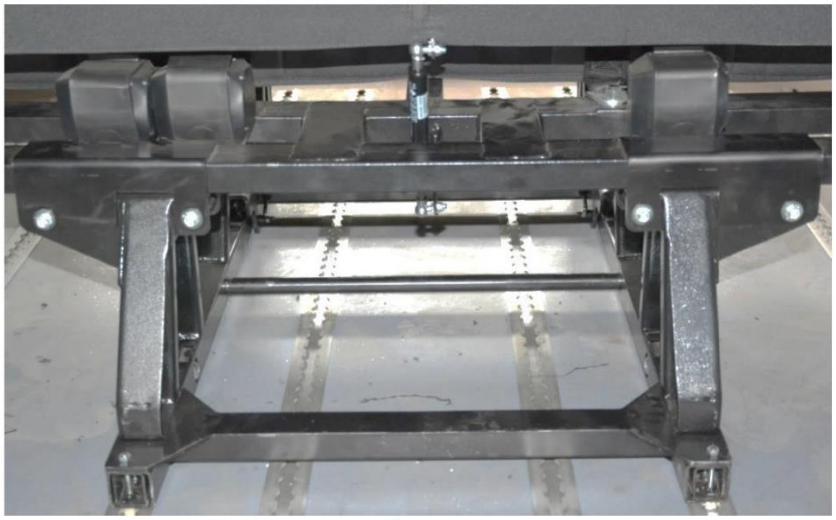


After X+

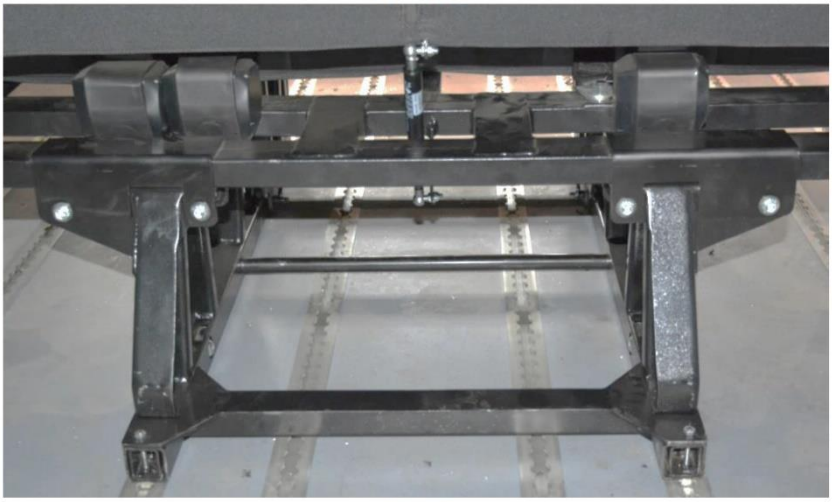
After X-

Test methodology: FMVSS 207 S4.3
Date of test: 29-30.03.2021
Seat under test: 3-panel (SAF12)

Before



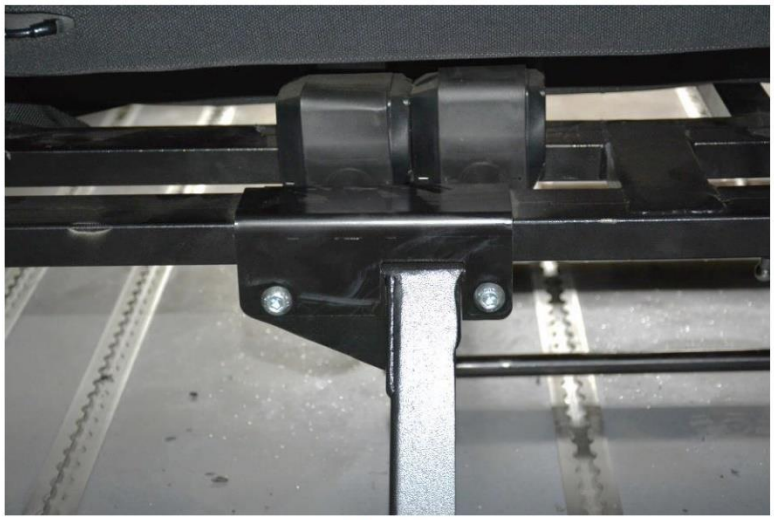
After X+



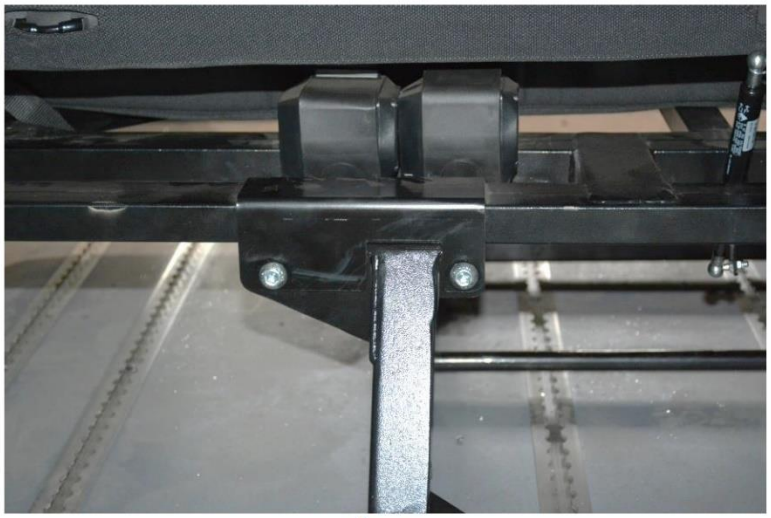
After X-

Test methodology: FMVSS 207 S4.3
Date of test: 29-30.03.2021
Seat under test: 3-panel (SAF12)

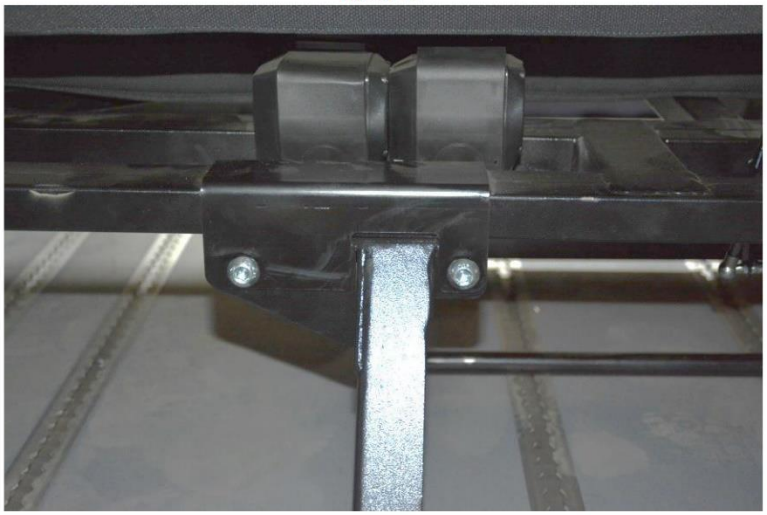
Before



After X+

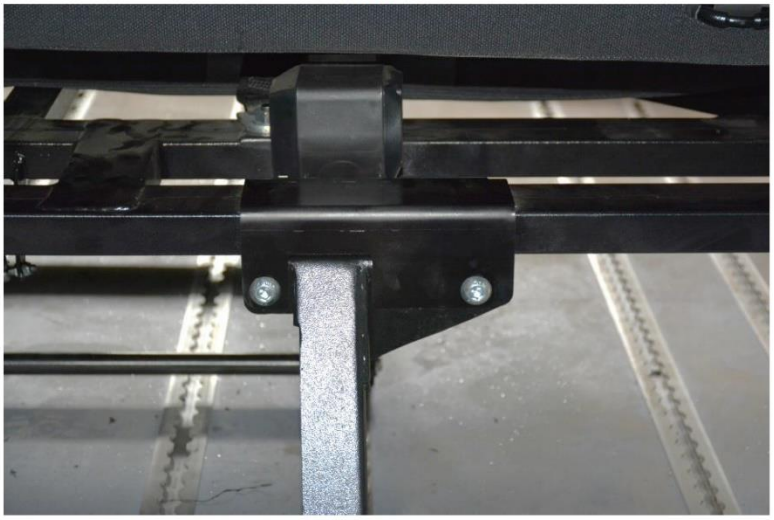


After X-

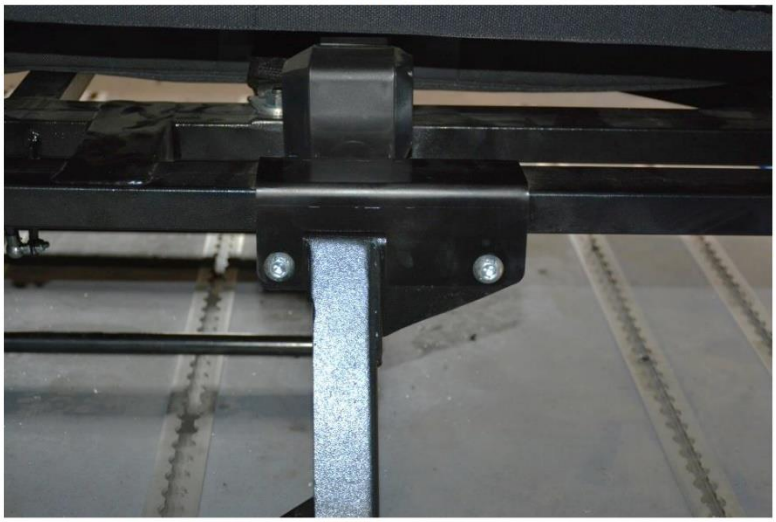


Test methodology: FMVSS 207 S4.3
Date of test: 29-30.03.2021
Seat under test: 3-panel (SAF12)

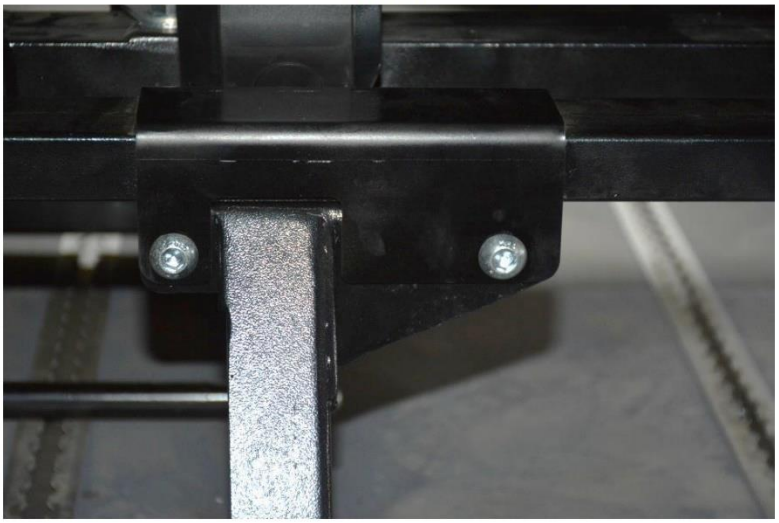
Before



After X+

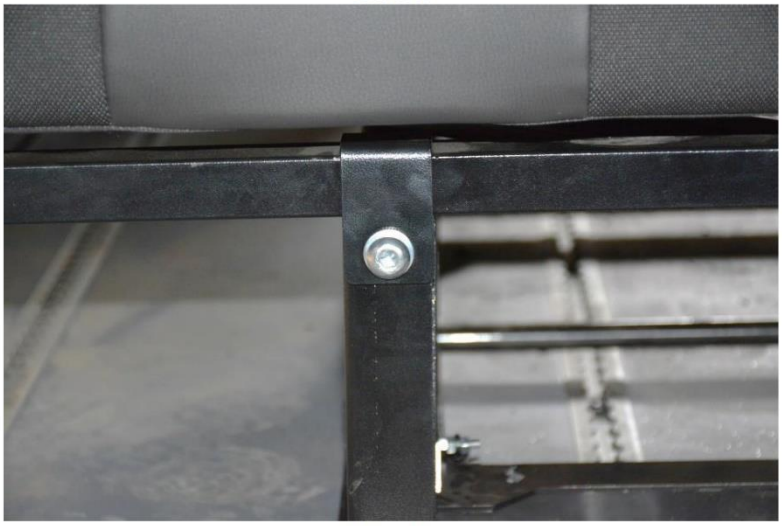


After X-

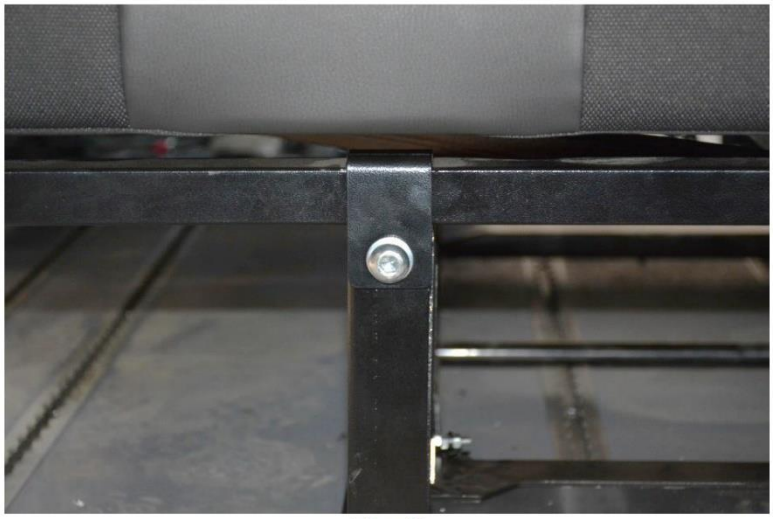


Test methodology: FMVSS 207 S4.3
Date of test: 29-30.03.2021
Seat under test: 3-panel (SAF12)

Before



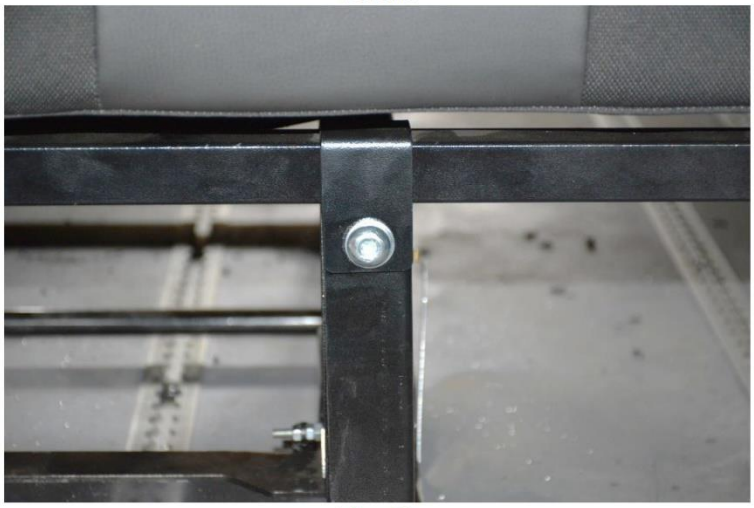
After X+



After X-

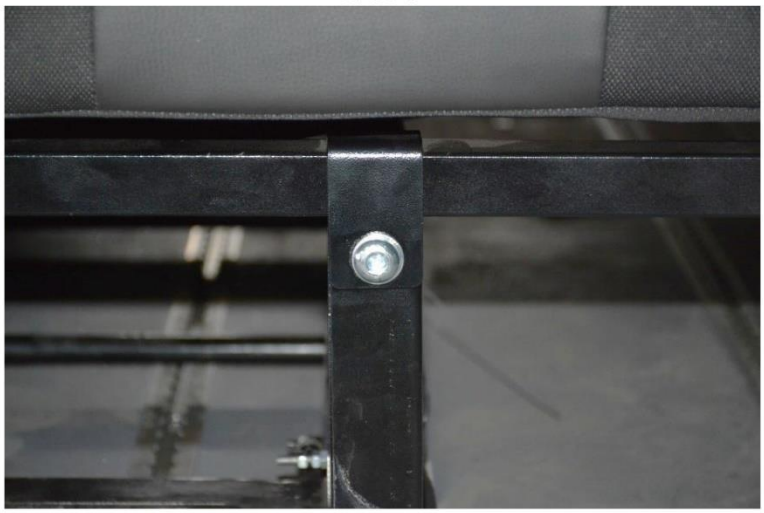
Test methodology: FMVSS 207 S4.3
Date of test: 29-30.03.2021
Seat under test: 3-panel (SAF12)

Before



After X+

After X-



Test methodology: FMVSS 207 S4.3
Date of test: 29-30.03.2021
Seat under test: 3-panel (SAF12)

Before

After X+

After X-