



Research progress of virtual testing in China

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Far side condition Virtual testing



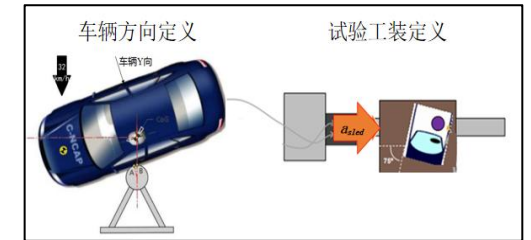
Load case

	Waveform	Dummy	Seat position
1	32pole*75°	WorldSID 50th	Consistent with the hardware pole collision
2	32pole*75°	WorldSID 50th	Based on condition 1, adjust to the highest level
3	32pole*90°	WorldSID 50th	Same working condition 1
4	32pole*90°	WorldSID 50th	Same working condition 2
5	32pole*60°	WorldSID 50th	Same working condition 1
6	32pole*60°	WorldSID 50th	Same working condition 2
7	32pole*75°	Sid2s	Design Position If the design position is at the highest, adjust it to the middle position
8	32pole*75°	Sid2s	Based on working condition 7, adjust to the highest level

Waveform conversion

condition	Conversion factor
75°	1.035
90°	1.000
(base waveform)	
60°	1.155

(angle fixed)



WS50 Arm Sleeveless



SID2S arm is located on the side of the airbag

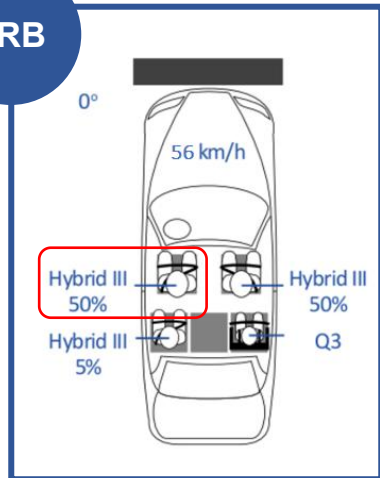
Active and passive OOP virtual testing



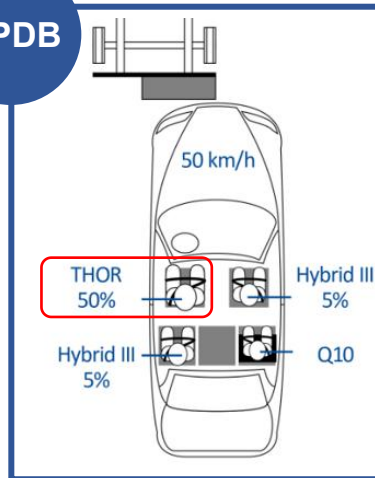
Load case

- FRB and MPDB Driver protection

FRB



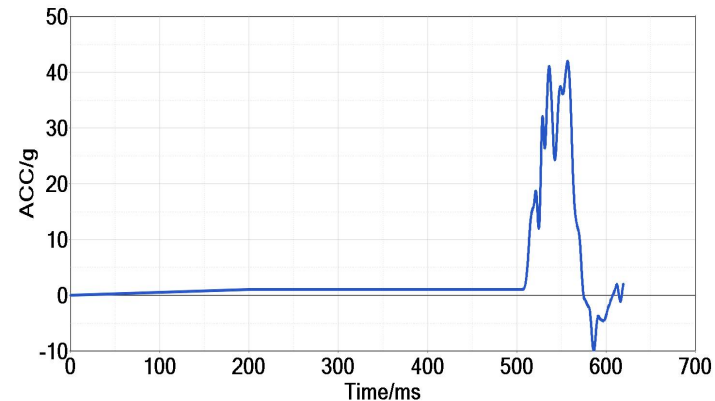
MPDB



Waveform

- AEB standard waveform and collision waveform integrated input

AEB+carash



Testing

- Injury to the upper body of the THOR dummy

Injury



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01 Existing extension virtual testing

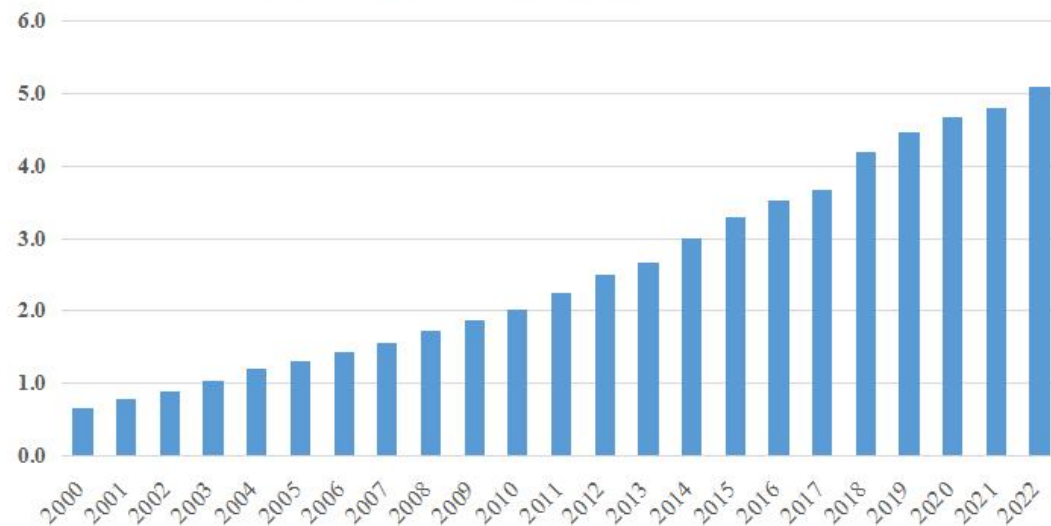
02 Equitable Occupant Protection VT research

Research background



In the past two years, the number of Chinese drivers is increasing year by year, female drivers have been growing rapidly at a scale of around 13 million people per year, and the proportion of male and female drivers has been less than twice

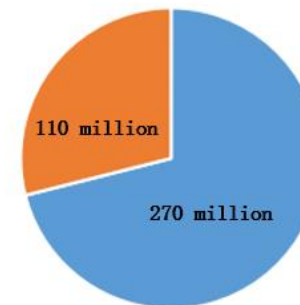
Statistics on the number of motor vehicle drivers in China over the years (2000-2022)



Data source: National Bureau of Statistics

Ratio of male to female drivers

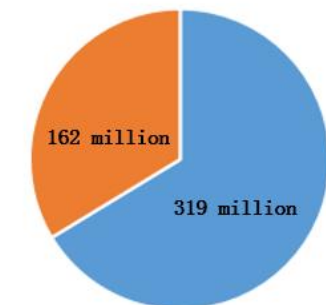
2017



Male Female

Ratio 2.45 : 1

2022



Male Female

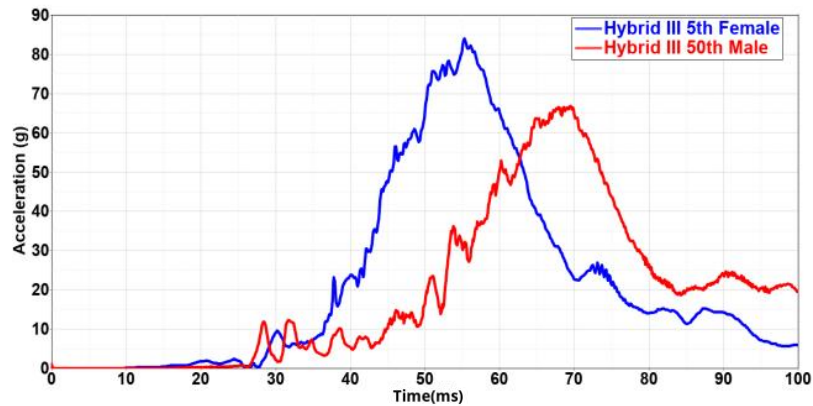
Ratio 1.97 : 1

Data source: Ministry of Public Security

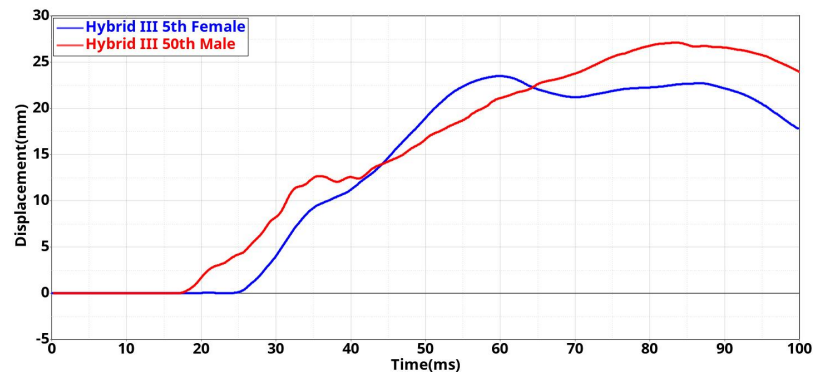
Front side of the diversity simulation



FRB Male/Female Head ACC Comparison



FRB Male/Female Chest Compression Comparison



	Male Limit	Hybrid III 50 th Male Dummy	Female Limit	Hybrid III 05 th Female Dummy
HIC ₁₅	500-700	380	500-700	615
Head Acc 3ms/g	72-80	66.9	72-80	84.1
Neck Shear/kN	1.9-3.1	1.17	1.2-1.95	0.77
Neck Tension/kN	2.7-3.3	0.93	1.7-2.62	1.41
Neck Extension/N·m	42-57	33.6	36-49	38.6
Chest Max Compression/mm	22-50	24.9	18-42	23.5
Chest VC /m/s	0.5-1.0	0.12	0.5-1.0	0.15
Left Femur compression/kN	3.8-9.07	0.84	2.6-6.2	0.68
Right Femur compression/kN	3.8-9.07	0.92	2.6-6.2	1.26
Left Knee slider compression/mm	6-15	2.16		3.8
Right Knee slider compression/mm	6-15	2.87		0.2

whiplash of the diversity simulation



whiplash of second row seat

