

BioRIDII Repeatability on Production Seat

June, 2011

**Ministry of Land, Transport and Maritime Affairs,
Korea Automobile Testing and Research Institute**

Objective of Repeatability

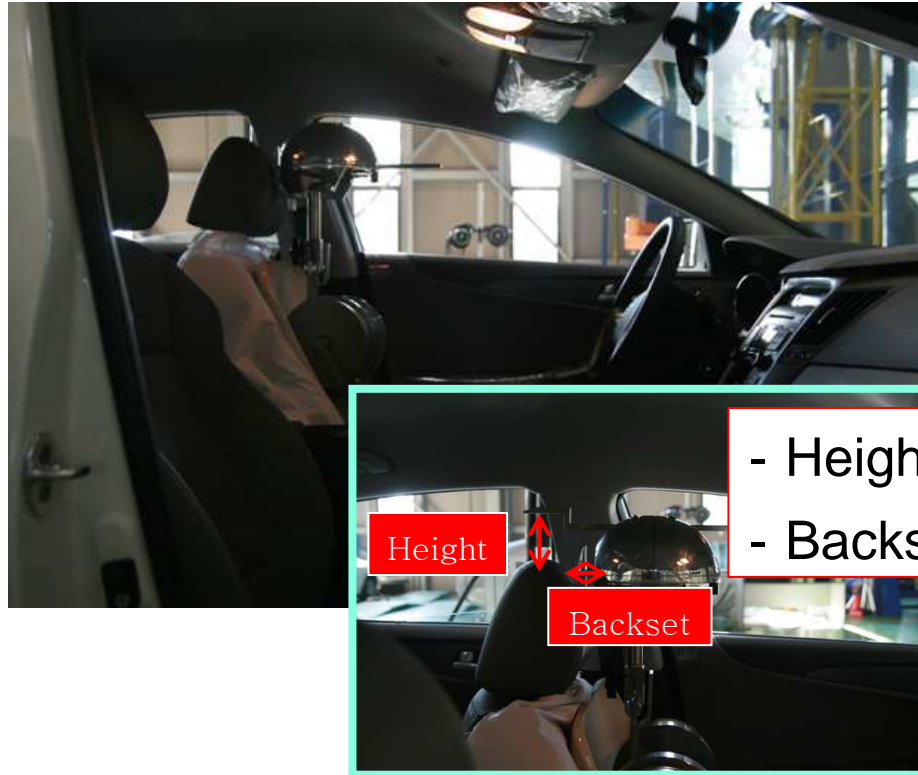
- Objective of repeatability test
 - Verify INDICATORS in BioRIDII when tested

- Tests

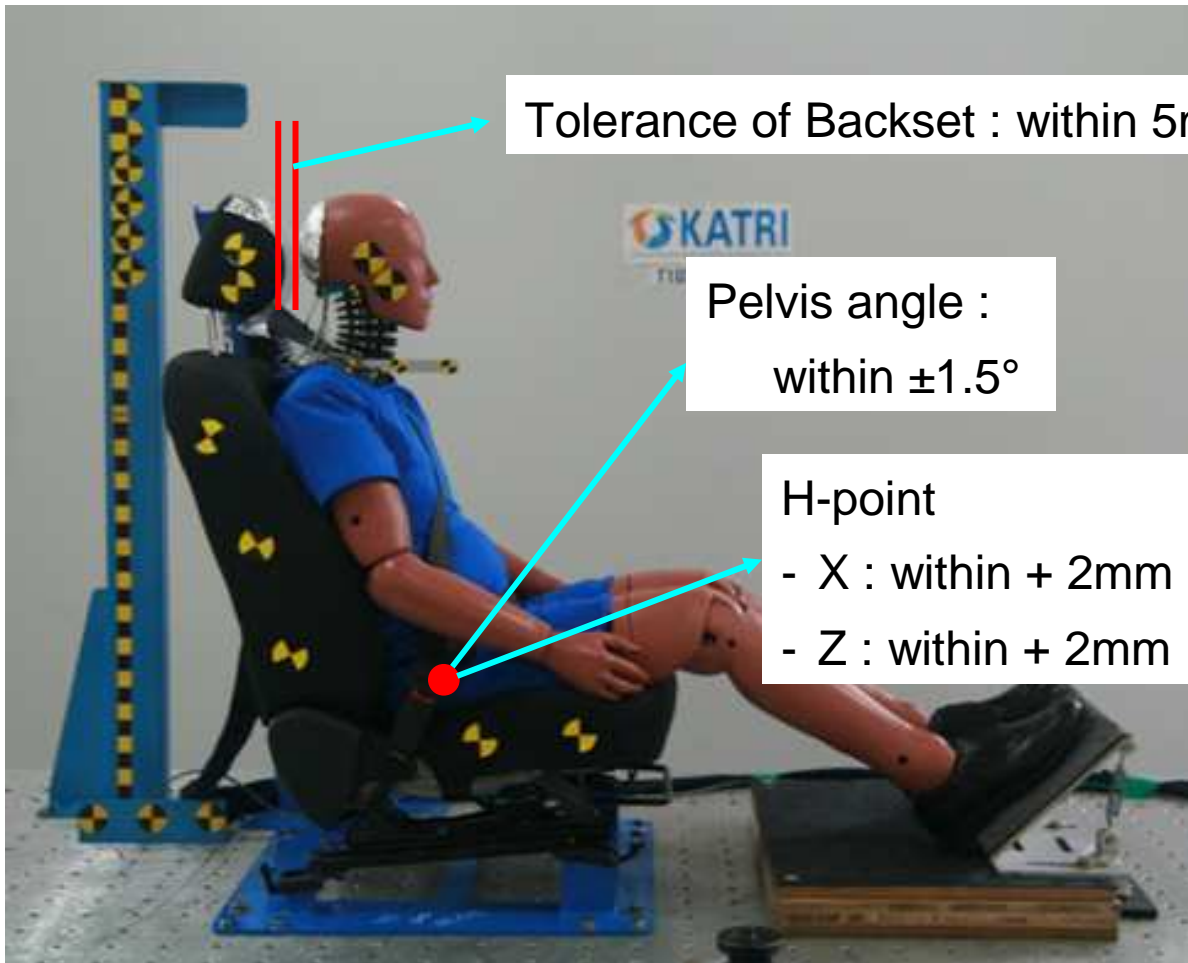
- Test sample : production seats
- Sled speed : 16 km/h & 20 km/h
- Number of tests : 5 at each speed
- Test procedure : KNCAP
- Indicators : NIC, HRC, T1 Acc, U_Fx, U_Fz, U_Fx, U_Fz, Nkm
- Dummy : BioRIDII-g 1



Static Evaluation

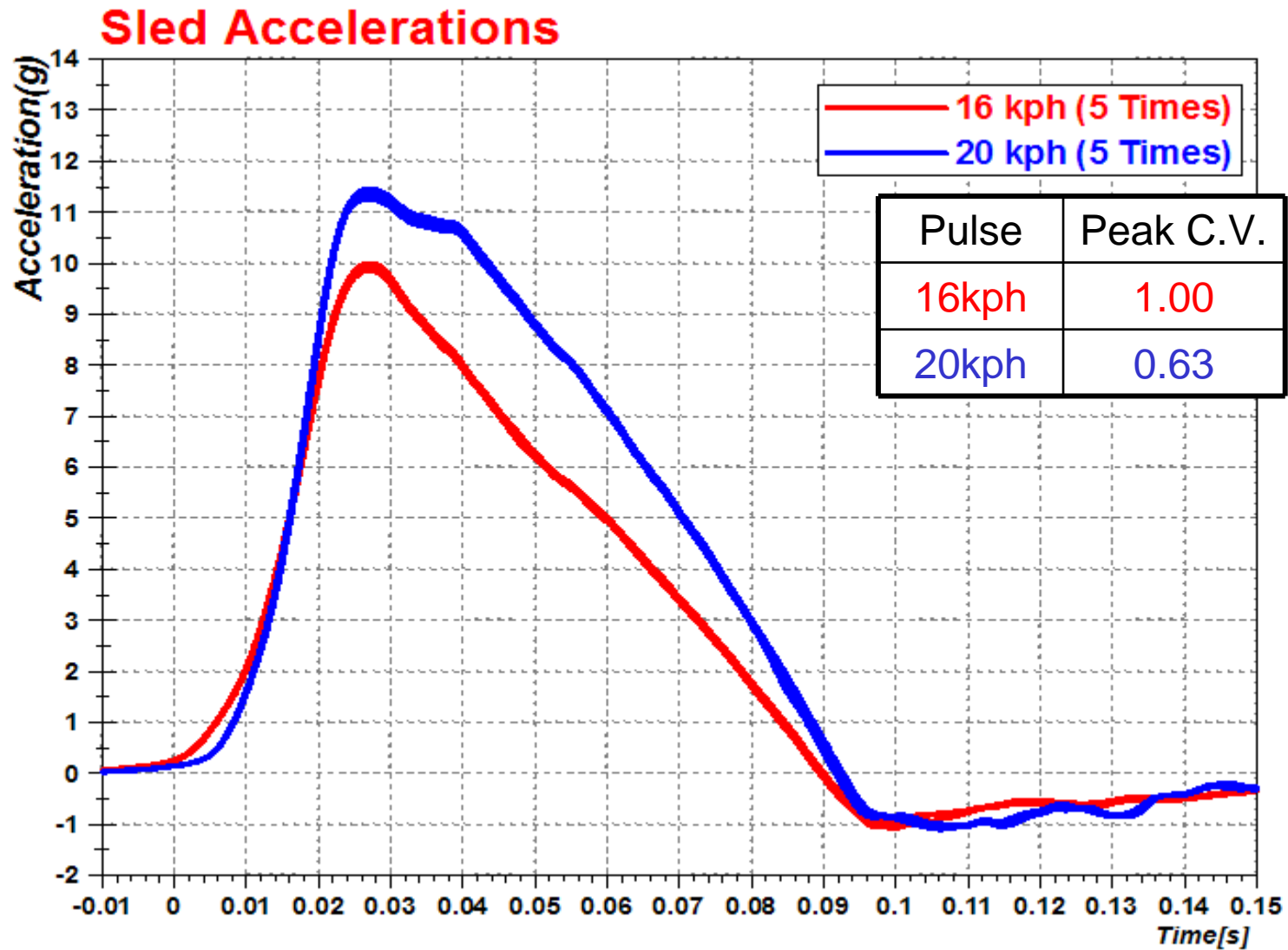


Dummy Sitting Conditions



Location	Target measure	Tolerance
H-point (X-axis)	+20mm Forward	$\pm 10\text{mm}$
H-point (Z-axis)	0mm	$\pm 10\text{mm}$
Pelvis angle	26.5°	$\pm 2.5^\circ$
Head plane angle	0°	$\pm 1^\circ$
Backset	15mm Forward	$\pm 5\text{mm}$

Pulse : 16km/h & 20km/h



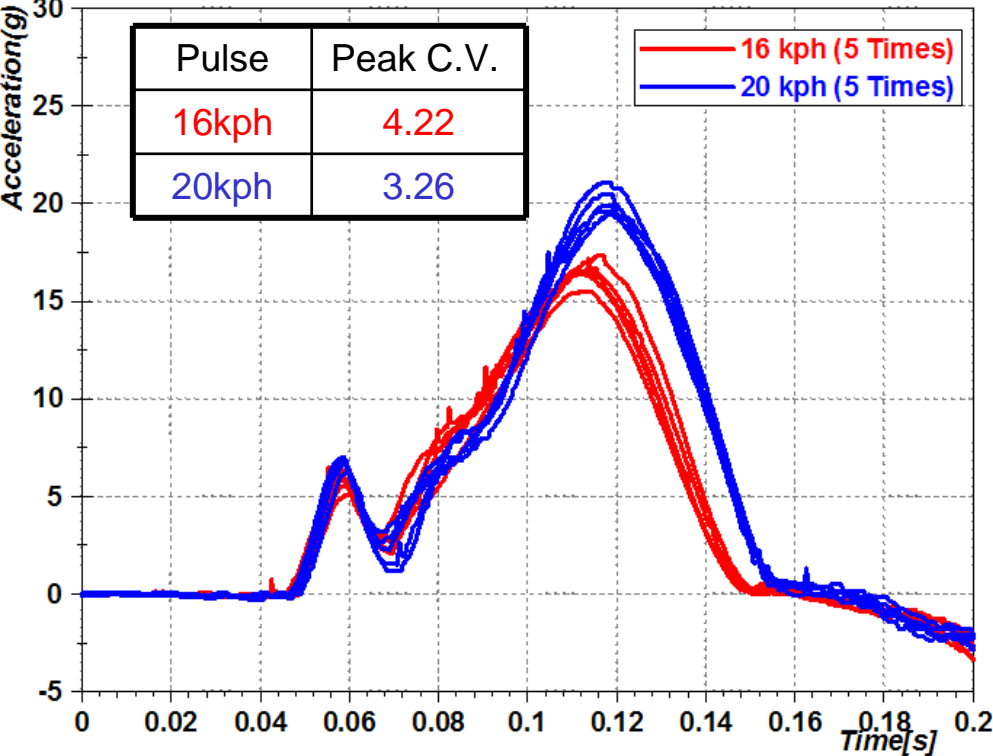
MLTM
Ministry of Land,
Transport and Maritime Affairs



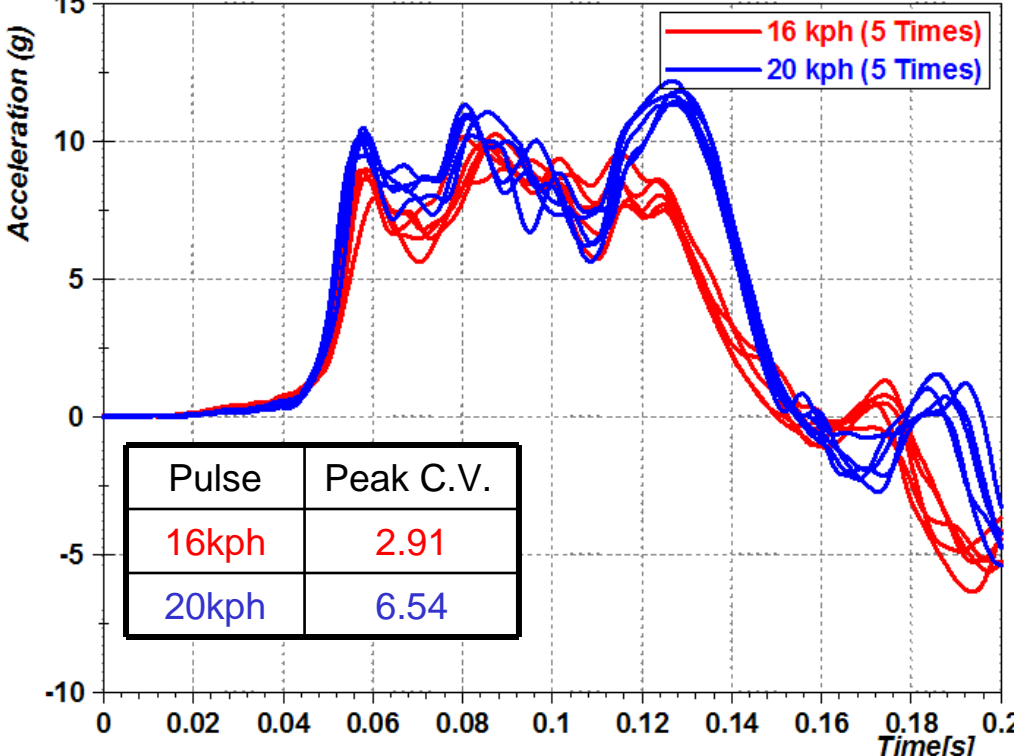
TS
Korea Transportation
Safety Authority

Test Results

Head X direction Accelerations

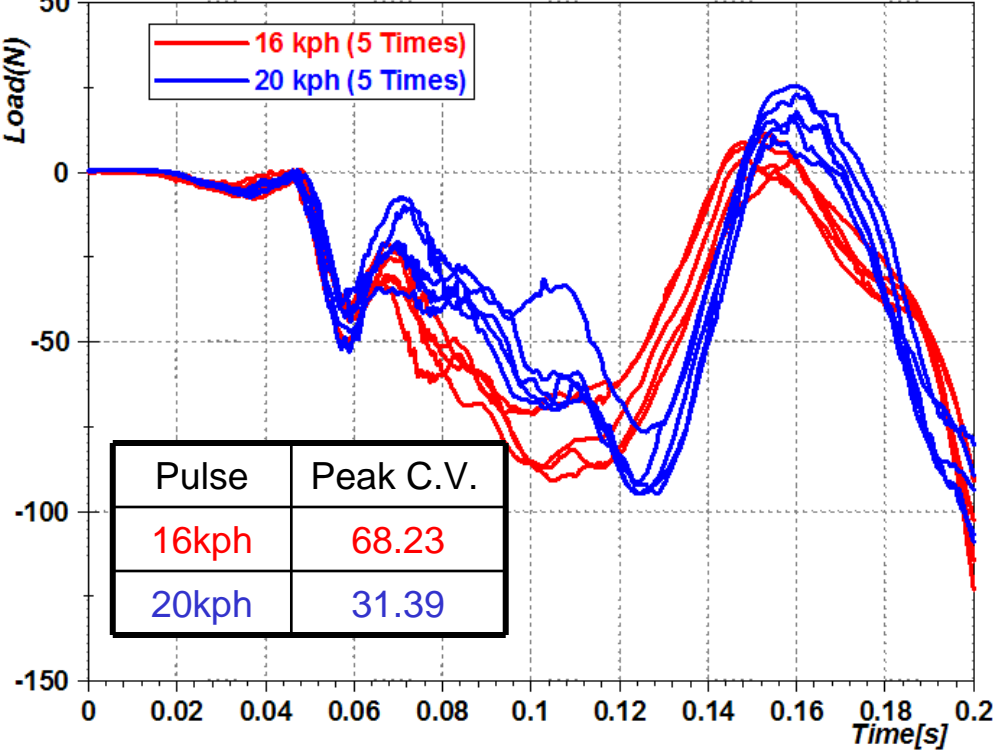


T1 X direction Acceleration

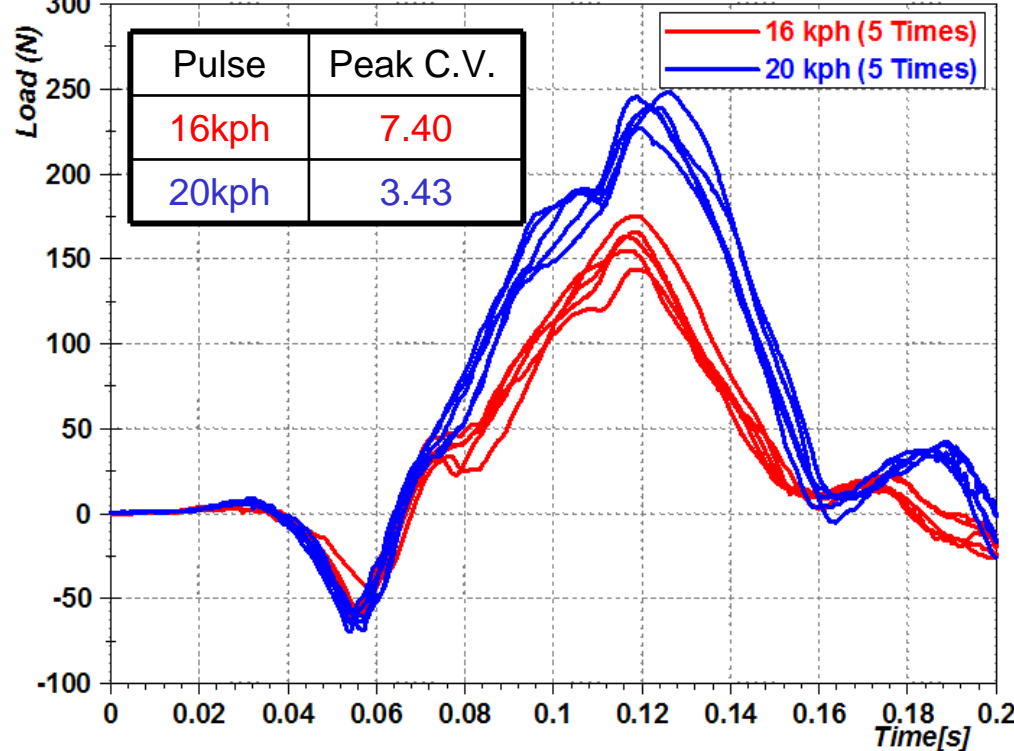


Test Results

Upper Neck Fx Load

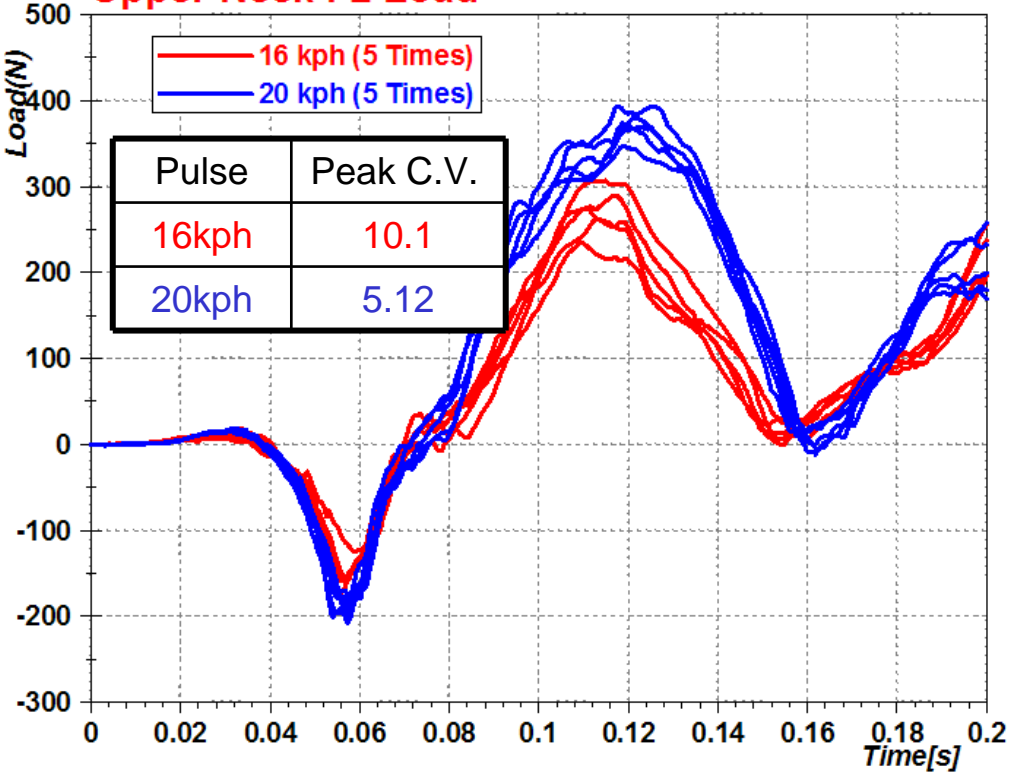


Lower Neck Fx Load

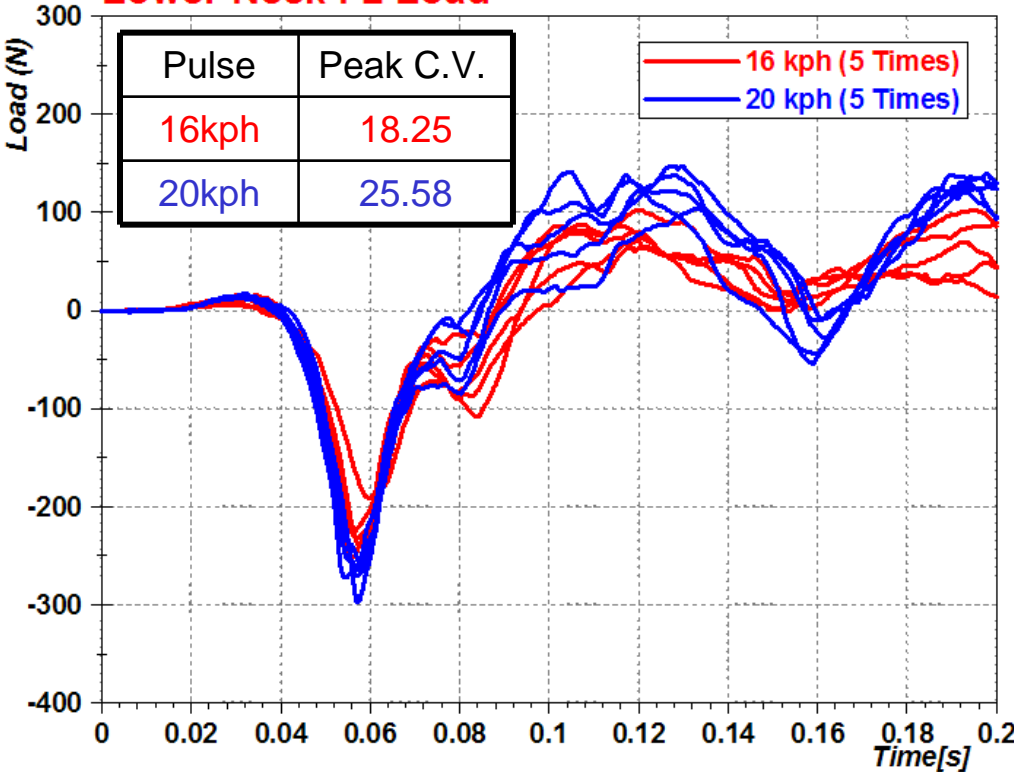


Test Results

Upper Neck Fz Load

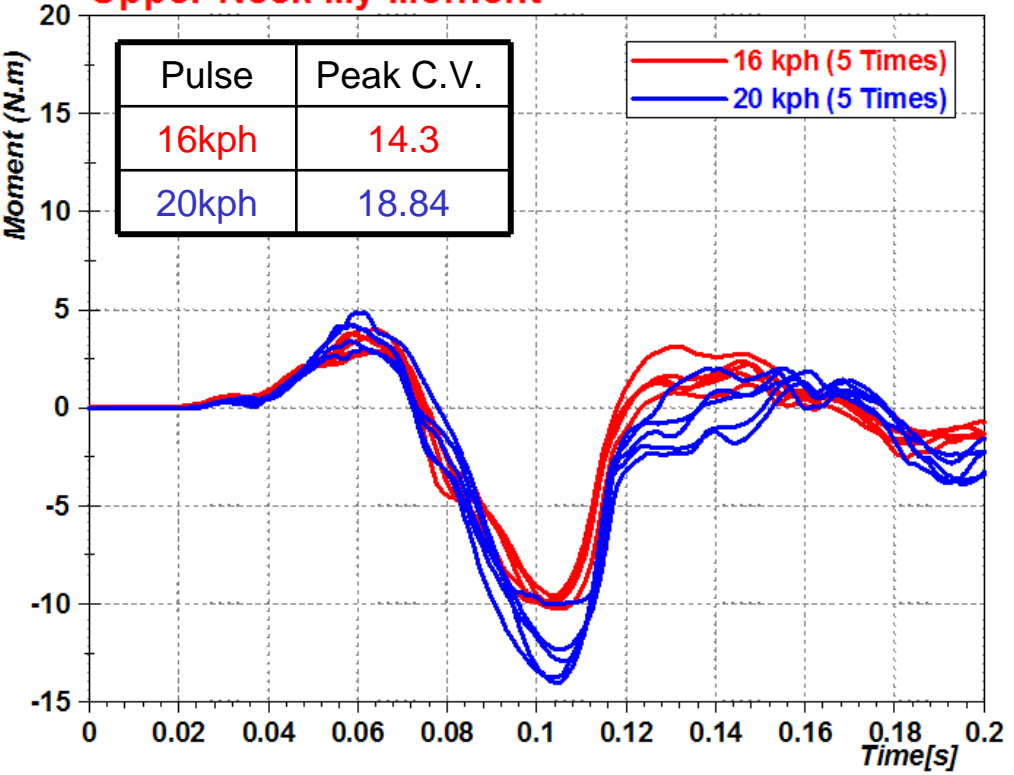


Lower Neck Fz Load

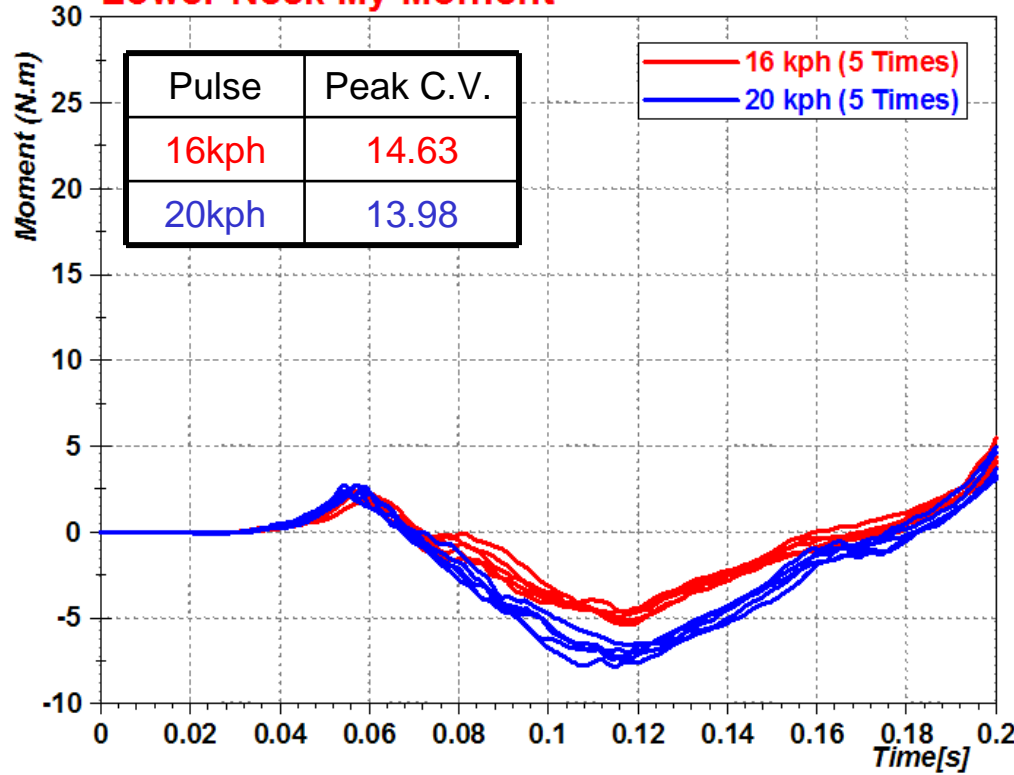


Test Results

Upper Neck My Moment

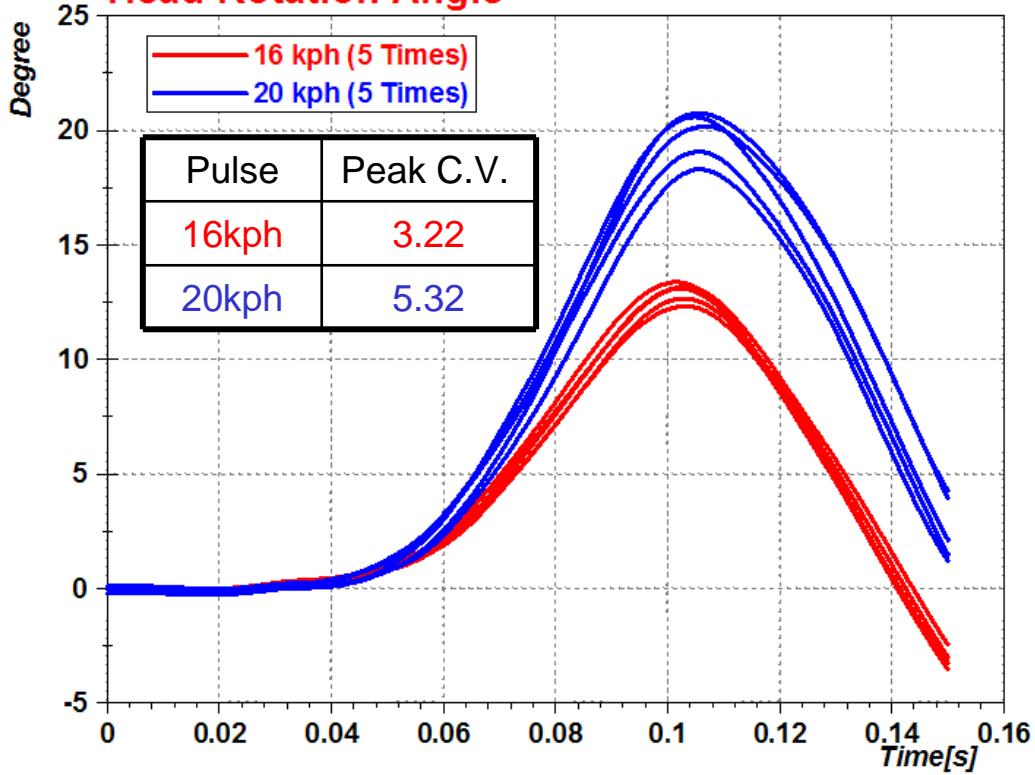


Lower Neck My Moment

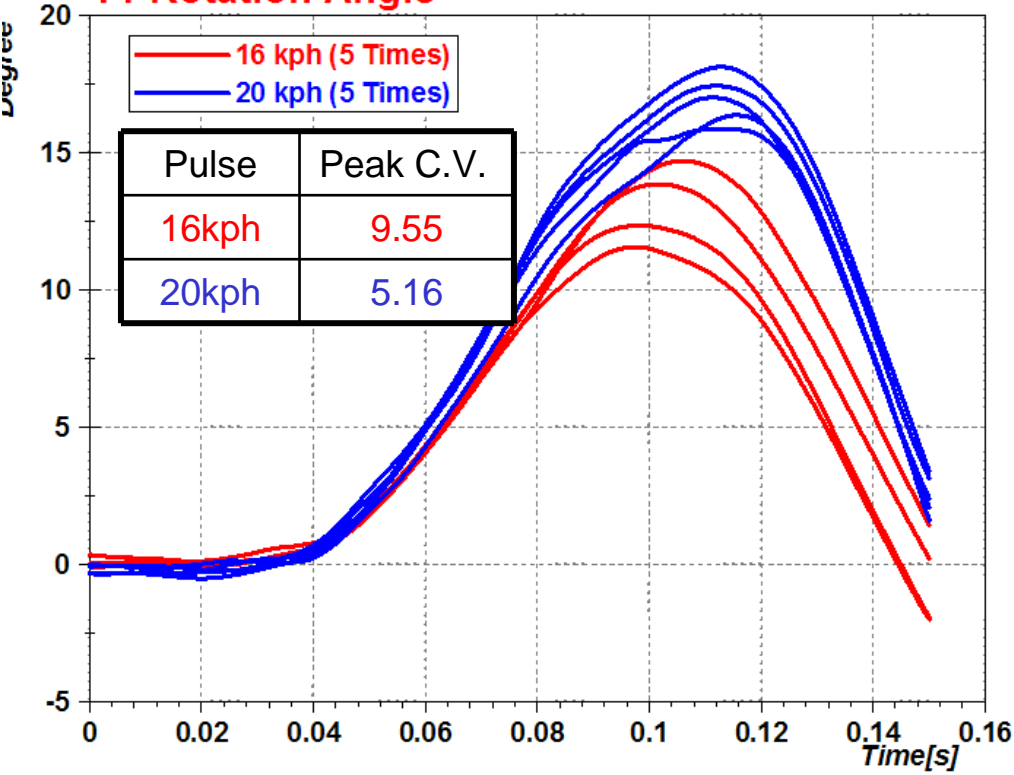


Test Results

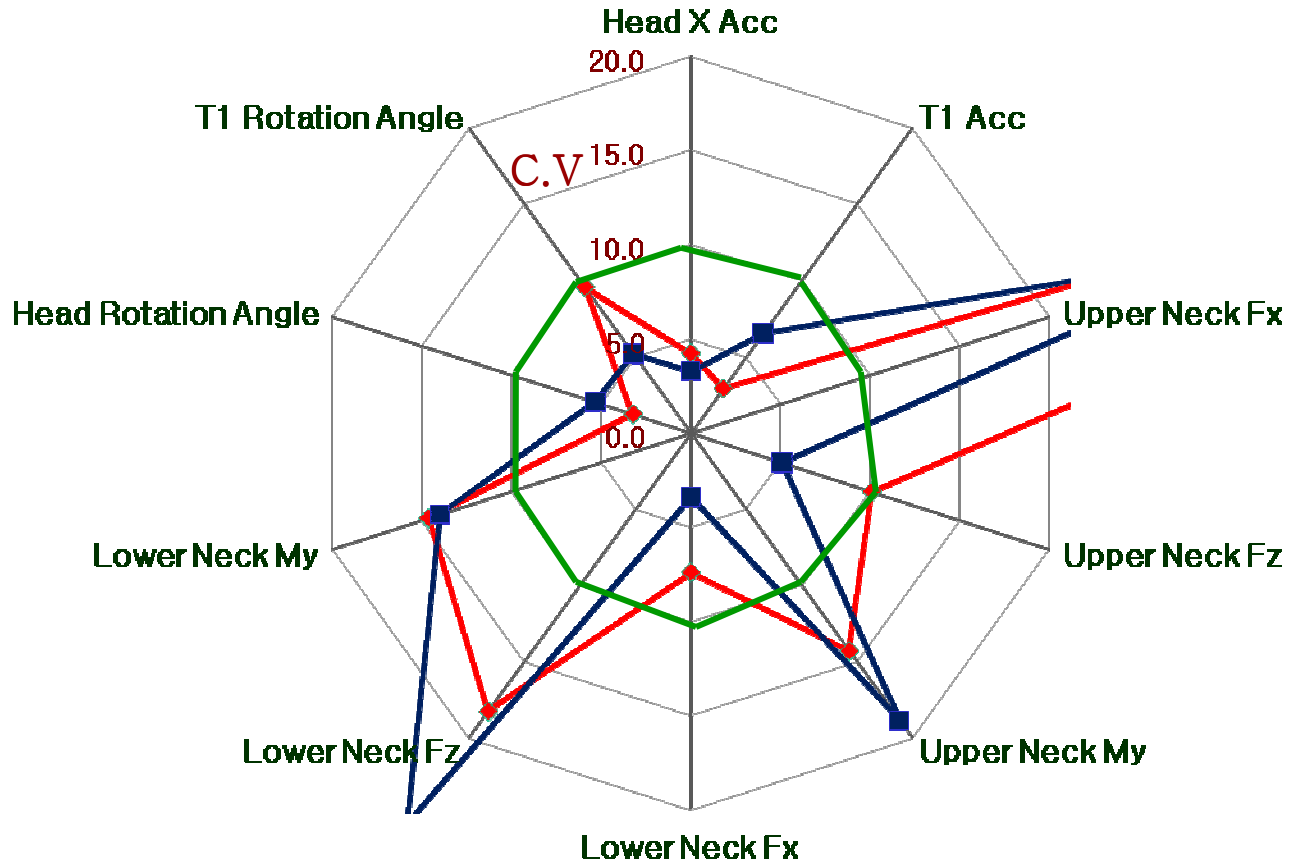
Head Rotation Angle



T1 Rotation Angle



C.V. of Indicators



— 16km/h — 20km/h



Summary

- ❑ Production seats were used to minimize the variation in seats.
- ❑ Repeatability tests were carried out from 2009 to 2010 **with BioRIDII**.
 - 2009 : GTR7-01-07 (Republic of Korea) GTR No.7 2nd phase research results
- ❑ For tests at 16 km/h : CVs of head X acc, T1 X acc, lower neck Fx, head & T1 rotation angle were below 10.
- ❑ In general **CV of indicators** at 16 km/h were larger than those at 20 km/h.
- ❑ Indicators predicting injuries showed **poor repeatability** in 10 tests.
- ❑ **Conservative approach** is necessary to include BioRIDII in GTR.
 - with limited number of tests, parameters of **head & T1 rotation angle, head X acc & T1 X acc** seem to be appropriate if BioRIDII is used in GTR.



Future Plan

- Keep accumulating test results to propose injury indicators**
- Test various seat models**
- Try to correlate 12 degrees criterion
n
b/w BioRIDII and HIII**