



**C L E P A**  
*European Association of  
Automotive Suppliers*



**CRS-07-02**

# Load levels in ISOFIX anchorages

GRSP Informal Group on Child Restraint Systems

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Michael Grohspietsch, Farid Bendjellal

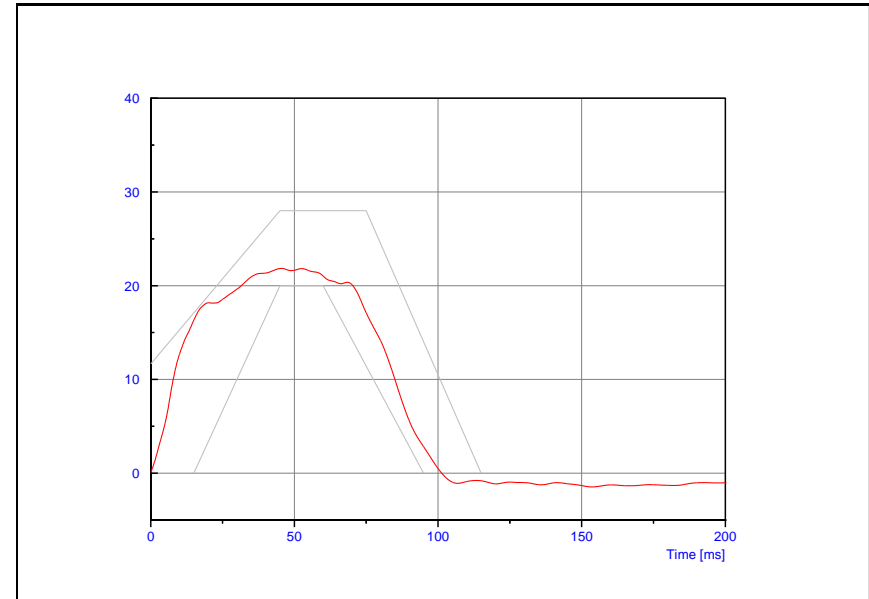
# Objectives

- ❑ Contribute to the Informal Group discussion on maximum loads sustained by Isofix anchorages system.
- ❑ Additional data in addition to those already presented by Clepa
- ❑ ECE R44 sled test environment

# Test Conditions

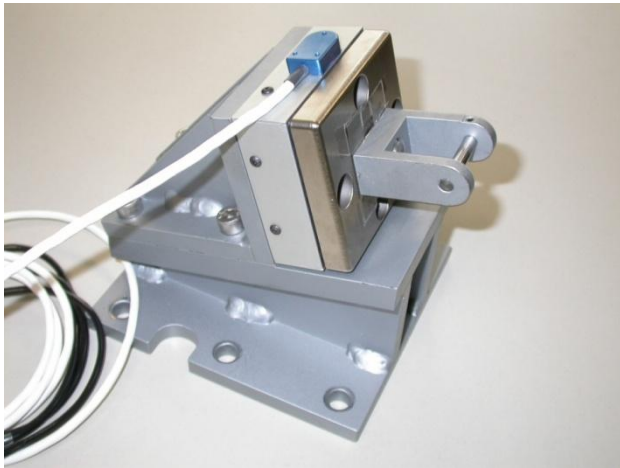
ECE 44.04 Test rig

- Sled deceleration according to ECE 44.04
- Impact speed 50 Km/h
- Max deceleration 22 g



# Force Transducer & Mounting

- Triaxial load cell (Denton)
- Range 40 kN each axis



- Left Isofix anchorage point
- Position rearmost H2



# Seats Tested

- Group 1 Seat with only 2-point Isofix fixing
- Group 1 Seat with 2-point Isofix and top tether (TT) fixing
- Group 1 Seat with 2-point Isofix fixing and support leg (SL)

# Seats Tested

## Seat A

- Weight 12,1 kg
- Group 1
- 2-point Isofix with or without top tether



# Seats Tested

## Seat B

- Weight 13,4 kg
- Group 1
- 2-point Isofix with support leg

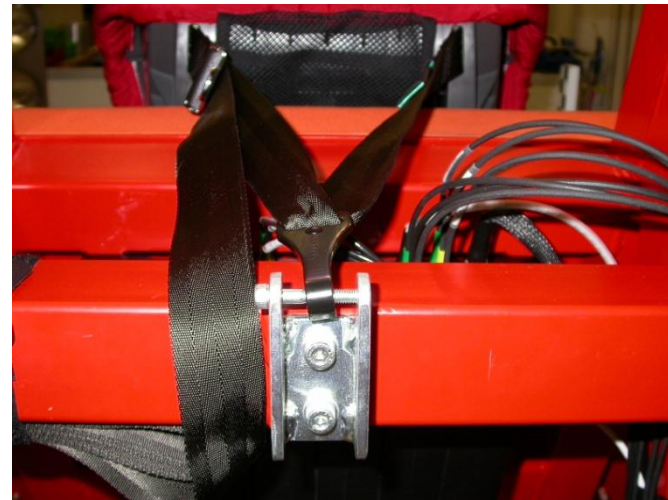




# Seats Tested

## Seat C

- Weight 8,7 kg
- Group 1
- 2 point Isofix with or without top tether





# Seats Tested

## Seat D

- Weight 14,6 kg
- Group 1
- 2 point Isofix with support leg



# Results

## summary table

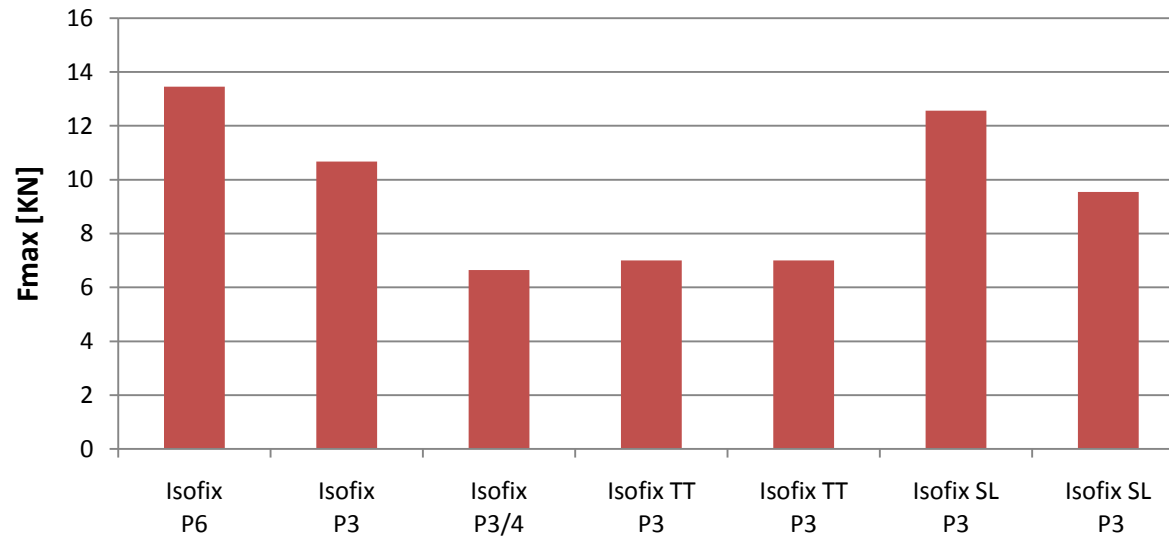
Seat	Dummy	Anchorage	Weight [kg]	Force [N] Isofix-Anchorage left/H2					Top Tether	Comment
			Seat+Dummy	x	y	z	Res			
Seat A	P6	Isofix	12,1 + 22 = 34,1	6234	341	2523	6729		without Tether	
Seat A	P3	Isofix / Top Tether	12,1 + 15 = 27,1	3310	94	1145	3497	4528 N		
Seat B	P3	Isofix / Support leg	13,4 + 15 = 28,4	6129	204	1491	6287	SL	Support leg	
Seat C	P3	Isofix	8,7 + 15 = 23,7	4763	239	2434	5334		without Tether	
Seat C	P3	Isofix / Top Tether	8,7 + 15 = 23,7	3298	228	1206	3516			
Seat C	P3/4	Isofix	8,7 + 9 = 17,7	3032	166	1358	3326		without Tether	
Seat D	P3	Isofix / Support leg	14,6 + 15 = 29,6	4380	88	1899	4768	SL	Support leg	
Seat D	P3	Isofix / Support leg	14,6 + 15 = 29,6	4773	122	1977	5157	SL	Force Support leg 4563 N Support leg modified	

No Isofix connector damage was observed

# Results

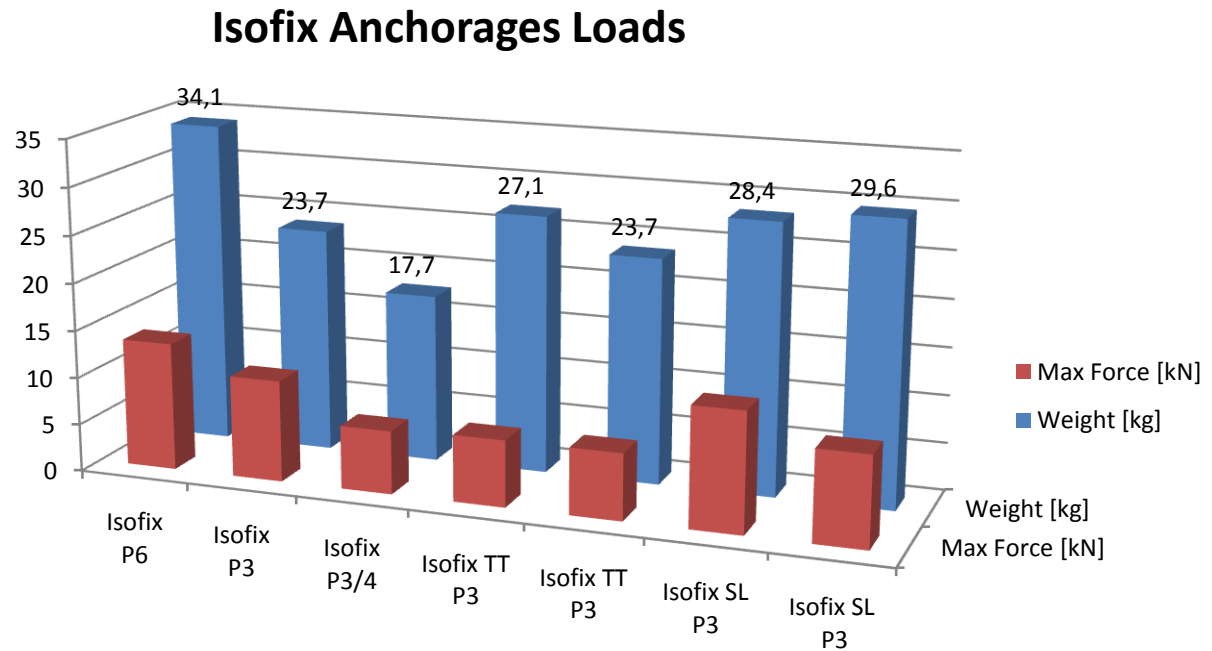
## summary diagram Isofix loads

### Isofix Anchorage Loads



# Results

summary diagram Isofix loads and weight



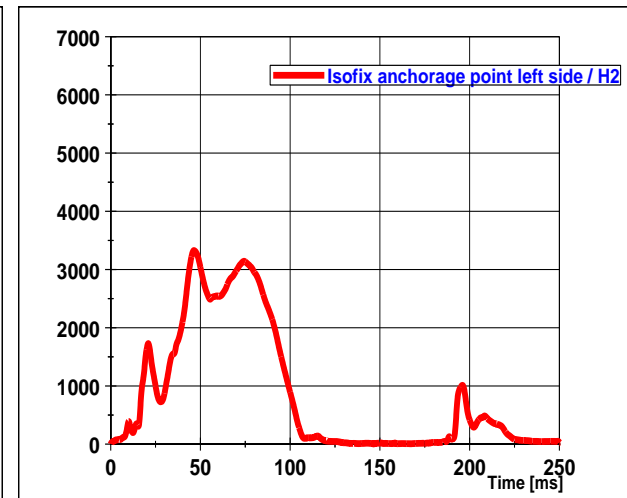
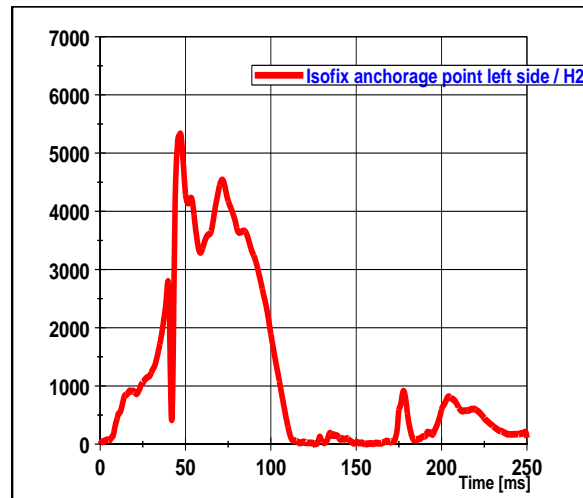
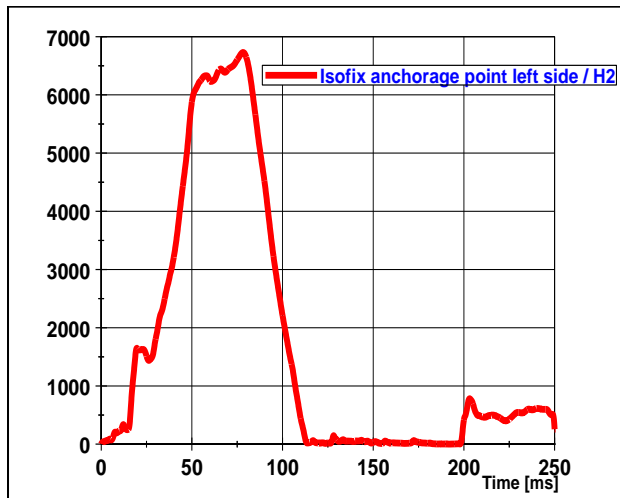
# Results

force time curves with 2-point Isofix fixing

Isofix P6 / 34,1kg

Isofix P3 / 23,7kg

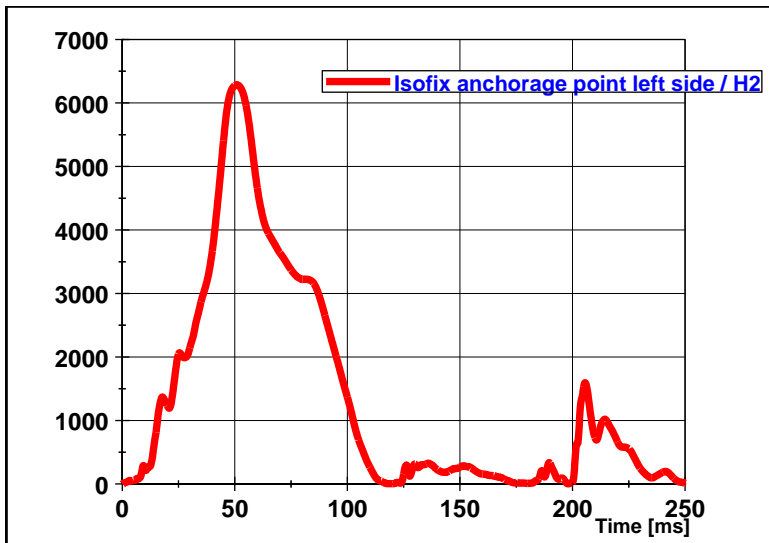
Isofix P ¾ / 17,7kg



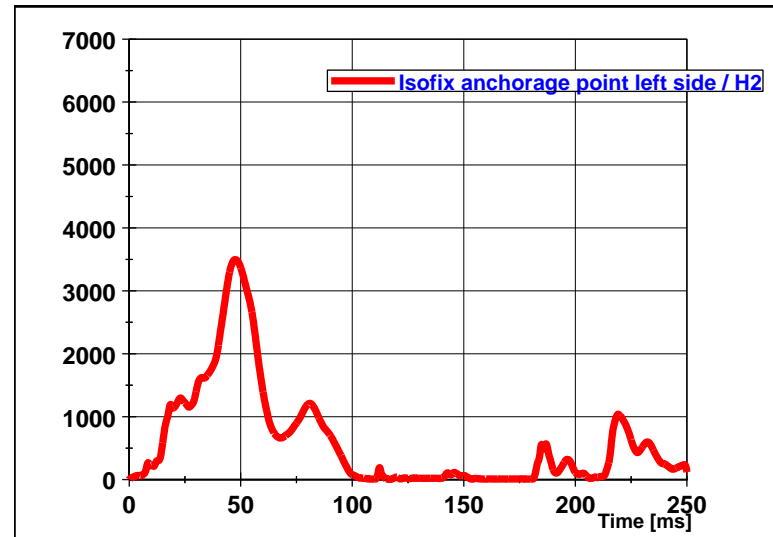
# Results

force time curves comparison Isofix support leg and Isofix top tether

Isofix support leg (SL) P3



Isofix top tether (TT) P3

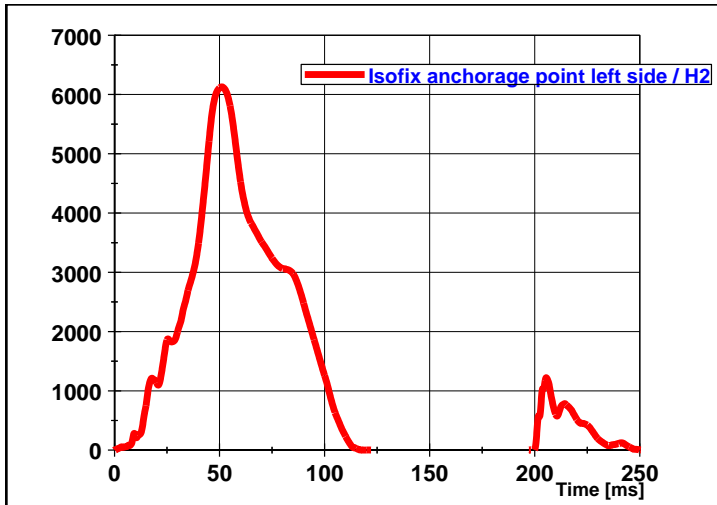




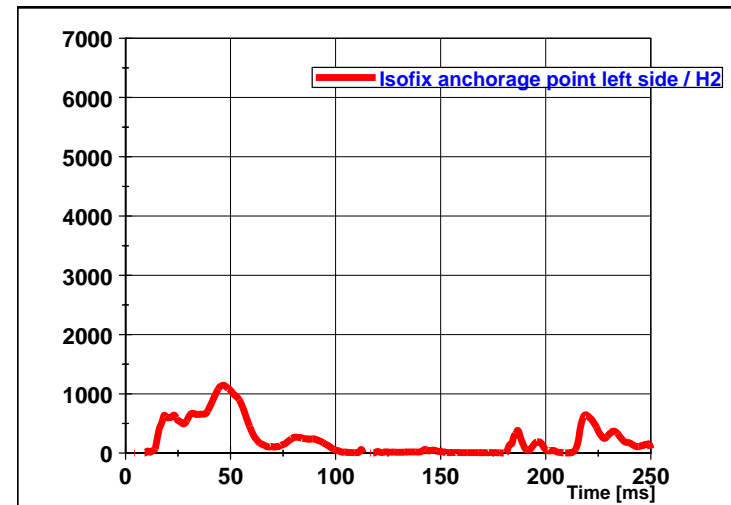
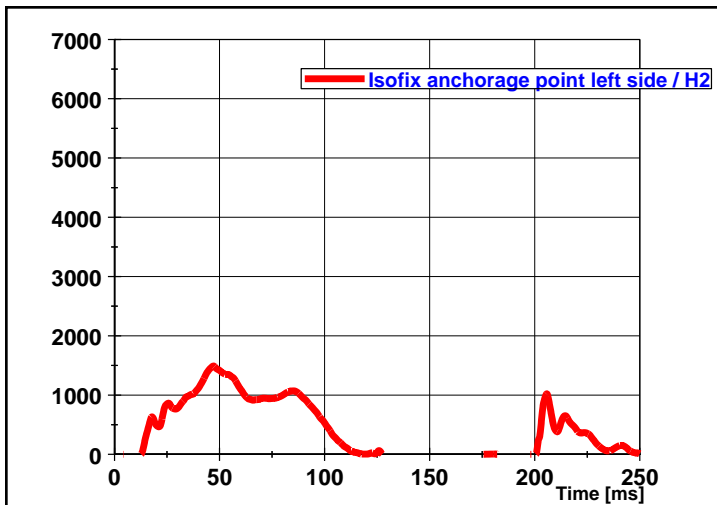
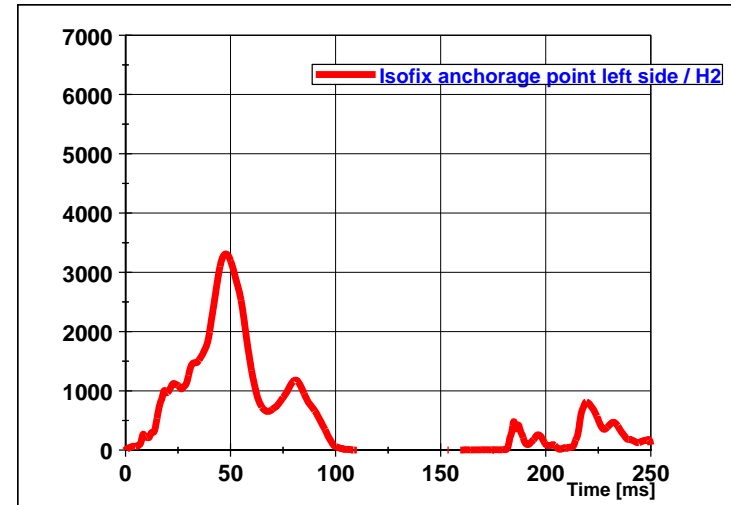
# Results

force time curves comparison Isofix support leg and Isofix top tether

Isofix support leg (SL) P3 X,Z-Axis



Isofix top tether (TT) P3 X,Z-Axis



# Conclusions

- Worst Case is Isofix 2-points with the 6 year occupant. Isofix seat connectors can handle up to 13 KN in ECE R44 pulse
- A combination of occupant mass and seat of 34 kg (Dummy P6 22 kg and a Isofix seat of 12 kg) did not show any damage on Isofix connectors when using ECE R44 puls
- When comparing Isofix plus support leg restraint and Isofix 2-point plus top tether restraint, higher loads are found in the support leg case