Torso Belt Path Assessment for Non-integral ECRSs

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Child Safety Informal Working Group, January 2016

Aim

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- To create a method and criteria to assess non-integral child restraints, to identify poor or good seat belt routing and positioning, that can be implemented into Regulation 129
- The method should be applicable for the Q3, Q6 and Q10
- To ensure non-integral child restraints can provide a seat belt path which is correctly positioned on the shoulder and across the chest of the occupant.

Method of Investigation

	Q3				No CRS	Booster	Poor	Cushion
	Chest Angle			°				
	Thigh angle			°				
	Neck		mm	mm	mm	mm	mm	mm
1	Centreline to belt							
2	Outside shoulder joint edge to belt							
3	Jacket seem to belt	Y						
4	Top of suit	Y						
	Chest		Clavicle	IR -Tracc				
5	Top of ribcage to belt	Z						
		Y	20	66				
6	Clavicle Retainer	Z						
		Y						
7	Left feature to belt	Z	70	70				
		Y						
8	Right Feature to belt	Z	70	70				
		Y						
9	Bottom ribcage to belt	Z						
		Y	75	39				
	Pelvis		Pelvis					
10	Left abdomen to belt	Z	38					
	Left pelvis to belt							
11	Right abdomen to belt	Z	38					
	Right pelvis to belt							
12	Centre abdomen to belt	Z	50					
	Centre of pelvis							

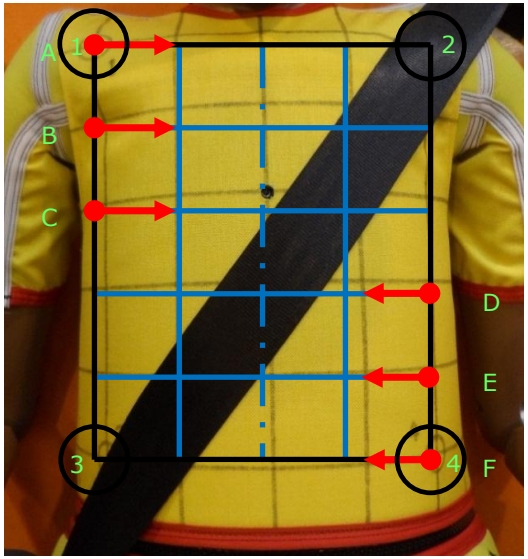
Method

- Measurement method based on IIHS
- Measurements taken in R129 test environment
- Different designs of child restraint were measured to determine a criterion for assessing the belt fit
- Initially a large range of measurements were taken with/without the suit
- Measurements that were difficult or not repeatable were removed

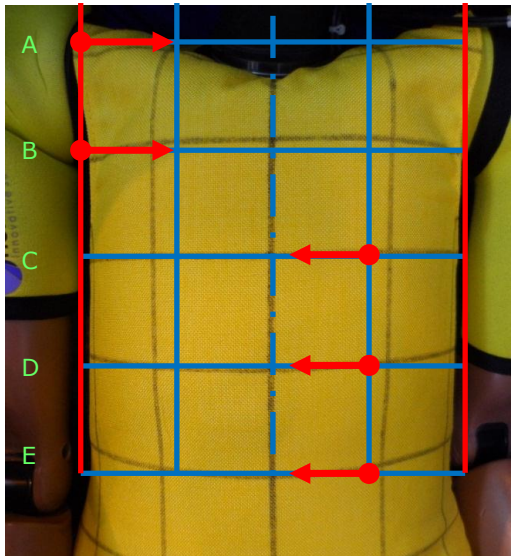
Method of Investigation - Grid Suit Measurements

Method progressed to using Q6 & Q10 grid suits, whereby measurements can be easily measured and recorded to determine the belt path for the different seats

Grid suit



Q10 grid



Q6 grid

Method of Investigation - Child Restraints

- Various different designs of child restraint have been evaluated
- These included child restraints that are perceived to position the seat belt wide on the shoulder or too close to the neck.
- Four different types were used:

No CRS

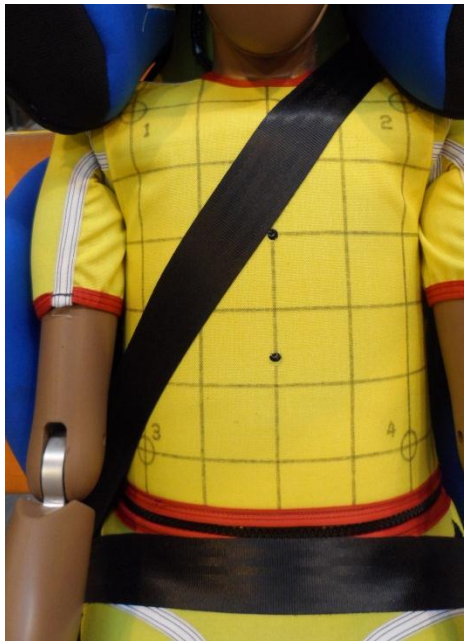
Booster Seat 1

'Poor' CRS
(abdomen loading)

Booster Cushion 1

Torso Belt Path Assessment - Results

- Belt path assessment based on IIHS method
- Criteria created to avoid being A) or C)



A) Too close to neck

B) Ok

C) Too wide

Torso Belt Path Assessment - Criteria

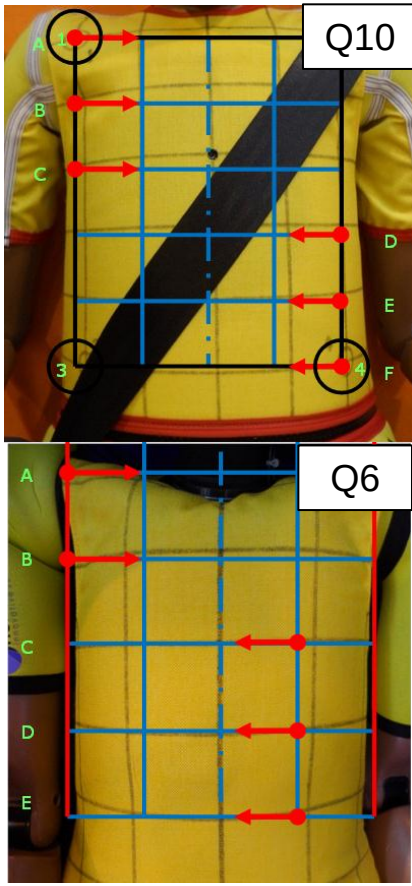
Belt path assessment based on belt position relative to grid suit

Use for Q3, Q6 & Q10

Values based on R129 test bench using UMTRI installation

Dummy	Suit	Grid A	Grid E	Grid F
Q10	Grid Suit	110< x <145	N/A	-190< x
Q6		105< x <130	-140< x	N/A
Q3		To be defined when suit is available		

*Measurements based on RHS B-pillar, measurements need to be inverted for LHS B-pillar



Complete assessment on Q3 once grid suit becomes available (expected early 2016)