



# **EXPLANATORY PRESENTATION TO CLEPA NECK LOAD LIMITS PROPOSAL**

*Submitted by the experts from CLEPA*  
*67<sup>th</sup> session of GRSP, 20-23<sup>rd</sup> July 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 **VCA** and **CLEPA**

# ANALYSIS METHOD

## Overview

1. VCA and CLEPA samples combined
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<sup>th</sup> percentile; Mean+2SD)
5. Limits proposed based on statistical analyses and outliers

# ANALYSIS METHOD

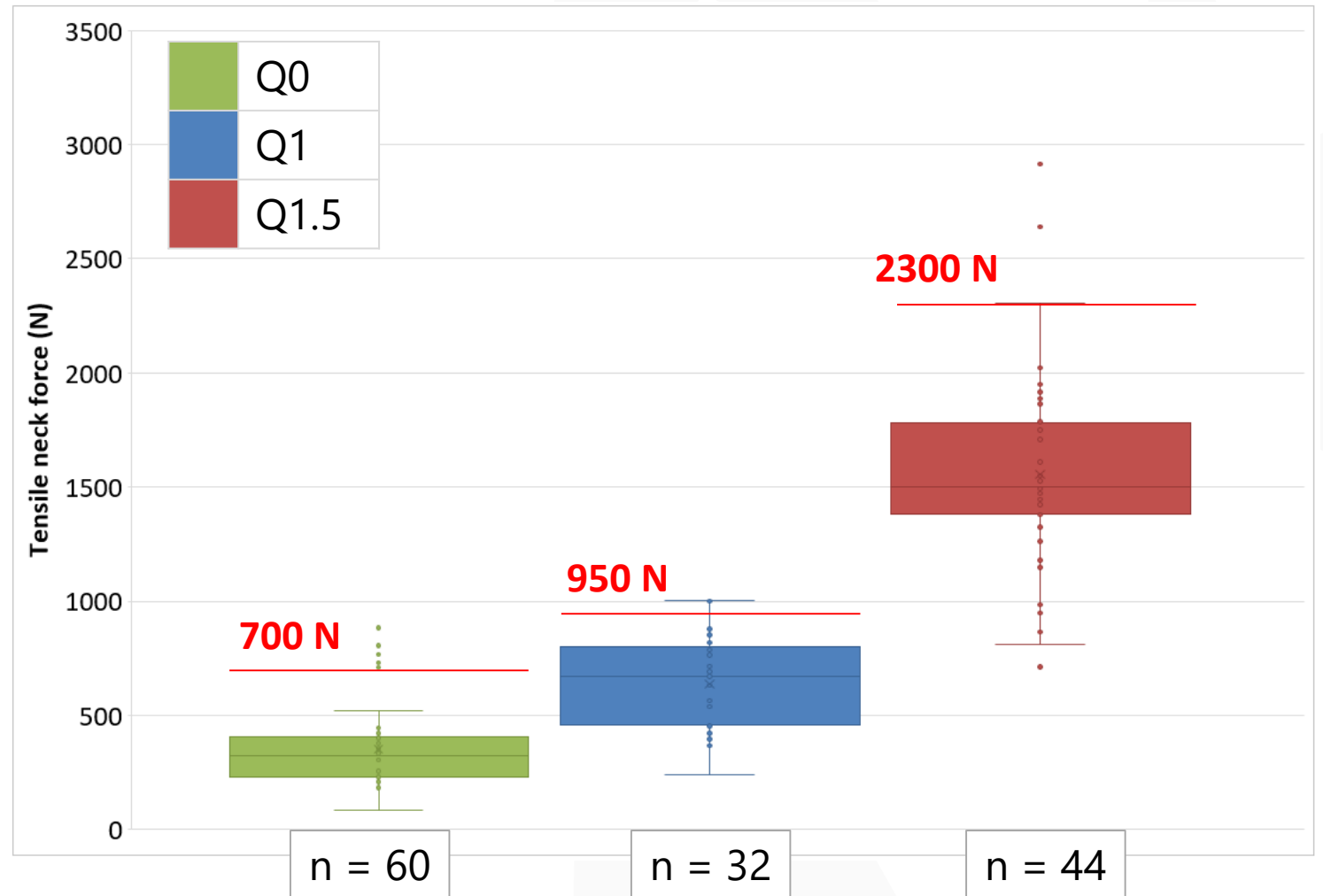
## Caveats

- 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)
- VCA 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	95 <sup>th</sup> %ile	Mean + (2*SD)	Limit proposal
Q0	732	680	<b>[700]</b>
Q1	933	1032	<b>[950]</b>
Q1.5	2264	2419	<b>[2300]</b>

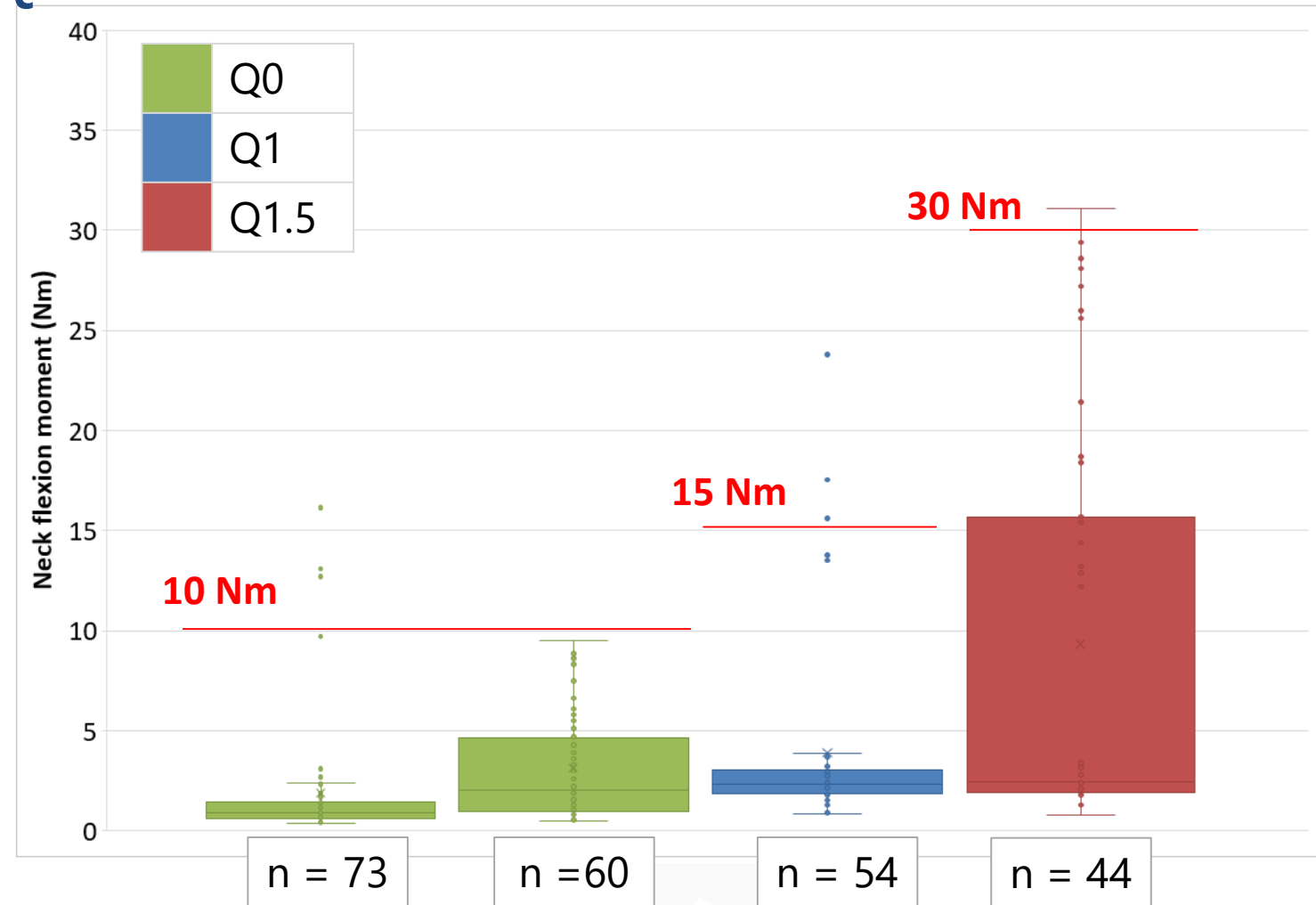


# PROPOSAL

## Neck flexion moment

Dummy	95 <sup>th</sup> %ile	Mean + (2*SD)	Limit proposal
Q0*	9.8	7.9	<b>[10]</b>
	8.6	8.3	
Q1	16.3	13.6	<b>[15]</b>
Q1.5	28.5	29.5	<b>[30]</b>

\* Worst-case is unclear for Q0 dummy



# MOVING FORWARD

- The analysis and limits presented here are based on samples from **VCA** and **CLEPA** only
- Can other **Contracting Parties** provide their anonymised monitoring data to support our analysis and confirm the proposed limits?
- A formal working document proposal will be submitted at **GRSP-68** in December 2020



**MANY THANKS FOR YOUR  
ATTENTION**