Informal document GRSP-68-10
68th GRSP, 07-11 Dec. 2020
Agenda item 12

CLEPA
European Association of Automotive Suppliers

EXPLANATORY PRESENTATION TO CLEPA NECK LOAD LIMITS PROPOSAL

Submitted by the experts from CLEPA

68th session of GRSP, 07 - 11th December 2020

BACKGROUND

- ECE/TRANS/WP.29/GRSP/2019/19 proposed chest vertical acceleration limits for Q0, Q1 and Q1.5 dummies
  - Justification was potential for increased neck loading in rear-facing CRS with a supine seating position
  - R129 requires **tensile neck force** and **flexion moment** to be measured for monitoring only
- GRSP deferred discussion to allow analysis of neck loads collected during R129 type-approvals
  - Data provided by **UK(VCA), Spain** and **CLEPA**

ANALYSIS METHOD

Overview

1. UK, Spain and CLEPA samples combined: 49 CRS = 471 tests
2. Data separated for each dummy by impact direction and CRS orientation
3. Worst-case condition identified for each dummy
4. Statistical analyses carried out (95^{th} percentile; Mean+2SD)
5. Limits proposed based on statistical analyses and outliers

ANALYSIS METHOD

Caveats

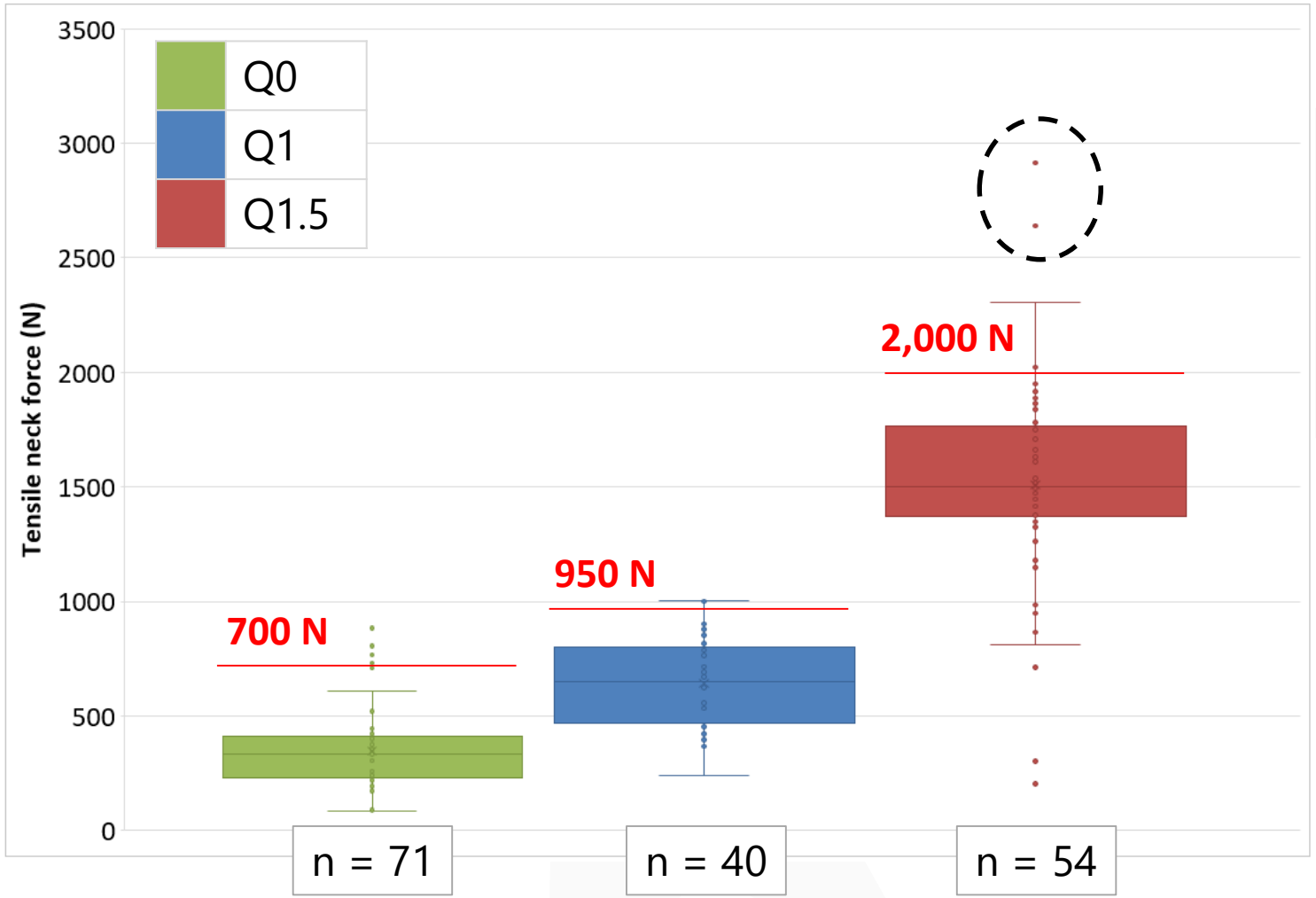
- SAE J211 sign convention may not have been used in all tests in VCA sample (especially flexion moment)
- Timing of peak value is unknown and may have been generated in rebound (especially flexion moment)
- UK, Spain and CLEPA samples may not be representative of the wider CRS market
- Any limits are pragmatic and their relationship to real-world injury risk is unknown

PROPOSAL

Tensile neck force

Dummy	95th %ile	Mean + (2*SD)	Limit proposal
Q0	720	670	**[700] N**
Q1	905	1018	**[950] N**
Q1.5	2,122	2,443	**[2,300] N**
With upper outliers removed*:			
Q1.5	1,931	2,261	**[2,000] N**

* CLEPA-Japan discussion – 26.11.20

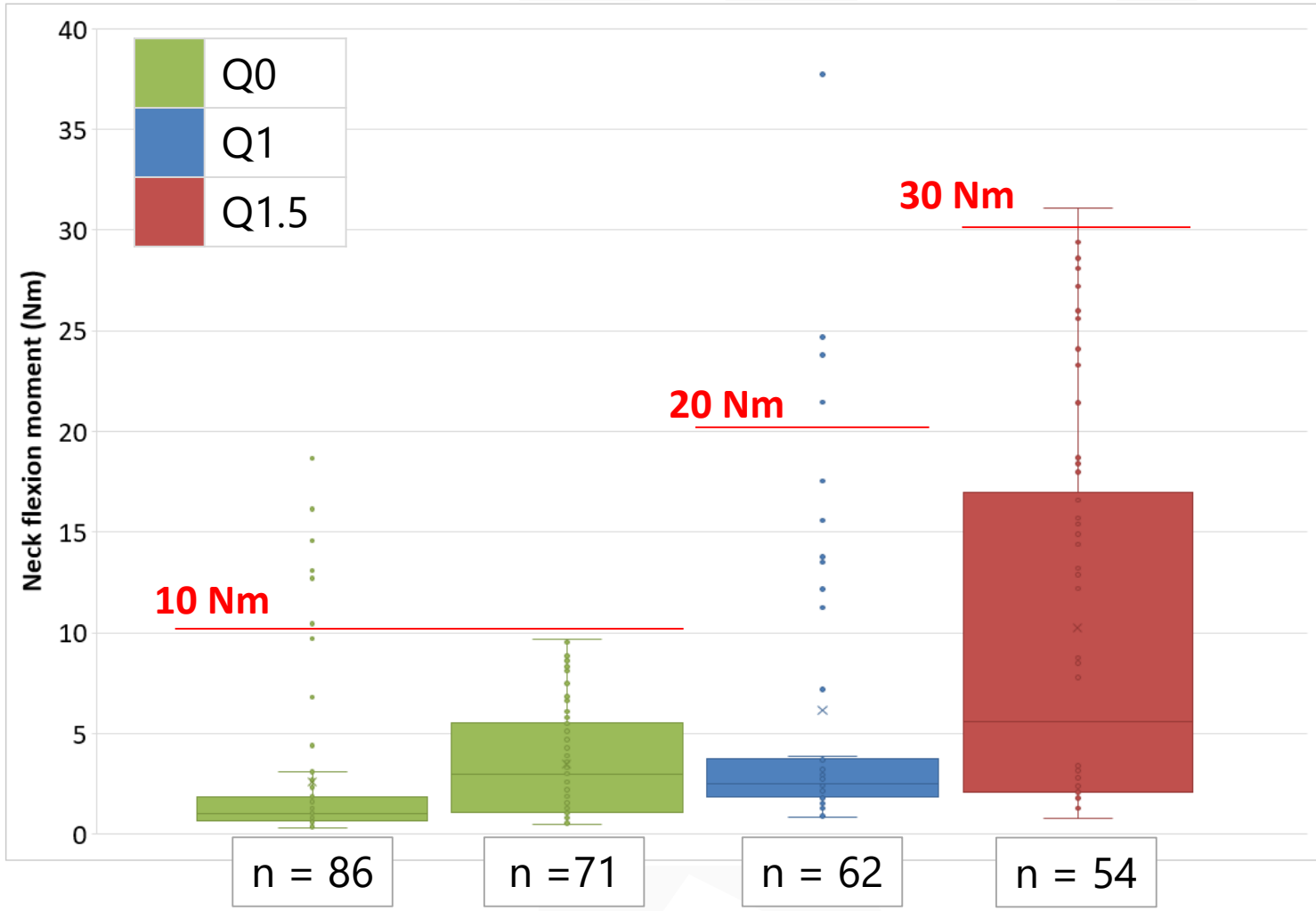


PROPOSAL

Neck flexion moment

Dummy	95th %ile	Mean + (2*SD)	Limit proposal
Q0*	13.0	10.8	**[10] Nm**
	8.7	8.8	
Q1	23.7	23.3	**[20] Nm**
Q1.5	28.3	29.5	**[30] Nm**

* Worst-case is unclear for Q0 dummy



MOVING FORWARD

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- The analysis and limits presented here are **work-in-progress** based on samples from **UK**, **Spain** and **CLEPA** only (**49 CRS**)
- Can other **Contracting Parties** provide their anonymised monitoring data to support our analysis and confirm the proposed limits?
- CLEPA proposes to defer a decision until **May 2021** with the understanding that further monitoring data will be provided


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