

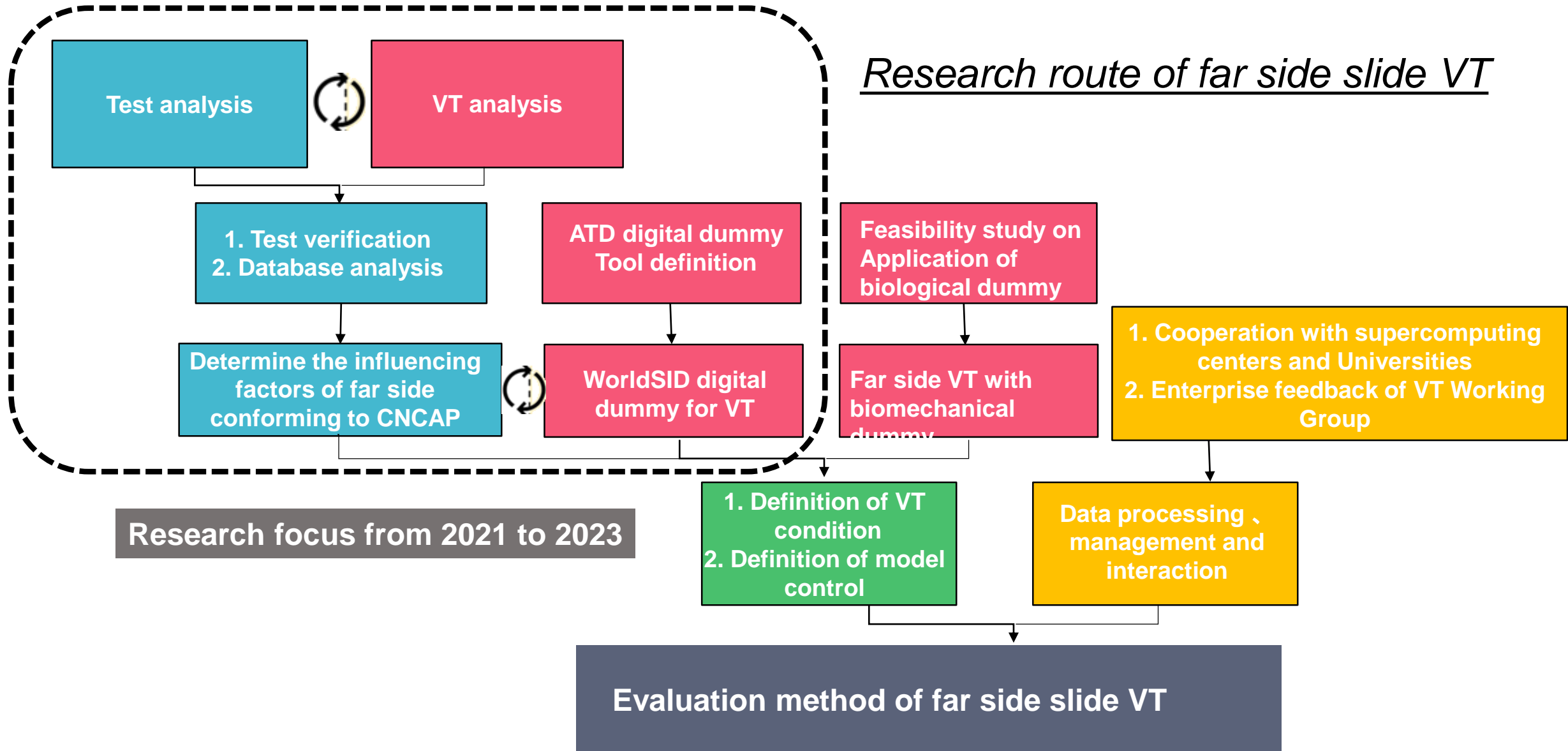


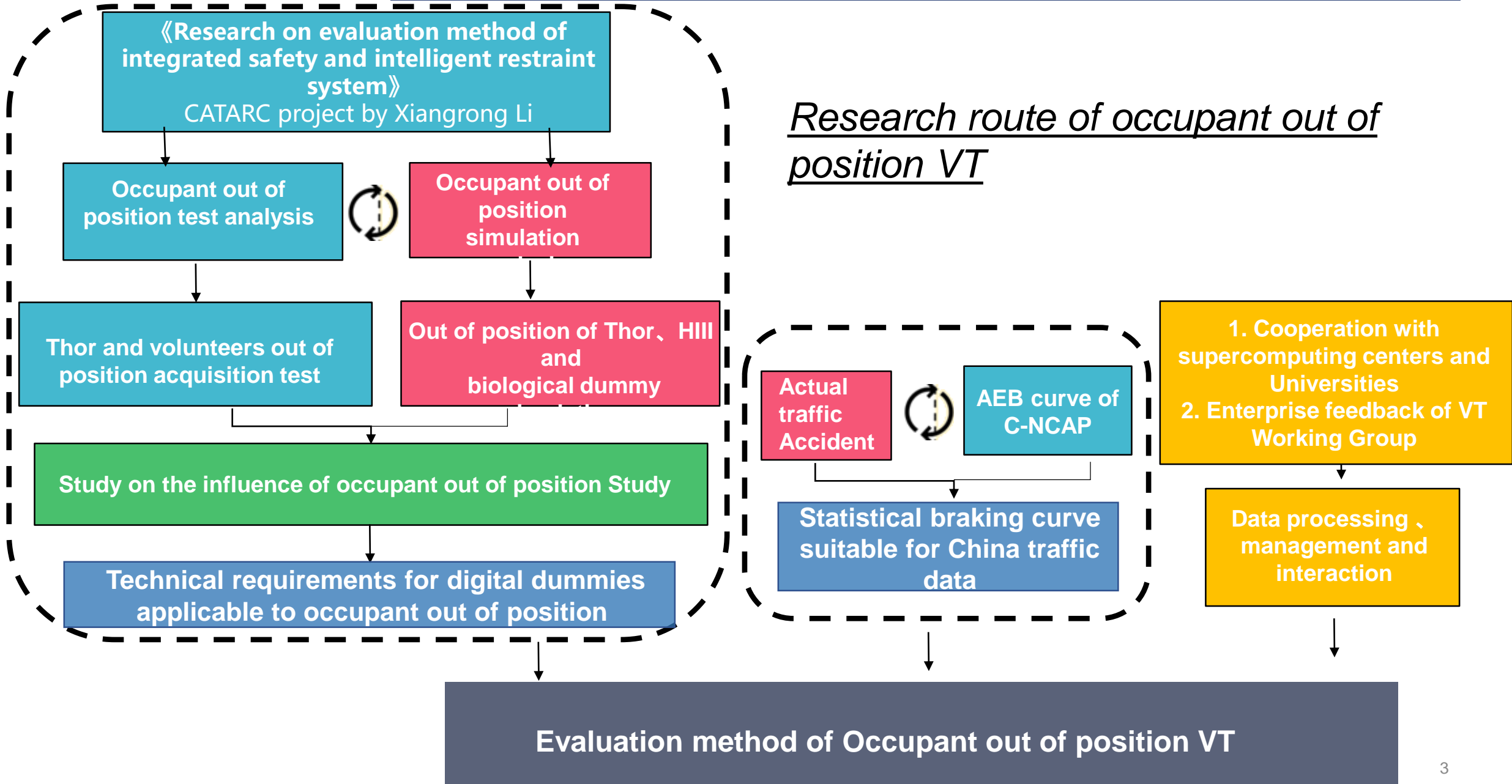
中汽中心 | 汽车测评



C-NCAP虚拟测评研究内容与计划

Research and plan of C-NCAP VT

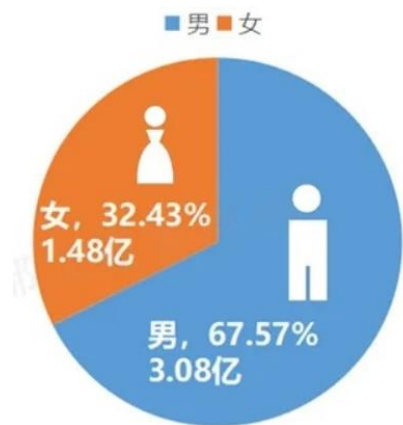




Research route of occupant out of position VT

Far side 女性假人试验研究 Experimental study on far side female dummy

全国驾驶人性别比例图



*来源于公安部交管局
Source: Traffic Control Bureau

从2016年到2020年的五年间，女司机人数从9738万增加到1.48亿，增加了5000多万；女司机占比，从27.23%增加到32.43%；2020年男女司机比例已接近2:1。

From 2016 to 2020, female drivers increased from 97.38 million to 148 million, an increase of more than 50 million; The proportion of female drivers increased from 27.23% to 32.43%; In 2020, male drivers are twice as likely as female drivers.

部位 Injury Region	伤害指标 Injury Criteria (E-NCAP)	RH		Worldsid50		SID2s		备注 Remarks
		NCAP限值		结果 Value	得分 Point	结果 Value	得分 Point	
		Higher	Lower					
头部 Head	HIC ₁₅	500	700	8.1	4.0	69.0	4.0	CAE Result
	Acc 3ms (g)	72	80	11.0	4.0	25	4.0	
颈部 Neck	上颈部伸张力 UP Fz(kN)		3.74	1.51	4.0	1.10	4.0	
	上颈部x向弯矩 UP Mx(Nm)	162	248	<u>33.0</u>	4.0	<u>21.7</u>	4.0	
	上颈部y向弯矩 UP My(Nm)		50	<u>7.50</u>	4.0	<u>20.0</u>	4.0	
	下颈部伸张力 LOWER Fz(kN)		3.74	1.78	4.0	1.13	4.0	
	下颈部x向弯矩 LOWER Mx(Nm)	162	248	<u>29.4</u>	4.0	<u>99.3</u>	4.0	
	下颈部y向弯矩 LOWER My(Nm) (20-21监测monitoring)		100	<u>11.00</u>	4.0	<u>60.0</u>	4.000	



头部偏转较大，与中控挤压手臂
Large head rotation, squeezing the arm with the central control



WorldSID50 CAE



SID2s CAE

Far side工况，女性乘员颈部伤害较男性存在更大风险。
Female passengers have a greater risk of neck injury than men

主被动AEB离位研究 occupant out of position in AEB

Pre-Crash

In-Crash



碰撞报警
Collision alarm

碰撞避免
Collision avoidance

发生碰撞
Collision

乘员伤害
Occupant injury

AEB制动波形

AEB braking waveform

- 制动波形提取
Braking waveform extraction
- 波形简化处理
Waveform simplification processing
- 等效波形分析
Equivalent waveform analysis

碰撞前制动响应
Pre crash braking response

乘员姿态离位

Occupant out of position

- 虚拟测评假人选择
Virtual test dummy selection
- 主动肌肉力分析
Active muscle force analysis
- 离位影响因素分析
dislocation influencing factors

碰撞前乘员姿态
Occupant attitude before impact

约束系统响应

Restraint system response

- 安全带预紧、卷收
Pretensioning and retracting of safety belt
- 安全气囊点爆 Airbag ignition
- 座椅运动 Seat movement

碰撞中约束系统保护
Restraint protection in collision

乘员响应

Occupant response

- 假人伤害值
Dummy injury value
- 乘员运动状态
Occupant movement status
- 伤害评价
Injury evaluation

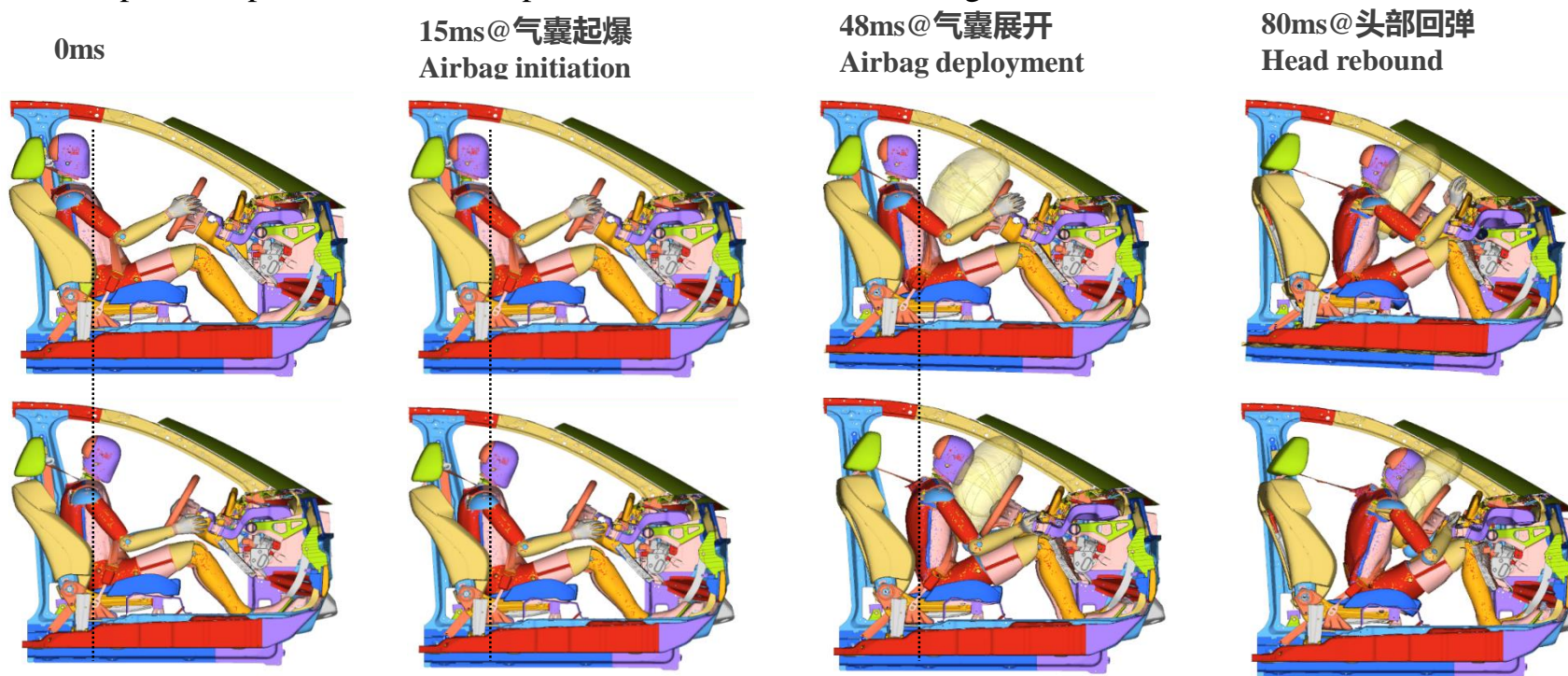
碰撞后乘员伤害分析
Occupant injury in collision

- AEB制动作用下发生正面碰撞THOR假人的姿态相对于不考虑AEB制动发生正碰THOR假人姿态离位非常明显，在安全气囊起爆时，如果假人离位位置位于安全气囊弹开区域内，会造成打脸损伤；

The posture of Thor dummy in frontal collision under AEB braking is obviously out of position compared with Thor dummy in frontal collision without considering AEB braking. During airbag initiation, if the dummy's out of position position is located in the airbag ejection area, it will cause face injury;

- 在气囊展开过程中，考虑乘员离位的THOR假人过早接触气囊，与不考虑AEB的乘员姿态相比，存在不能有效保护乘员的风险；

In the process of airbag deployment, the Thor dummy considering the occupant out of position contacts the airbag prematurely, which is at risk of not effectively protecting the occupant compared with the occupant attitude without considering AEB;



有无AEB制动THOR假人正面碰撞乘员姿态 Thor dummy occupant posture with or without AEB brake in FRB

减速台车不同假人和真实人体的离位响应差异 Difference of out of position response between different dummy and real human body of deceleration trolley

30km/h, 0.7g减速度制动

IIII 50th 头部最大位移

Maximum head displace **150mm**

THOR 50th头部最大位移

Maximum head displace**230mm**

志愿者头部最大位移

Maximum volunteerhead displace**280mm**

