Review of Seatbelt Anchorage and Dimensions of Test Bench Seat Cushion

JASIC

Motivation and Purpose

- There is no definition about whether seatbelt anchorage should be fixed or not.

- We tested the same test conditions except for that the ISOFIX anchorage is fixed or movable, and the Injury measures of a dummy were compared.
  - From those results, we reviewed that the seatbelt anchorage should be fixed or movable.

Side Impact Test Methods

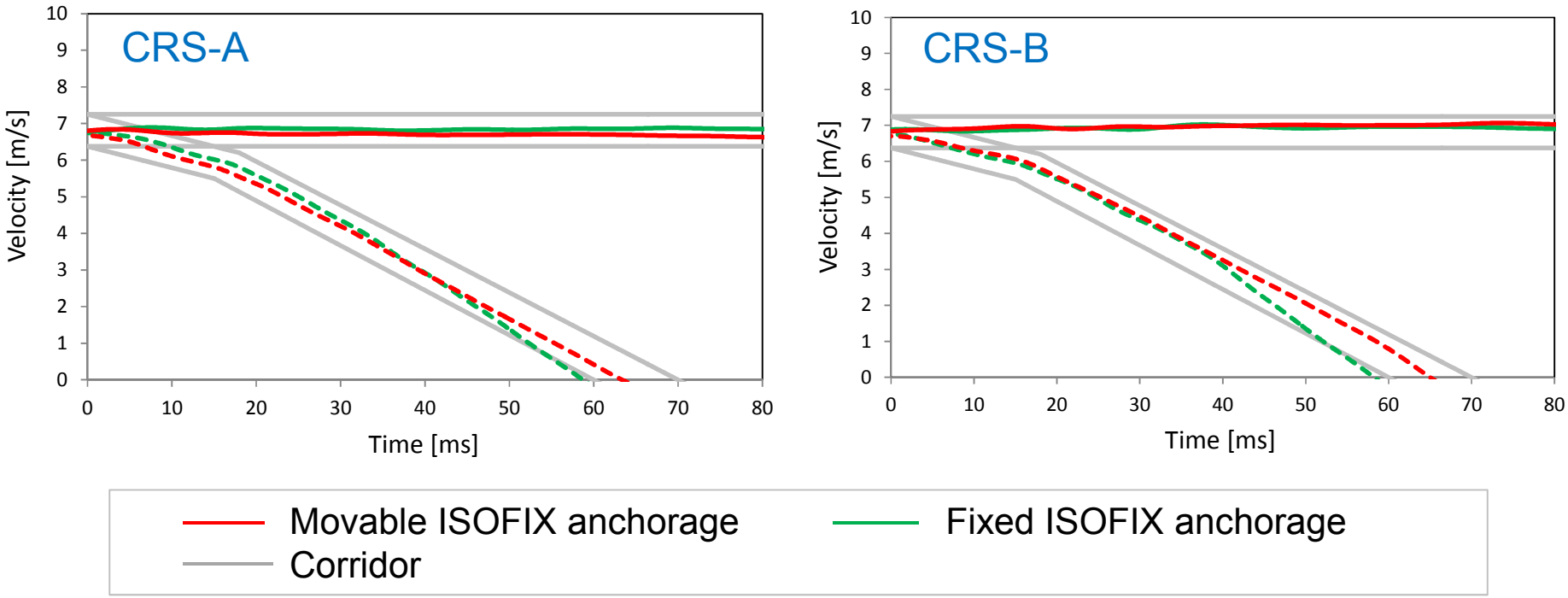
- We used acceleration type sled test system
- We used Q3 dummy
- We tested 2 kinds of ISOFIX type CRS

CRS

CRS-A

CRS-B

Door Velocity, and Relative Velocity between Door and Seat



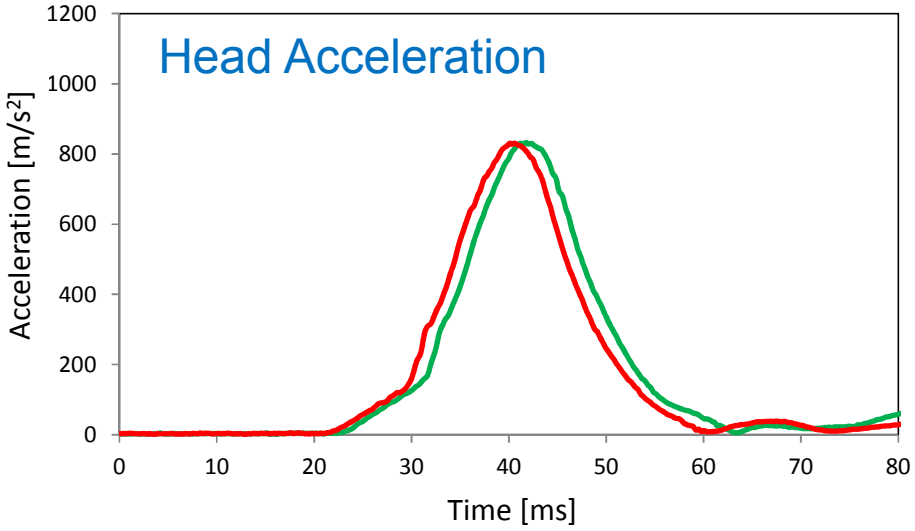
- The door velocities were in Corridor
- The relative velocities when ISOFIX anchorage fixed were out of corridor after 50ms, but it was the time after the maximum dummy injury measures . So we think it was not influenced to the comparisons.

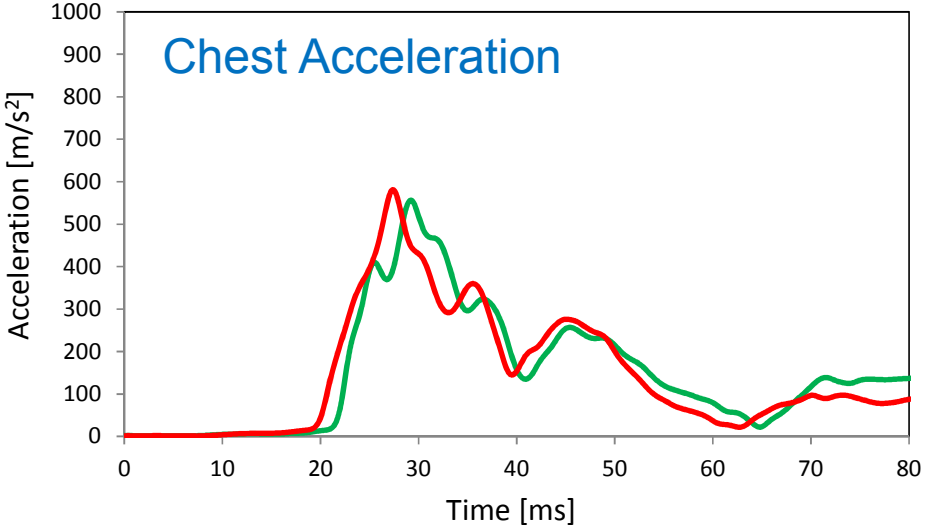
Test Video of CRS-A

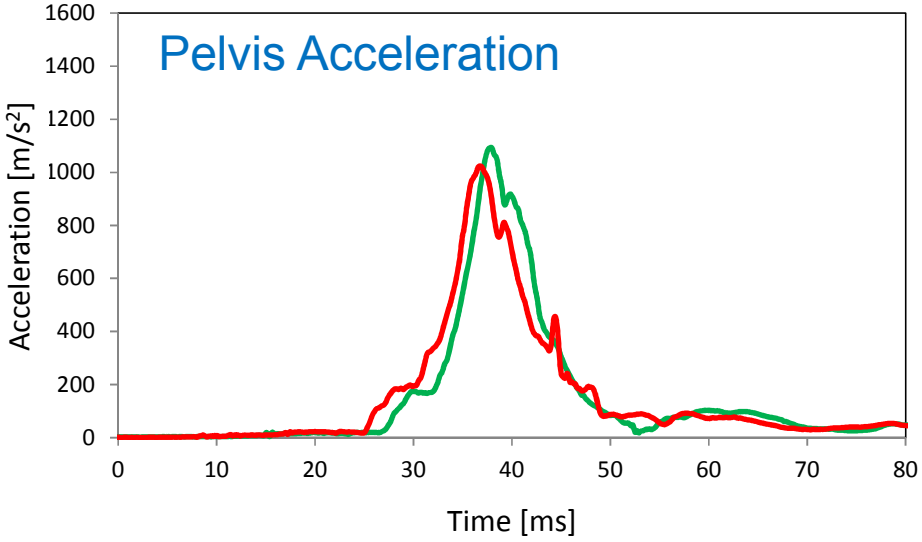
Movable ISOFIX anchorage

Fixed ISOFIX anchorage

Dummy Accelerations (CRS-A)



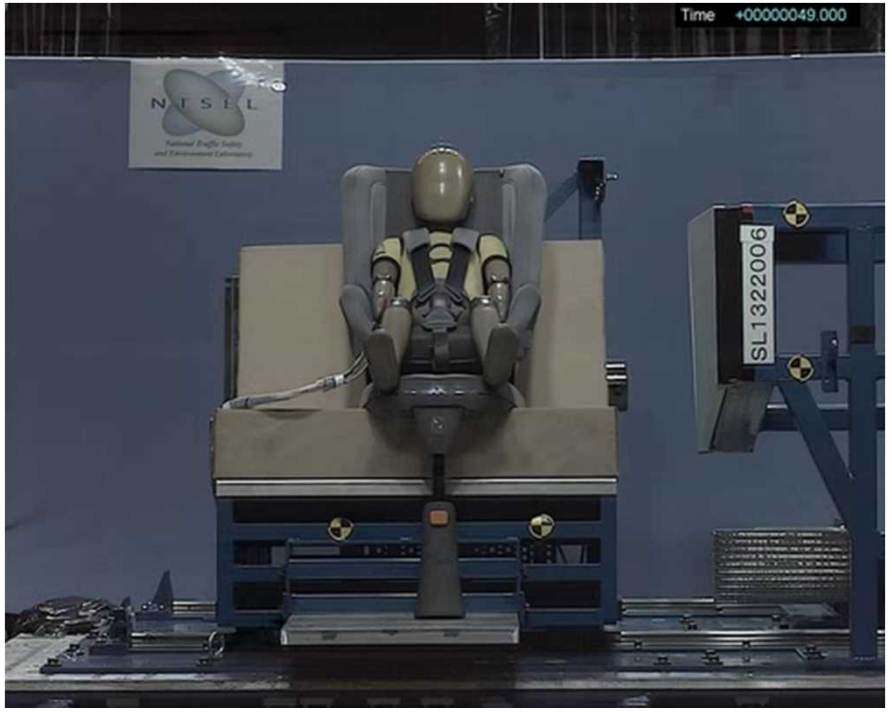




Movable ISOFIX anchorage
Fixed ISOFIX anchorage

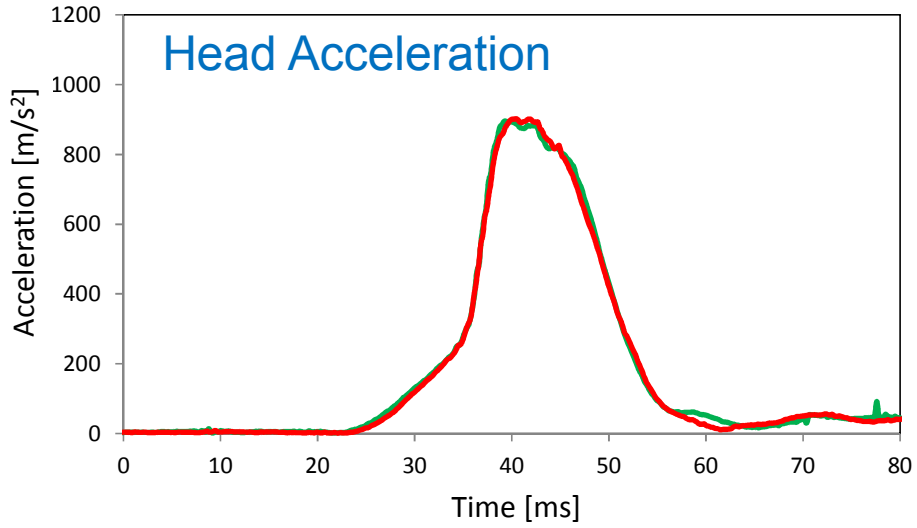
Test Video of CRS-B

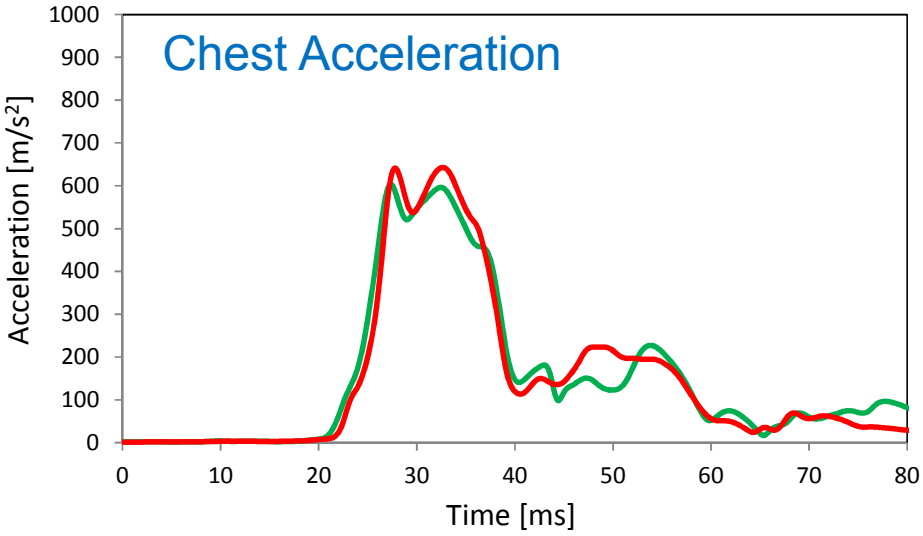
Movable ISOFIX anchorage

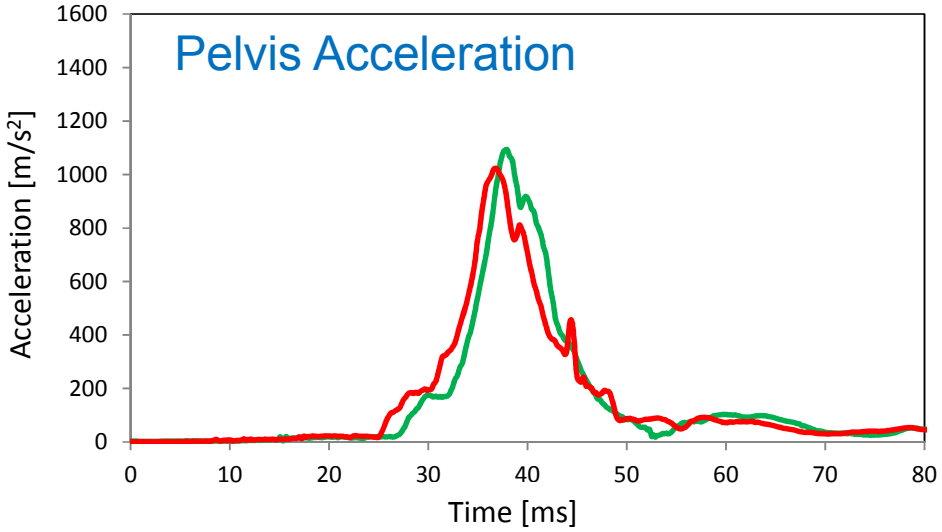


Fixed ISOFIX anchorage

Dummy Accelerations (CRS-B)





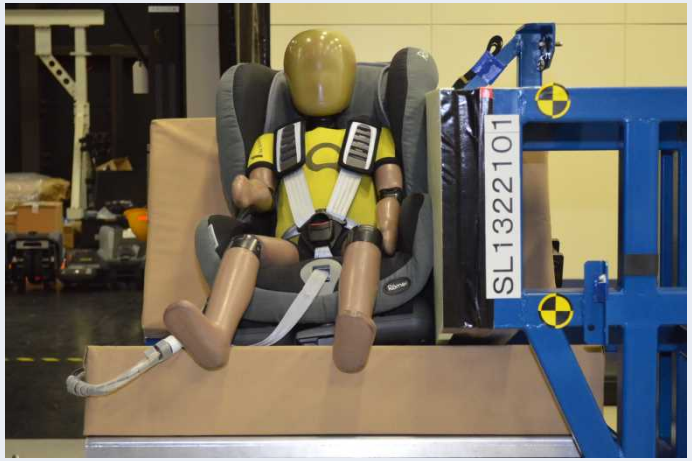


Movable ISOFIX anchorage
Fixed ISOFIX anchorage

Maximum Dummy Injury Measures

Region	Injury measure	Unit	Threshold	CRS-A		CRS-B	
				ISOFIX Anchorage		ISOFIX Anchorage	
				Movable	Fixed	Movable	Fixed
Head	HPC15	–	800	523	533	697	713
	3ms Acceleration	G	80	81.5	82.6	90.9	89.2
Chest	Chest deflection	mm	–	18.9	16.1	21.4	21.2
	3ms Acceleration	G	–	47.1	47.9	60.8	57.5
Pelvis	3ms Acceleration	G	–	83.5	89.5	108.2	104.9

Photos of CRS Before / After Test (CRS-A)

	Movable ISOFIX anchorage	Fixed ISOFIX anchorage
Before		
After		

Photos of CRS Before / After Test (CRS-B)

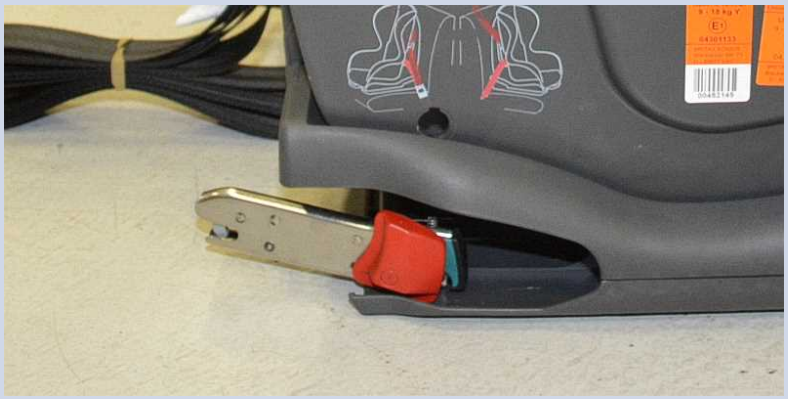
	Movable ISOFIX anchorage	Fixed ISOFIX anchorage
Before		
After		

Photos of ISOFIX Connector after Tests

	Fixed ISOFIX anchorage	
CRS-A		
CRS-B		

Photos of ISOFIX Connector after Tests

Fixed ISOFIX anchorage (CRS-A)



ISOFIX connector was broken.

Conclusion about ISOFIX Anchorage

- Injury measures under conditions that the ISOFIX anchorage was fixed and movable were almost similar.
- There were cases that ISOFIX connector lever could not be moved when ISOFIX anchorages were fixed, so we could not release the ISOFIX connector and it took a long time to remove a CRS from the test bench seat.
  - It was easy to remove a CRS from the ISOFIX anchorage when the ISOFIX anchorages were movable.

We think it is better that the ISOFIX anchorage is movable.

Side Impact Test Methods

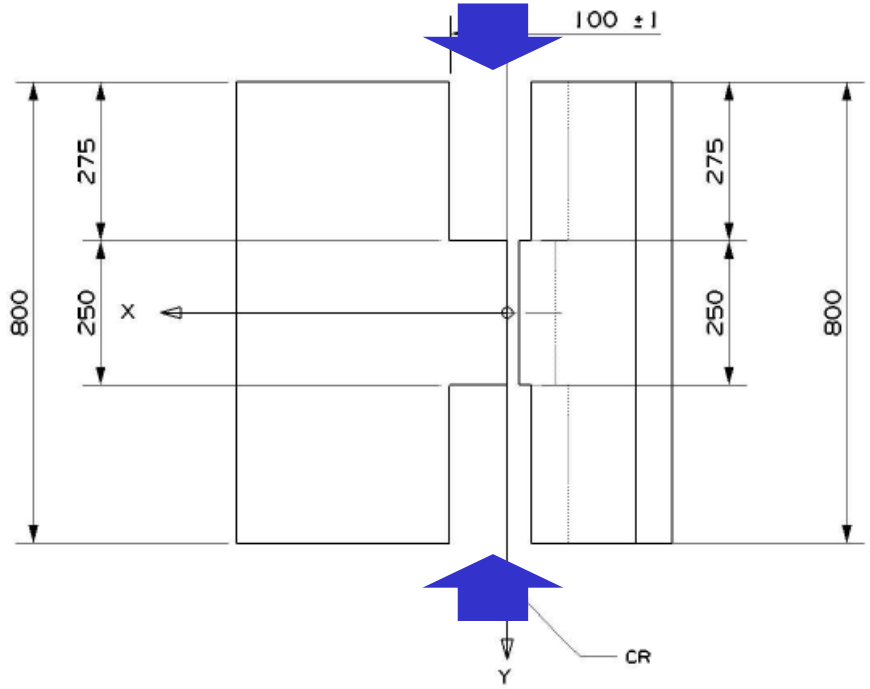
- We used acceleration type sled test system
- We used Q3 dummy
- We tested CRS fixed by seatbelt

Conclusion about Seatbelt Anchorage

- It was easy to remove CRS fixed by seatbelt from test bench seat.
- A movable seatbelt anchorage may make structure of the jig complex.

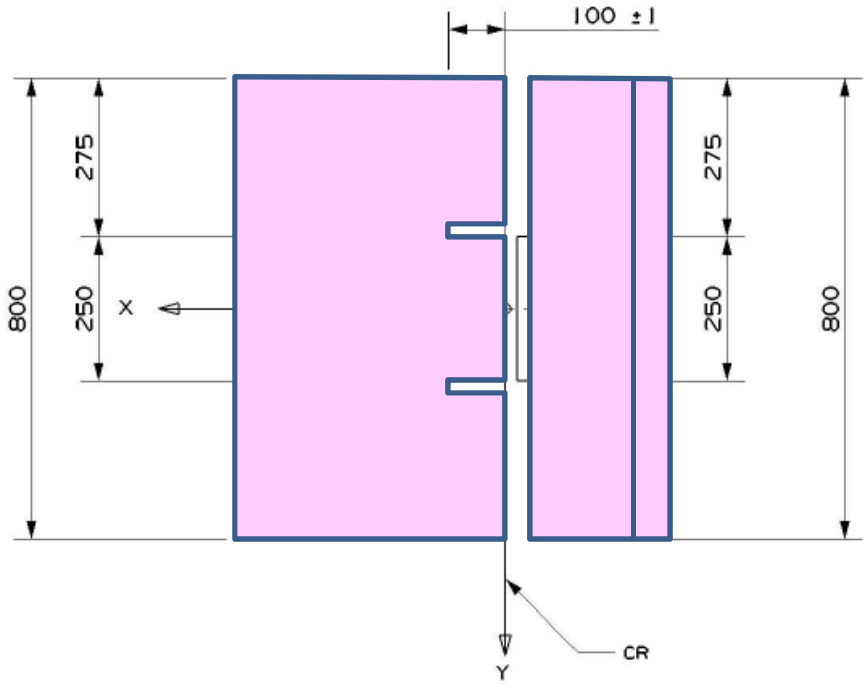
It is considered that a fixed seatbelt anchorage is an advantage because the different between fixed and movable anchorages has a small effect on injury measures.

Dimensions of Test Bench Seat Cushion



- There are cutouts in a seat defined in the new regulation.
- The difference between fixed and movable anchorages has a small effect on injury measures.
  - Injury measures are almost the same regardless of a distance when a CRS moves on a seat. There is no influence of a friction.

Dimensions of Test Bench Seat Cushion



- A seat shape has a small effect.
- We think it better that a seat shape is simple because it is easy to make the cushion, for example, like the shape defined in UN.