



Q-dummies Update in 2004

Q-Dummies (original design)

- Issues and problems based on user feedback:
 - Original series did not cover all CRS mass groups.
 - Intended use in EuroNCAP and future ECE-44 testing increased loading conditions
 - Durability problems with shoulders
 - Increased neck rotation without increase in neck moment
 - Not reliable as an injury measurement device
 - Unstable neck design (buckling).
 - Mass distribution head and neck

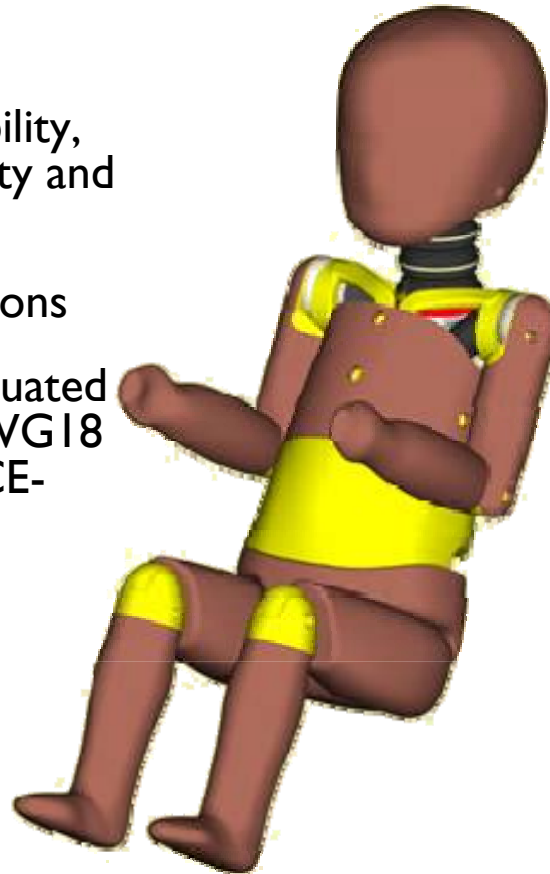


Q-Dummies Update Program

- Update program started 2003
- Improve dummy durability, retain current biofidelity and anthropometry
- Frontal impact evaluations
- Updated dummies evaluated by EEVC WG12 and WG18 (for introduction in ECE-R44)
- Q1.5 added to cover ECE-R44 mass groups

Improvements made:

- New head and neck design
- New durable rubber shoulder design
- IR-TRACC replaces string potentiometer
- Modified hip cups and elbow joint of Q3 and Q6.
- Q0 dummy developed in CHILD project (see separate presentation)



Q-dummy Updates Design details

New head
(heavier,
stiffer)

Angular
velocity
sensors
(optional)

New neck
(600 gram
lighter)

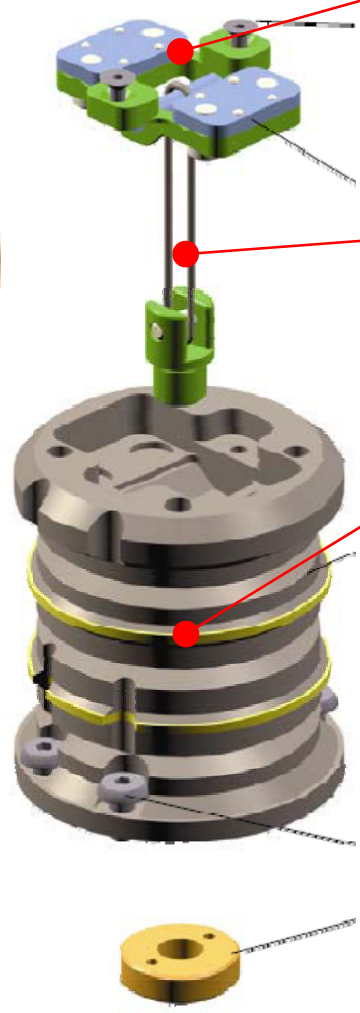
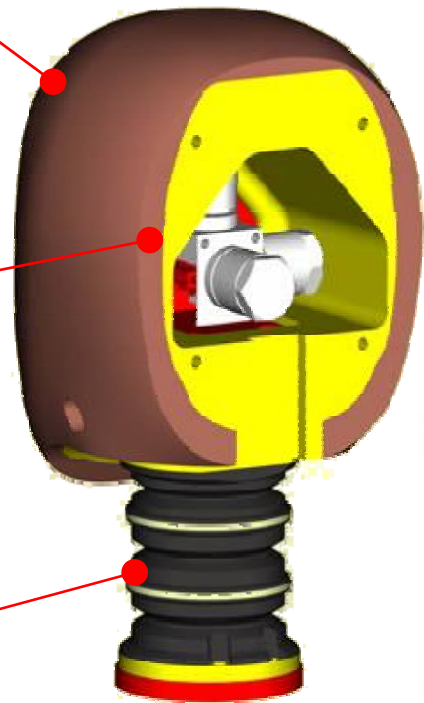
No hinge / swivel joint at
OC

Double neck cord
(central)

Neck with three rubber
segments aluminum disks

*Neck common of Q1, Q1.5 and
Q3*

*Q0 and Q6 dedicated necks
similar design*



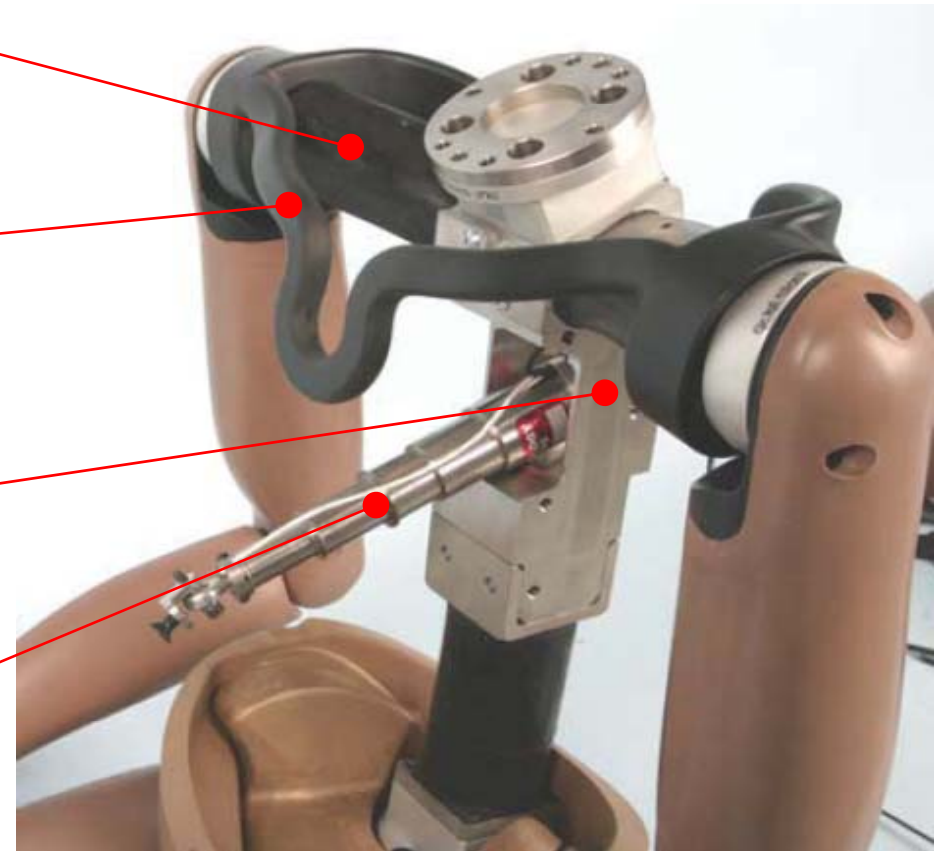
Q Updated Design Features

New rubber
shoulder
(90 gram heavier)

Modified clavicle /
scapula part

Thoracic spine
lighter version

IR-TRACC
Q3 and Q6 only
(string pot remains in Q1
and Q1.5)



Q6 shown (ribcage and abdomen omitted)

Durability Evaluations

200 Sled test

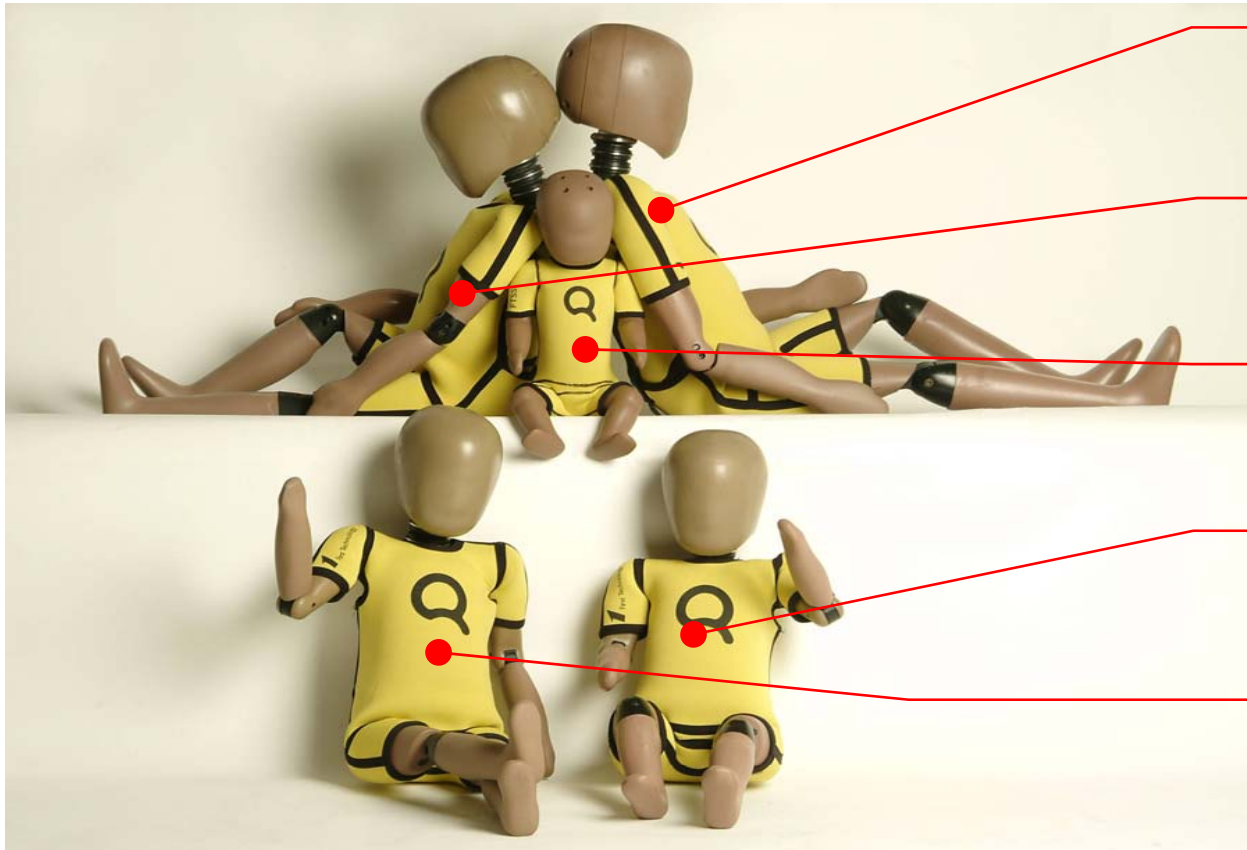
- Pulse based on average EuroNCAP pulse.
- Speed difference 60 km/h, deceleration of 40g.
- **Rigid seat** to maximize dummy loading.
- Each dummy type sustained 40 tests.
- Q0 and Q1 dummy have been tested rearward facing
- Q1.5, Q3 and Q6 have been tested forward facing.

Results

- Results of durability tests are good.
- No significant damage
- Additional improvements are being made to improve handling



Q-family fully equipped ...



Q6 23.0 kg

Q3 14.5 kg

Q0 3.4 kg

Q1 9.6 kg

Q1.5 11.0 kg

... to contribute to child safety