


# Independent Transport
# **Research, Consultancy & Testing**

Creating the future of transport

# EC child safety project – proposal for testing

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# CRS 49-05e – Items to be reviewed for Phase 2

- Q dummies issues – Leader: TRL (Jolyon)
  - Q10 Size
  - Abdominal criteria
  - Chest behaviour and deflection
  - Dummies behaviour
  - Submarining
  - Drawing
- Test procedure – Leader: TRL (Jolyon)
  - Severity
  - Test bench

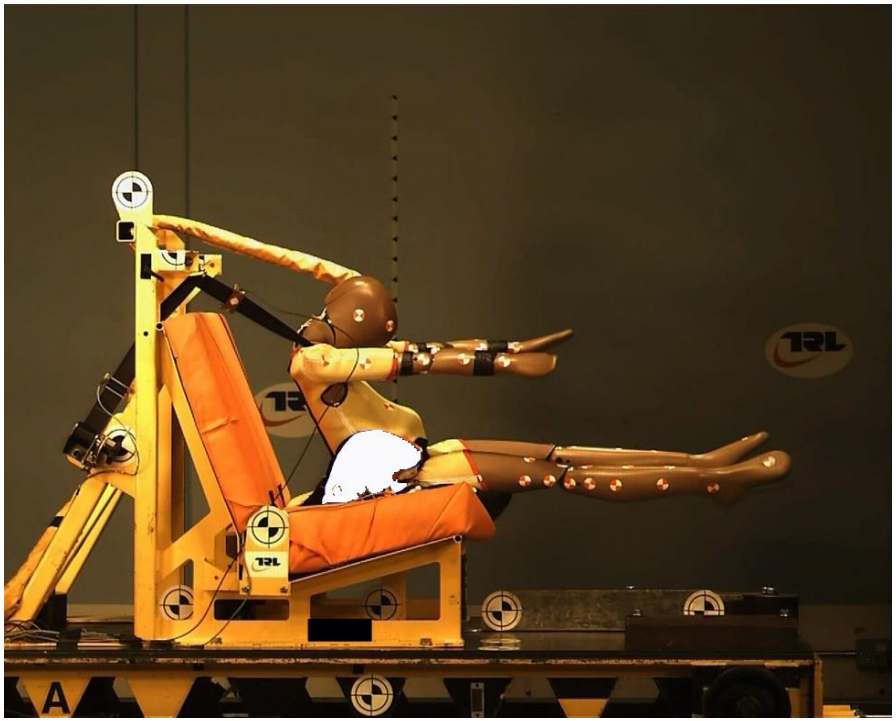
# Q dummies issues

Basis for proposed tests for European Commission project

| Issue | Response |
| --- | --- |
| ▪ Q10 Size | ▪ Experience with the dummy will allow the group to set reasonable values for limits on head excursion |
| ▪ Abdominal criteria / Chest behaviour and deflection | ▪ Supporting the work of the chest and abdomen injury criteria task force, experience with new sensors may support adoption of sensible limits for regulation |
| ▪ Dummy behaviour | ▪ Still need to look at belt slippage across chest – are we removing the need for belt guides? |
| ▪ Submarining | ▪ Building on the succes of the Q6 pelvis inserts, test using these and Q3 and Q10 equivalents |

# Dummy behaviour

## Submarining



**Lack thereof**

- We understand that it has been difficult to generate submarining with Q-Series dummies in R129 conditions
- Initial tests with Q6 pelvis inserts (Dorel) show promise in addressing this
- Would equivalent products also work with Q3 and Q10?
  - Confirm results with Q3, Q6 and Q10

# Abdomen loading and submarining

- Need to gain experience using the Q10
  - This will help with evaluation of thresholds
  - It will also provide information to aid discussions on Q10 size
- Need to find a seat where submarining is a realistic expectation
  - Based on experience with R44 testing and P10 dummy
    - TRL can modify a seat to show characteristics we want to avoid

# Test Matrix – Abdomen loading and submarining

| Test | CRS | Dummy | Dummy Extras | Pulse | Test Environ. | Result |
|---|---|---|---|---|---|---|
| 1 | Submarining CRS (w/o ISOFIX) | P10 | - | R129 | R44 | No Submarining |
| 2 | Submarining CRS (w ISOFIX) | P10 | - | R129 | R44 | Submarined |
| 3 | Submarining CRS (w ISOFIX) | P10 | - | R129 | R129 | Submarined |
| 4 | No CRS | P10 | - | R129 | R44 | No Submarining |
| 5 | Submarining CRS (w ISOFIX) | Q10 | Abdomen sensors and Pelvis insert | R129 | R129 | Planned in June |
| 6 | Good Belt Guidance Booster Seat | Q10 | Abdomen sensors and Pelvis insert | R129 | R129 | Planned in June |

# Dummy behaviour

## Chest behaviour and deflection

### Belt slippage

- Understand tendency for shoulder belt to move towards the neck
- This means less risk of twisting out of the belt
  - Any need for effective belt guides anymore?
- Also moves loading away from chest deflection sensor
  - Peak measured deflection coincides with chin to chest contact
  - Second sensor being used in chest and abdomen injury group

# Belt slippage and chest deflection measurements

- Hoped that injury risk functions for chest deflection come from chest and abdomen injury criteria group
  - Unlikely to offer definitive injury risk function this year
  - May offer concept that could be used to identify inappropriate loading of the chest
- Still need to investigate the general kinematics of the dummy
  - P-Series tended to 'roll out' of belt
  - Q-Series less inclined to roll out
    - Shown that basic belt guide keeps shoulder belt sliding to the neck
    - What about booster cushion or no CRS?

# Chest behaviour and deflection

| Test | CRS | Dummy | Dummy Extras | Pulse | Test Environ. | Result |
|---|---|---|---|---|---|---|
| 7 | Booster cushion | P10 | - | R44 | R44 – no offset of CRS on bench | Planned in June |
| 8 | Booster cushion | P10 | - | R129 | R129 | Planned in June |
| 9 | Booster cushion | Q10 | Abdomen sensors & Pelvis insert | R129 | R129 | Planned in June |
| 10 | Booster cushion | Q10 | Abdomen sensors & Pelvis insert | R129 | R129 with extreme D-ring position | Planned in June |
| 11 | No CRS | Q10 | Abdomen sensors & Pelvis insert | R129 | R129 | Planned in June |
| 12 | No CRS | Q10 | Abdomen sensors & Pelvis insert | R129 | R129 with extreme D-ring position | Planned in June |
| 13 | Booster seat | Q10 | Abdomen sensors & Pelvis insert | R129 | R129 | Planned in June |
| 14 | Booster seat | Q10 | Abdomen sensors & Pelvis insert | R129 | R129 with extreme D-ring position | Planned in June |

# Chest behaviour and deflection

| Test | CRS | Dummy | Dummy Extras | Pulse | Test Environment | Result |
|---|---|---|---|---|---|---|
| 15 | Booster cushion | P6 | - | R44 | R44 | Belt remained on shoulder |
| 16 | Booster cushion | Q6 | 2nd deflection sensor + abdomen sensors and pelvis inserts | R129 | R129 | Planned in August |
| 17 | Booster cushion | Q6 | " | R129 | R129 with extreme D-ring position | Planned in August |
| - | No CRS | Q6 | " | R129 | R129 | DOREL test demonstrated submarining |
| 18 | No CRS | Q6 | " | R129 | R129 with extreme D-ring position | Planned in August |
| 19 | Booster seat | Q6 | " | R129 | R129 | Planned in August |
| 20 | Booster seat | Q6 | " | R129 | R129 with extreme D-ring position | Planned in August |

# Chest behaviour and deflection

| Test | CRS | Dummy | Dummy Extras | Pulse | Test Environment | Result |
|---|---|---|---|---|---|---|
| 21 | Inflatable | P3 | - | R44 | R44 | Abdomen belt remained in place Shoulder belt stayed on shoulder |
| 22 | Inflatable (guides not used) | P3 | - | R44 | R44 | Abdomen belt lifted into lower abdomen Shoulder belt stayed on shoulder |
| 23 | Inflatable | Q3 | 2nd deflection sensor + abdomen sensors and pelvis inserts | R129 | R129 | Planned in August |
| 24 | Inflatable | Q3 | " | R129 | R129 with extreme D-ring position | Planned in August |
| 25 | Inflatable | Q3 | " | R129 | Additional test for pragmatic belt slippage assessment | Planned in August |

# Belt slippage and chest deflection measurements

- Request stakeholder data for testing experience with Q3, Q6, Q10:
  - Non-integral restraints (Phase II)
  - Without a CRS
  - Poorly performing CRS (development work?)

  - In R129 test environment
  - In body shell/vehicle test environment

  - Belt interaction solutions (thank you, Dorel)
  - Chest and abdomen loading measurements

# Thank you

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