Qiantu Motors

Dr.F Xiong

General Manager/VP

2018-11

1：K50 Introduction
2：BIW Lightweight Features

K50 – Integration of Science Technology and Performance

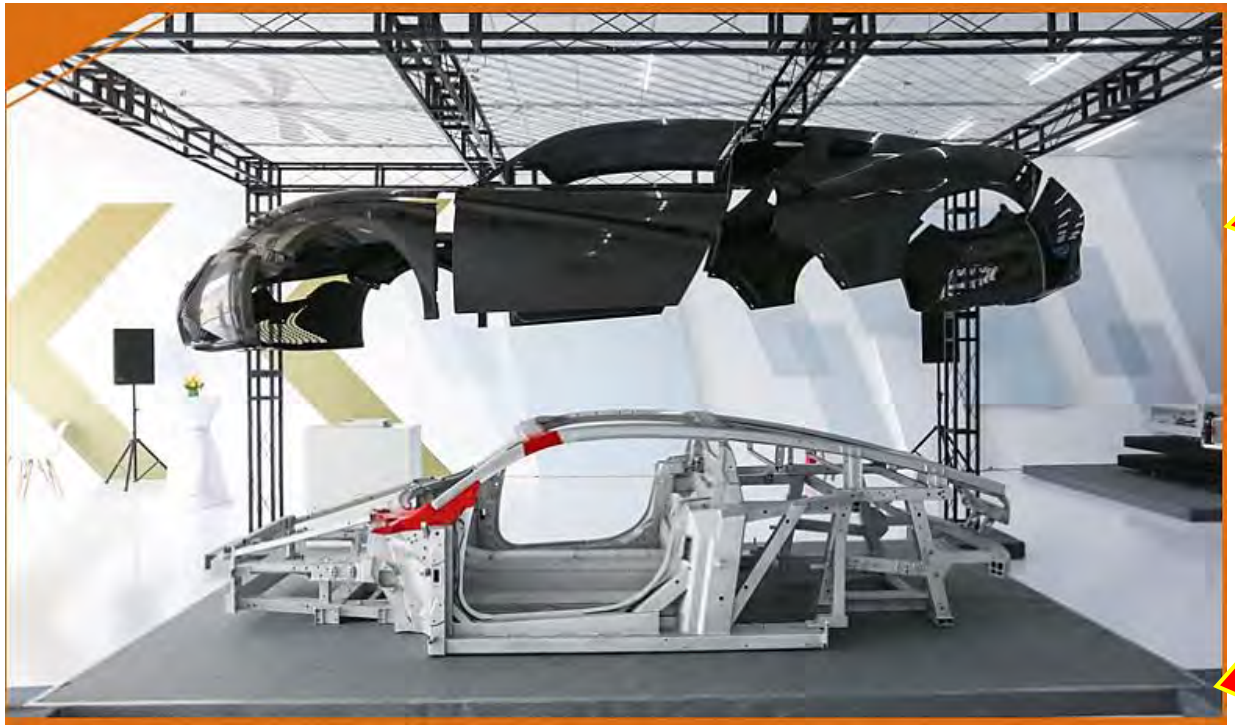
QIANTU MOTOR
前途汽车

K50 – Integration of Science Technology and Performance

QIANTU MOTOR
前途汽车

Al SF

自主研发
整车控制
管理系统
（VCU）



CFRP
Mass
Application

（RESS）

双电机四
驱系统
（300KW）

Max.
Torsion
600Nm

0-100
4.6s

Range
380km

前途K50主要配置

主/副驾驶位安全气囊	主●/副
前排侧气囊	●
前排头部气囊	●
胎压监测系统	●
ABS防抱死	●
制动力分配	●
刹车辅助	●
牵引力控制	●
车身稳定控制	●
并线辅助	●
前/后驻车雷达	前●/后
倒车影像	●
全景影像	●
定速巡航	●

前途K50主要配置

电动吸合门	●
无钥匙启动	●
无钥匙进入	●
运动风格真皮座椅	●
座椅高低调节	●
座椅电动调节	●
座椅加热	●
座椅通风	●
中控显示屏尺寸	●
GPS导航系统	●
蓝牙电话	●
手机互联	●
车联网	●
自动空调系统	●
后视镜电动折叠	●
感应雨刷	●

◆动力系统采用双电机四驱系统，常规模式下其综合最大功率为320kW，峰值扭矩580N·m，而当切换到超频模式后，最大功率将提升至在435kW，最大扭矩达到680N·m，此时从静止加速到100km/h只需要4.6s

前途K50电动机/电池参数

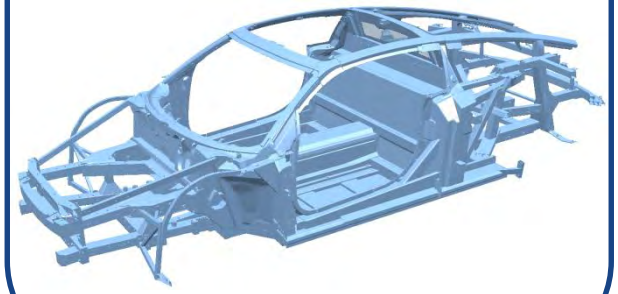
电机类型	永磁/同步
电动机总功率（kW）	320
电动机总扭矩（N·m）	680
驱动电机数	双电机
电机布局	前置+后置
电池类型	三元锂电池
续航里程（km）	380
电池容量（kWh）	78.84
快充时间（h）	0.75
慢充时间（h）	13
快充电量（%）	80

1：K50 Introduction
2：BIW Lightweight Features

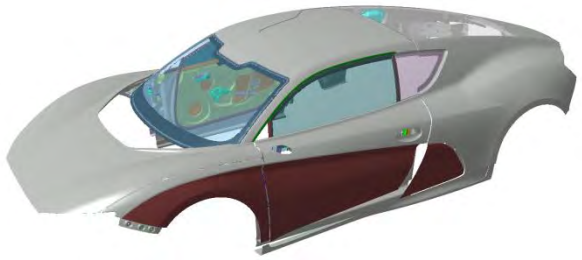
K50 – The Most Advance Lightweight Tech. Application

QIANTU MOTOR
前途汽车

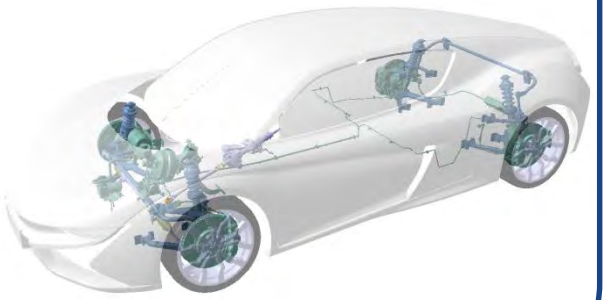
Al SF



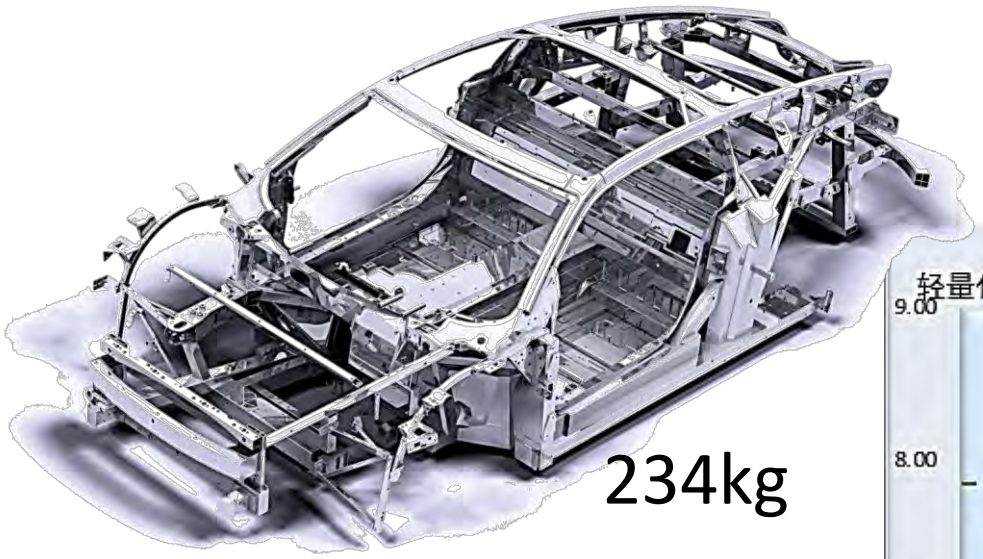
CFRP



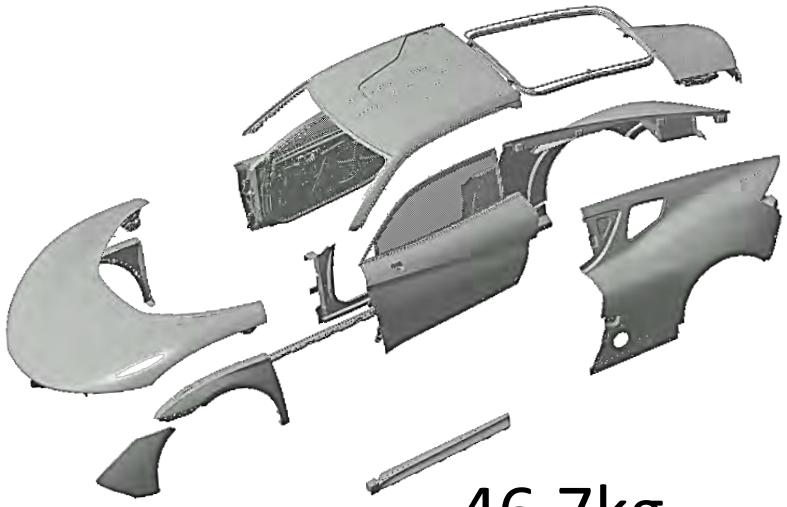
Al Chassis Parts



K50 – The Most Advance Lightweight Tech. Application

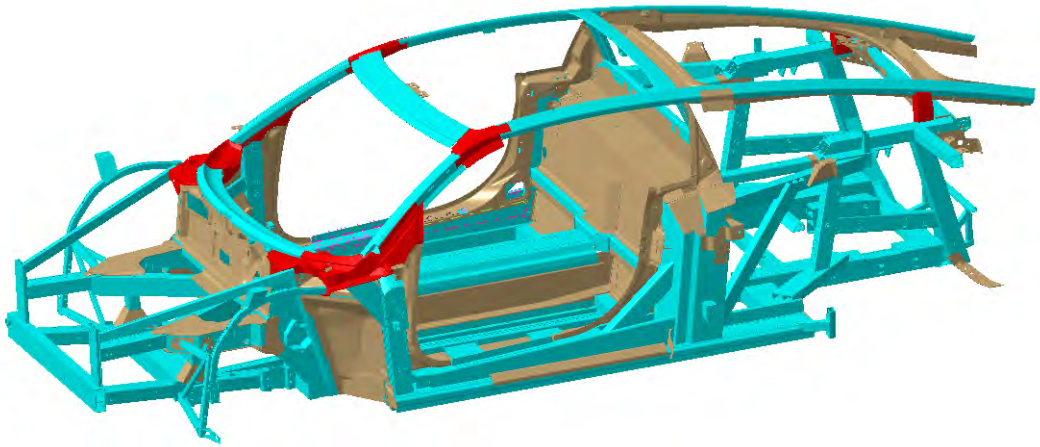


234kg



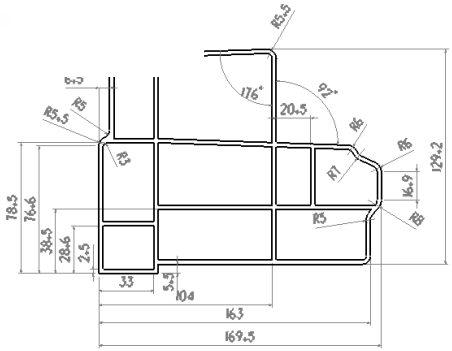
46.7kg

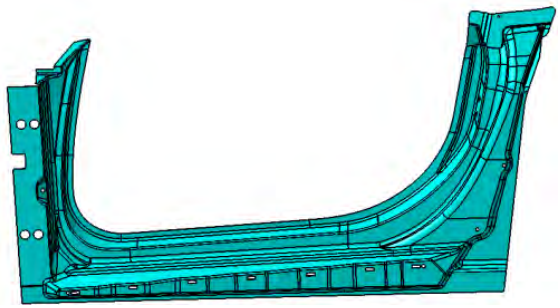
ASF



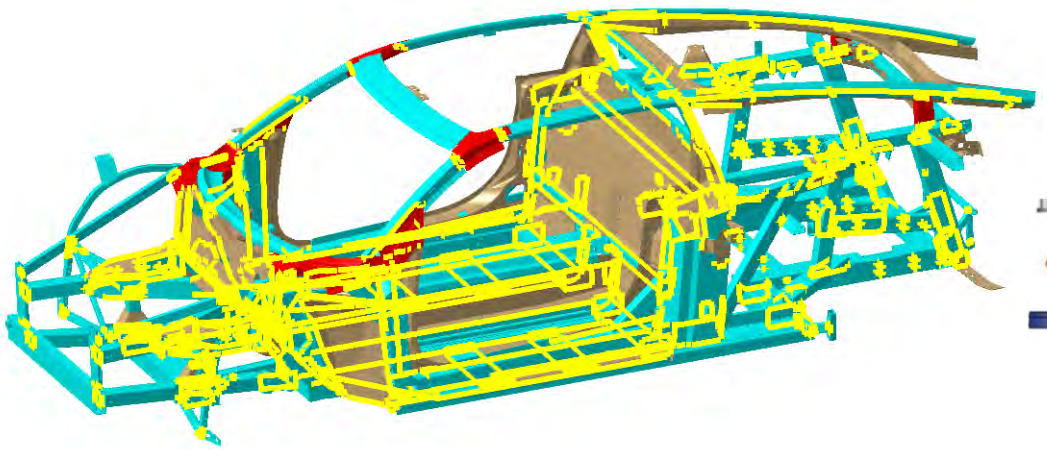
车身框架总成共用铝合金型材截面69种，型材总重量为184.14Kg，占比80.7%，板材重量为37.63Kg，占比16.5%，铸造件重量为6.43Kg，占比2.8%。

- 铝合金型材件，材料牌号6061
- 铝合金冲压件，材料牌号5182
- 铝合金铸造件，材料牌号AlSi10Mg



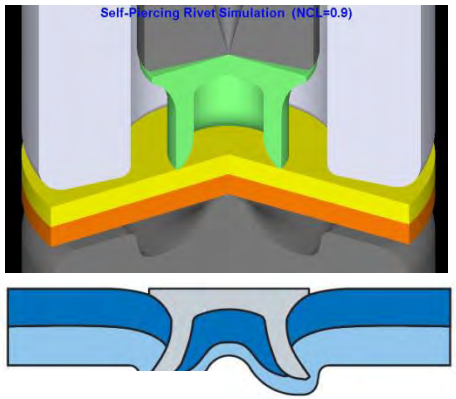


ASF



FDS(Flow Drill Screw)

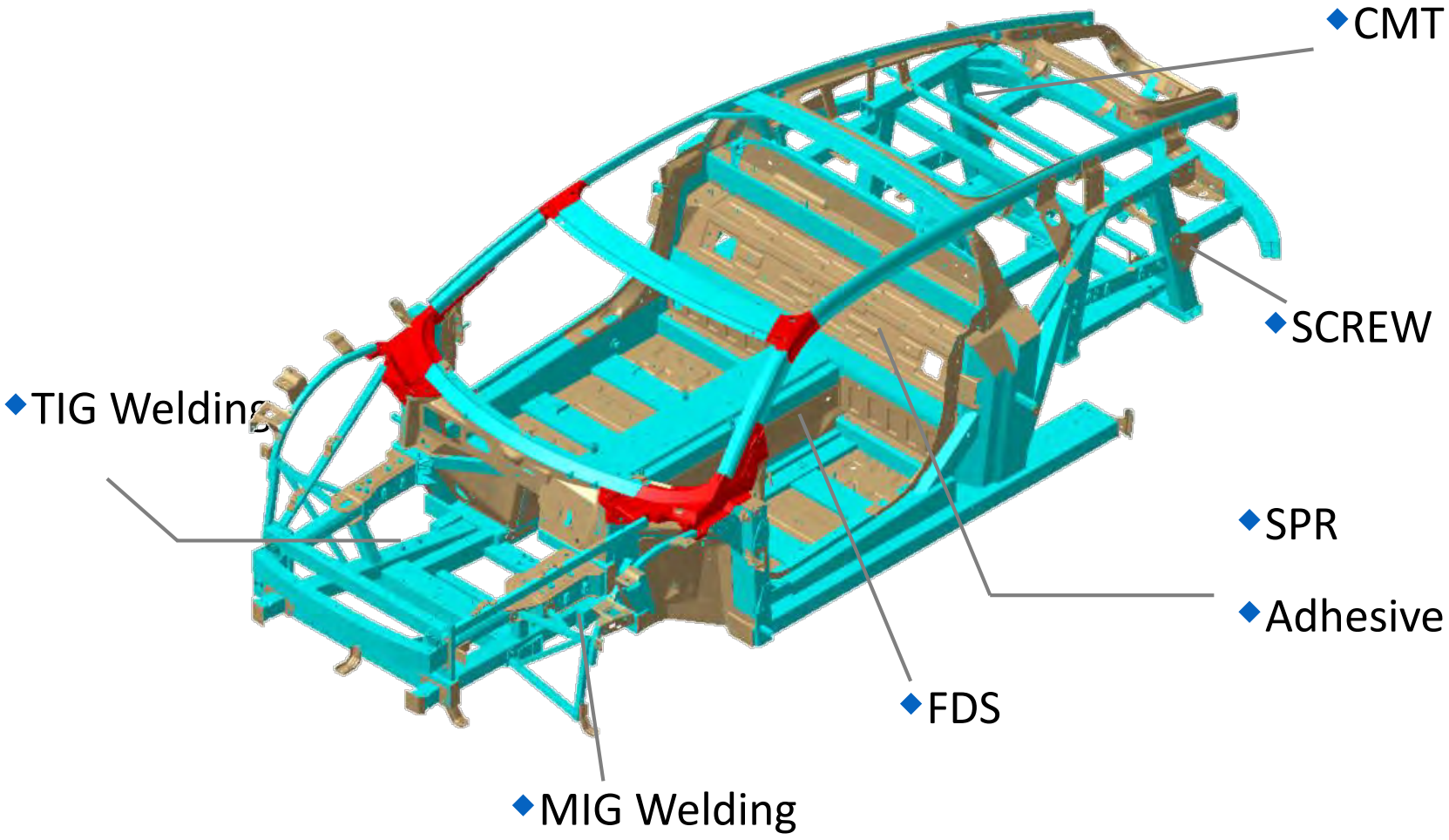
SPR (self piece rivet)



BETAFORCE™结构胶 DOW

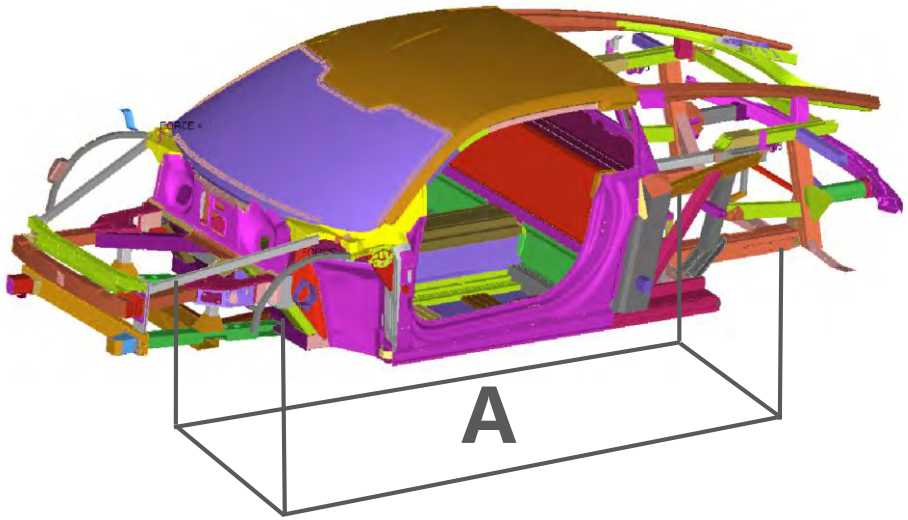
K50 – The Most Advance Lightweight Tech. Application

QIANTU MOTOR 前途汽车



ASF Joining Technology

Lightweight Index

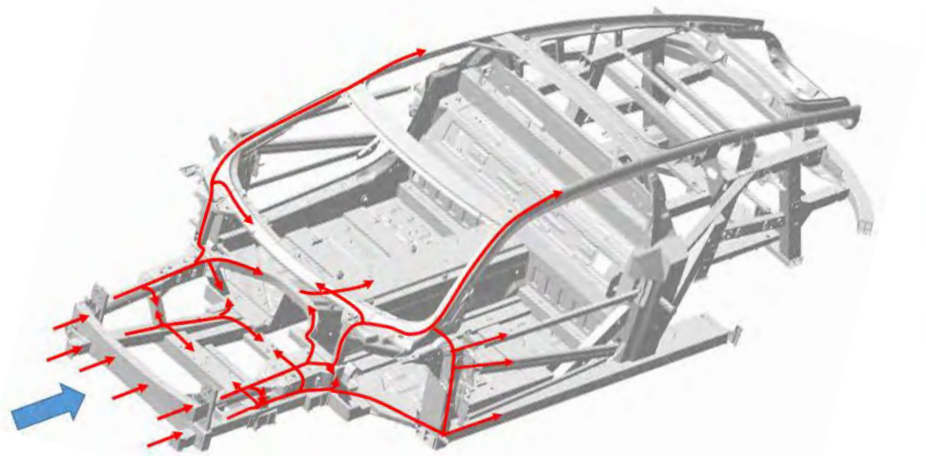


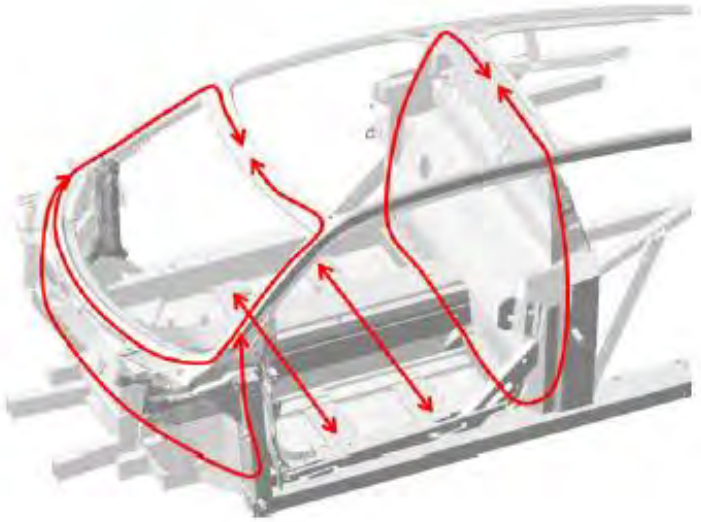
轻量化系数				
车型	m (kg)	K_{TG} (kNm/deg)	A (m^2)	L
K50	278	21.98	4.684	2.7

L			
车型	KTG (kNm/deg)	A (m2)	L
BENZ SL CLASS	19.4	4.14	3.2
Mazda MX-5	9.302	3.47	6.11
ALFA ROMEO 4c COUPE	14.15	3.87	3.08
Subaru WRX	22.3	4.08	3.35
Chevrolet Corvette Z06	14.658	2.94	4.99
Audi R8	10.71	4.27	5.9
BMW i8	49	3.90	1.2
		平均值：	3.98

$$L = \frac{m}{K_{TG} \times A}$$

Robust Structure to meet all requirements



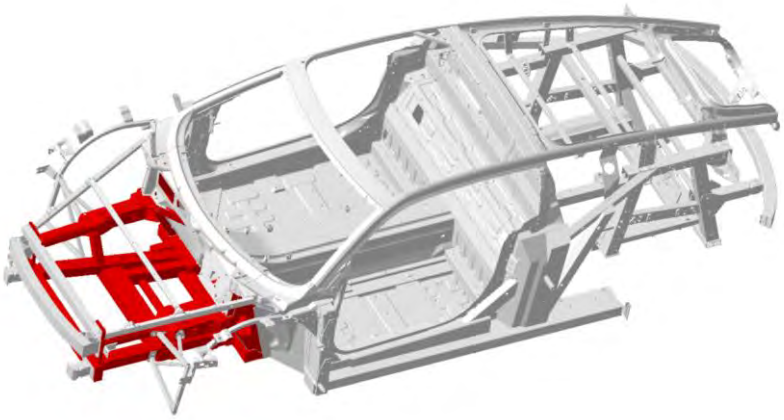


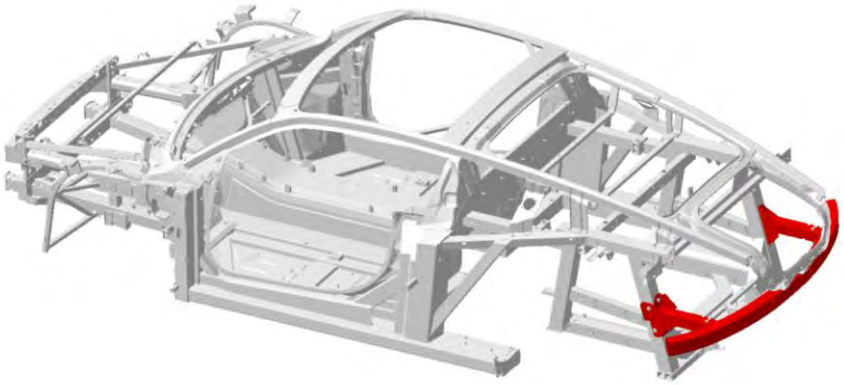
- 正面：完整的侧向能量传递路径
- 侧面：碰撞加强件+碳纤维内外蒙皮，抗弯强度高
- 闭环结构设计
- 高强度封闭舱室

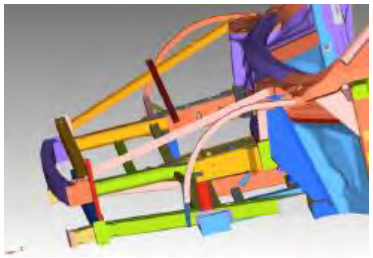
◆提升整车刚性

◆保证优秀的操控性

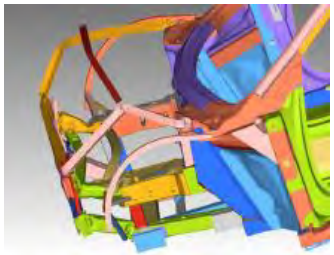
Safety



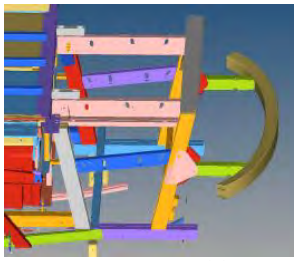




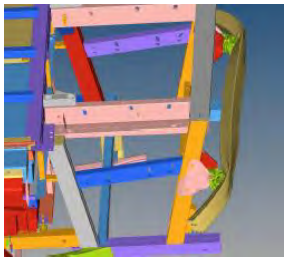
◆变形前



◆变形后



◆变形前

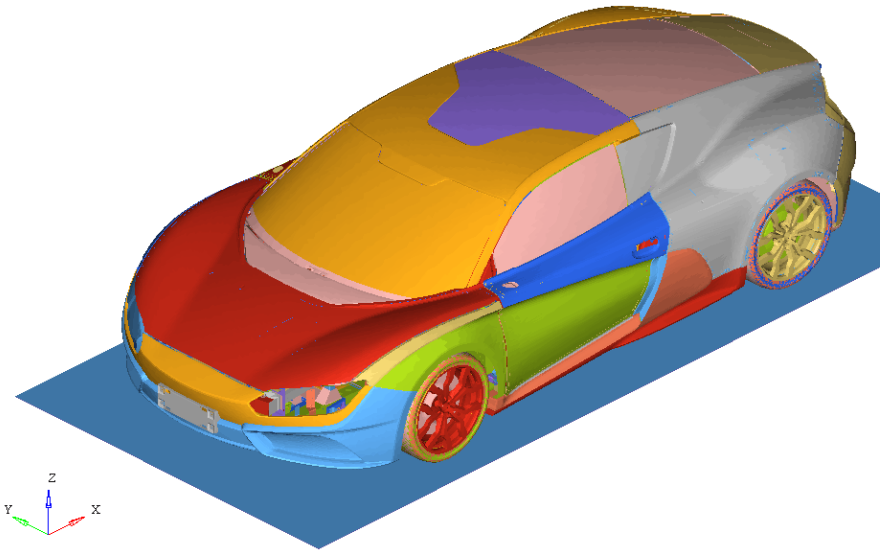


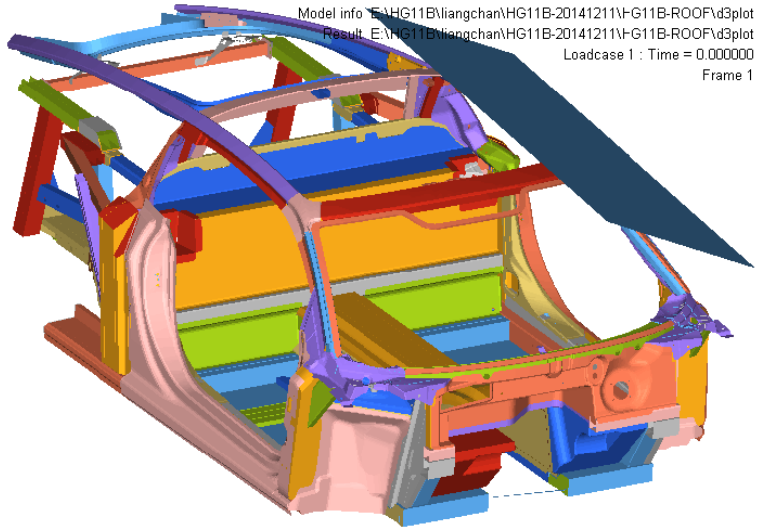
◆变形后

◆前后碰撞缓冲区域 吸收碰撞能量

◆保护乘客安全

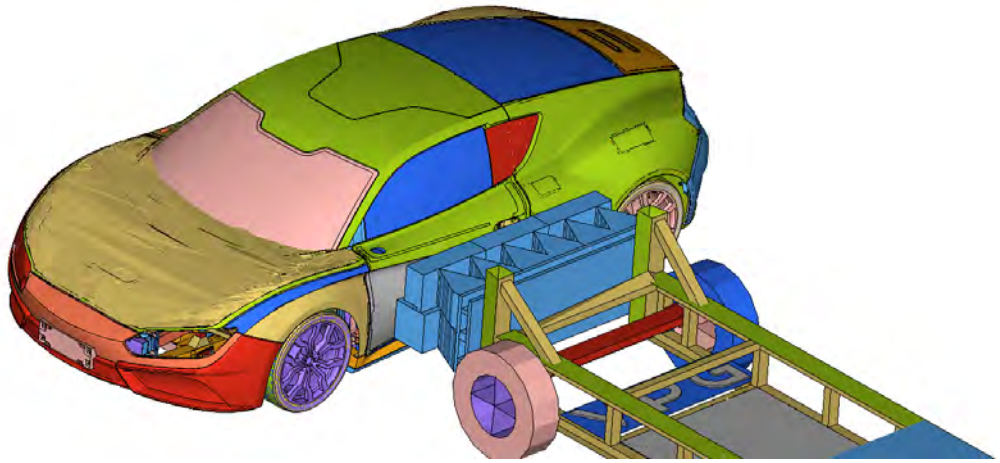
安全性仿真和试验

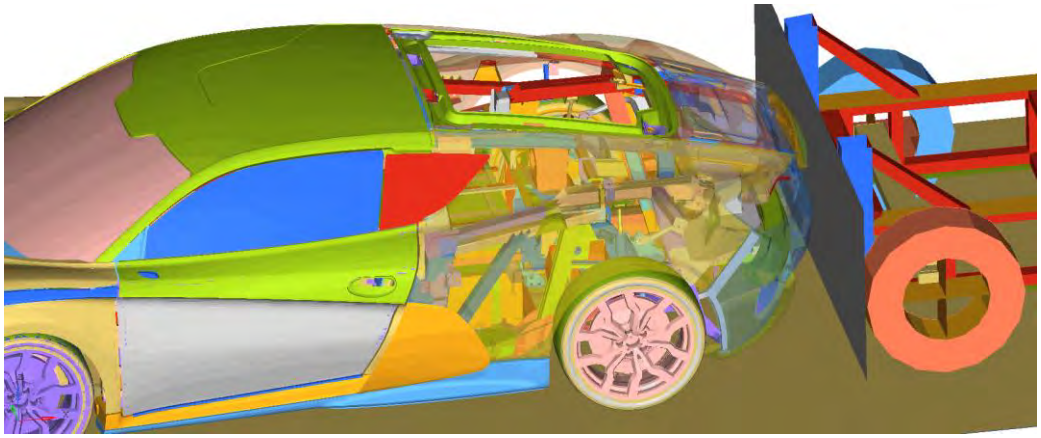

Z
Y
X


Model info E:\HG11B\liangchan\HG11B-20141211\I-G11B-ROOF\d3plot
Result E:\HG11B\liangchan\HG11B-20141211\I-G11B-ROOF\d3plot
Loadcase 1 : Time = 0.000000
Frame 1

K50 – The Most Advance Lightweight Tech. Application

QIANTU MOTOR
前途汽车

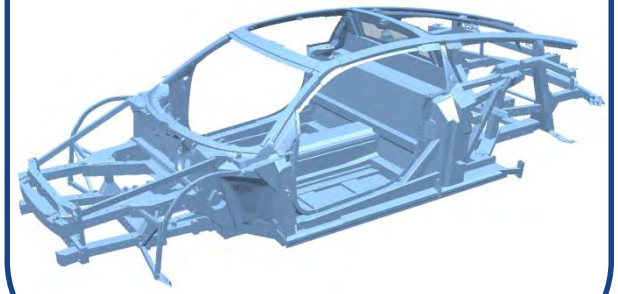




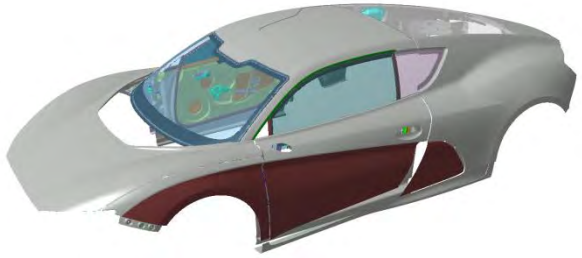
K50 – The Most Advance Lightweight Tech. Application

QIANTU MOTOR
前途汽车

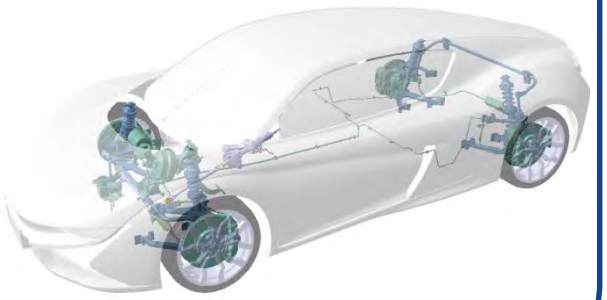
ASF



CFRP



Al Chassis Parts



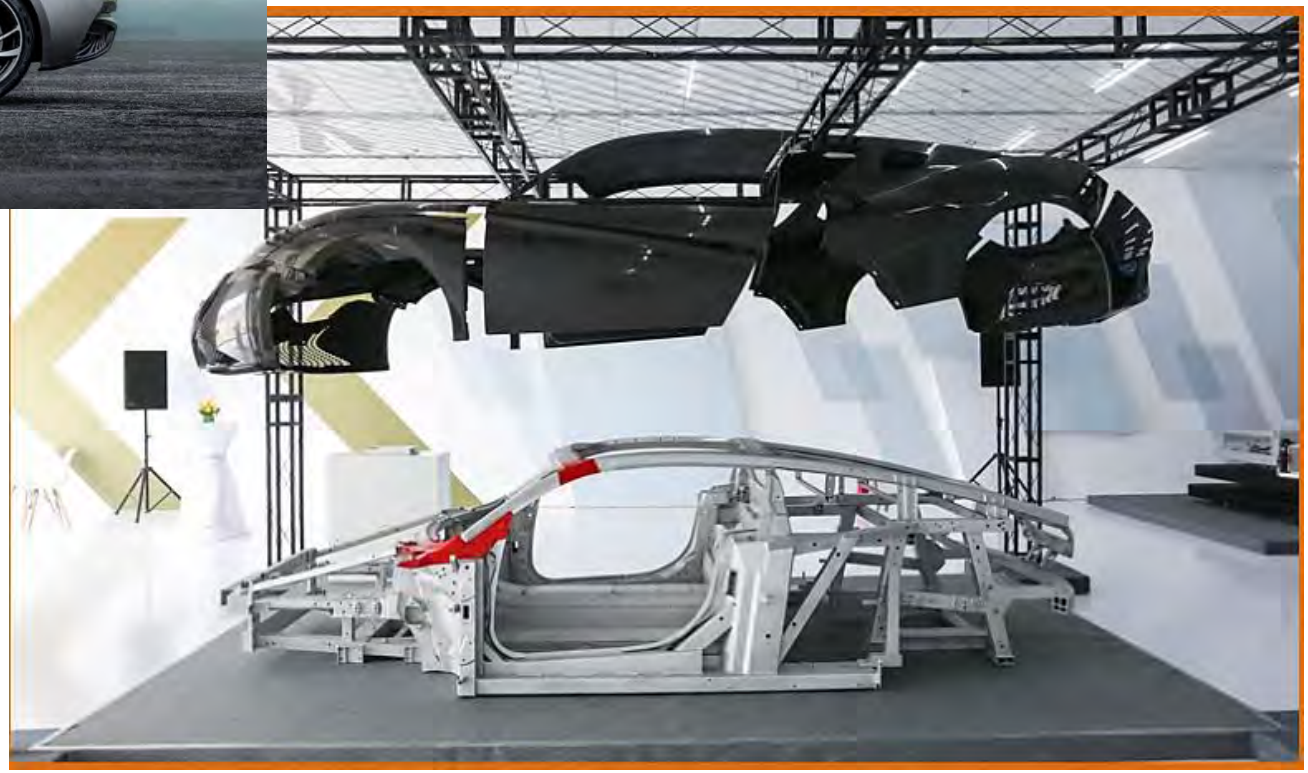
K50 – The Most Advance Lightweight Tech. Application

QIANTU MOTOR
前途汽车

- Products--- QIANTU K50

前途 K50
QIANTU K50

18 Assembly, 29 composites Parts



K50 – The Most Advance Lightweight Tech. Application

QIANTU MOTOR 前途汽车

- Products--- QIANTU K50

- Hood Assembly (inner and outer panel)
- Roof Assembly
- Rear Door Assembly (inner and outer panel)
- Left Door Assembly (inner and outer panel)
- Right Door Assembly (inner and outer panel)
- Fender Left Door Assembly (L&R)
- Rear Side Panel(L&R)
- Side Panel (L&R)
- Front Bumper Decoration (L&R)
- Apron (L&R)
- Grille Cover (L&R)

◆ QIANTU K50 carbon fiber composites outer panels are made by PCM(Prepreg Compression Molding) and Autoclave Process , the total weight is 45kg, 20% lighter than aluminum alloy, 45% lighter than steel.

K50 – The Most Advance Lightweight Tech. Application

QIANTU MOTOR
前途汽车

- Products--- QIANTU K50

Company Profile---Background

◆北京长城华冠股份有限公司
◆CH-AUTO Technology Co. Ltd
◆http://www.ch-auto.com

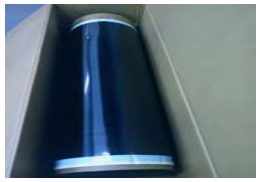
◆前途汽车（苏州）有限公司
◆Qiantu Moter (Suzhou) Co. Ltd
◆http://www.qiantumotor.com

◆苏州华特时代碳纤维有限公司
◆Suzhou HT Carbon Fiber Co. Lt
◆http://www.qiantumotor.com

K50 – The Most Advance Lightweight Tech. Application

Fully Automated Engineering Process：Fast Curing（5min.）PCM

◆**Automatic Production Line：Process Molding by Rapid curing prepreg（5min Curing System）**



◆**Rapid curing prepreg**

◆**Storage at Low Temperature**

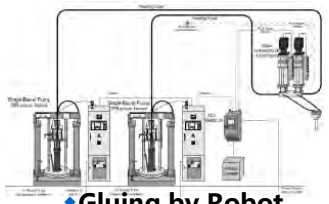
◆**Cutting**

◆**Laying Up Assisted by Laser**

◆**PCM**

◆**CNC**

◆**Cleaning**



◆**Gluing by Robot**

◆**Assembling**

◆**Online Detection**

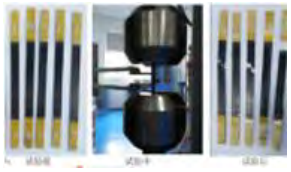
◆**Final Products**

K50 – The Most Advance Lightweight Tech. Application

QIANTU MOTOR 前途汽车

- Technical Expertise---Case Show

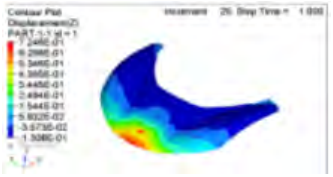
◆Hood Assembly ◆Development Process



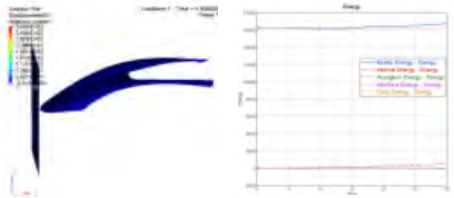
◆Materials tes t

◆Process ◆ verification

◆Bonding test



◆Stiffness ◆ analysis

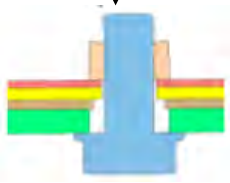


◆Dynamic analysis

◆Crash test

◆Materials&Proces s ◆Confirm → ◆Structur e ◆Design → ◆CAE ◆Analysi s → ◆Process ◆Developmen t → ◆Sampl e ◆Trial → ◆Compone nt ◆Test → ◆Vehicl e ◆Test

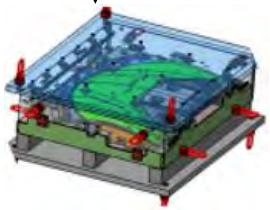
◆Structure ◆design



◆Connection ◆design

◆Lay-up ◆design

◆Lay-up ◆optimize

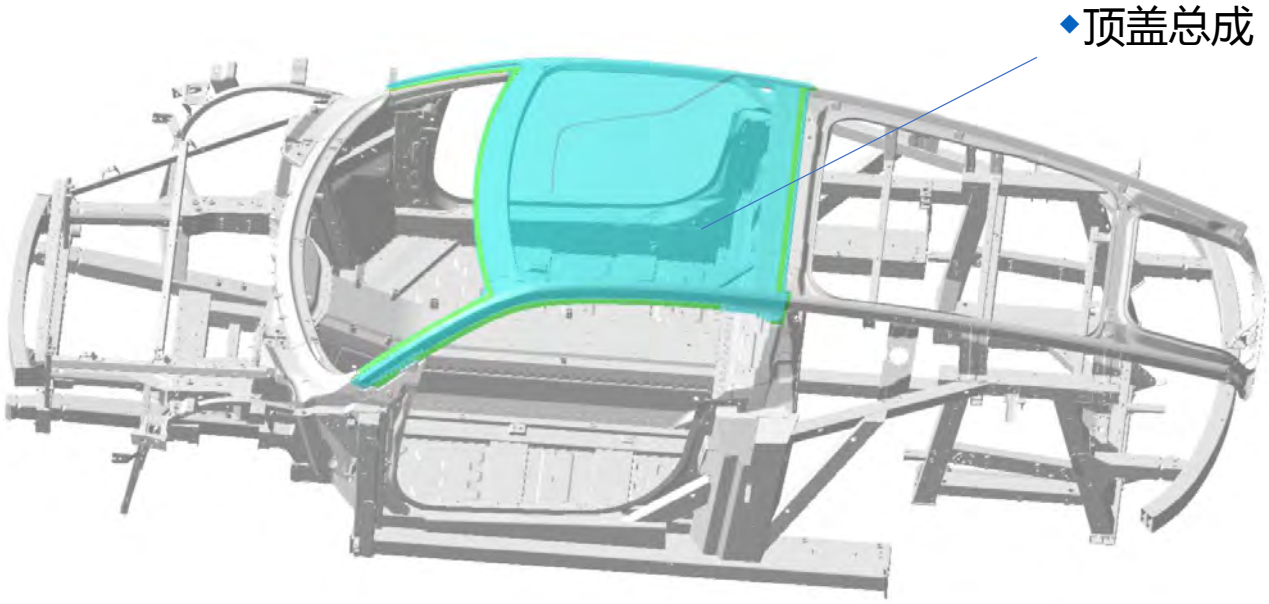


◆Tooling ◆development

◆Sample trial

◆Bench test

碳纤维-连接



顶盖与白车身采用胶结连接的连接方式，优势：

1.改善整车结构的刚度与强度

2.防止碳纤维顶盖与铝车身的电化学腐蚀

3.改善连接疲劳性能

4.保证连接处的密封性

5.保证结构的完整性与传力的连续性

6.提高车身NVH性能

翼子板与白车身采用螺栓连接的连接方式，优势：

1.提高连接的刚度与强度，可靠性

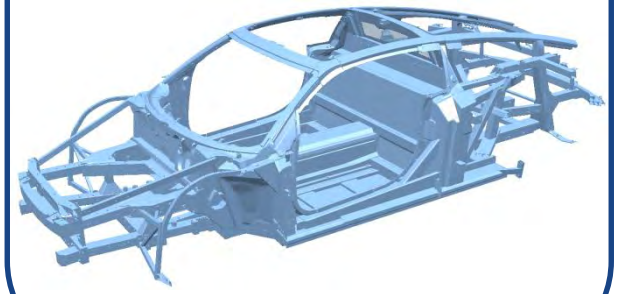
2.保证结构的传力的连续性

3.提高车身NVH性能

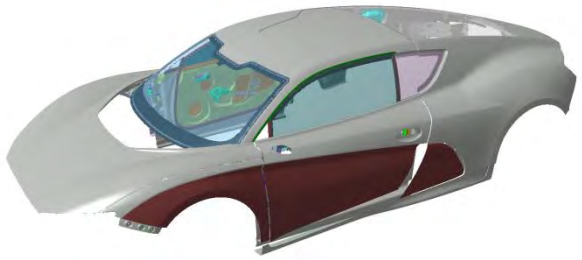
K50 – The Most Advance Lightweight Tech. Application

QIANTU MOTOR
前途汽车

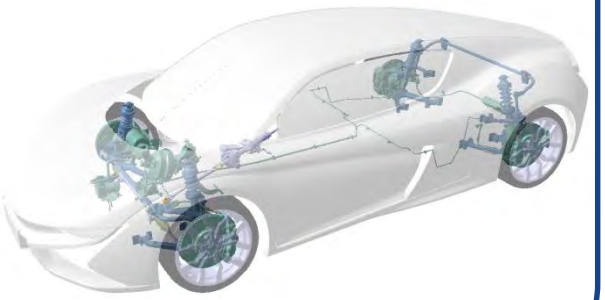
ASF



CFRP

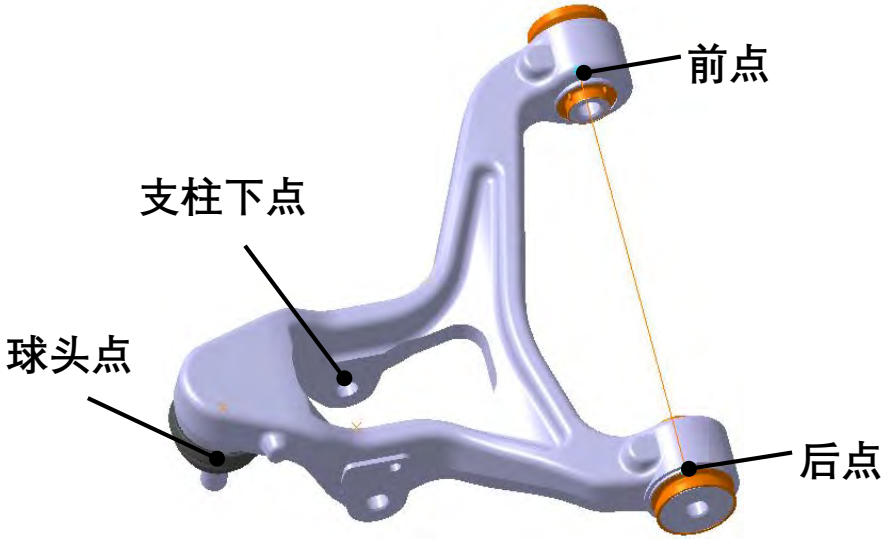


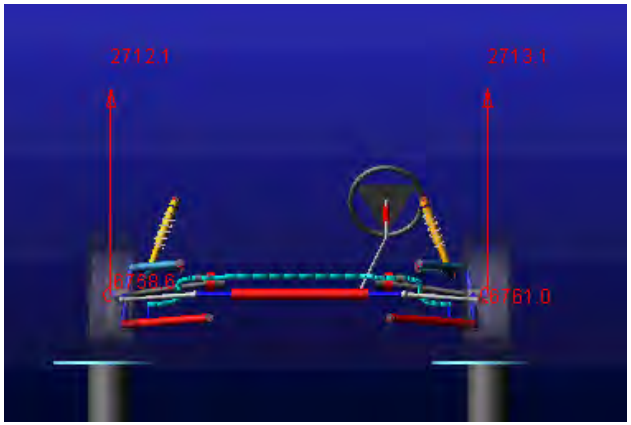
Al Chassis Parts

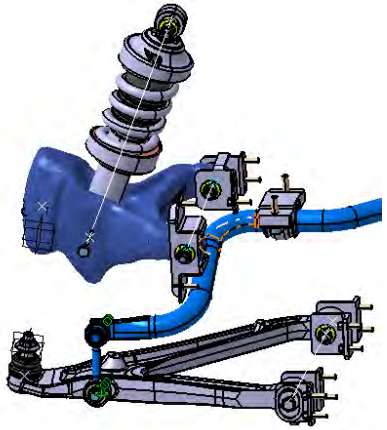


锻造铝合金摆臂的设计开发

结构设计 → 结构分析 → 工艺开发试制 → 台架试验 → 道路试验







输入条件：

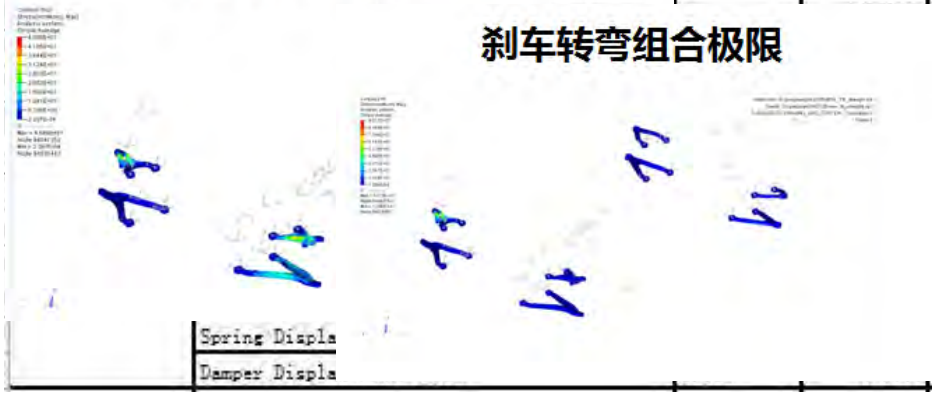
1.空间要求(基于运动校核合理)；

2.硬点坐标。

Front_Suspension_K&C		unit	Avg.
Geometry	Spindle Length	mm	71.4702
	Scrub Radius	mm	30.5686
	Kingpin Inclination	deg	9.6668
	Caster Angle	deg	6.4822
	Caster Offset at Wheel Center	mm	4.0183
	Caster Offset at Ground	mm	35.1864
	Side View Swing Arm Angle	deg	1.8487
		mm	7630.643
		mm	55.8407
	Spring Displa		
	Damper Displa		

转弯极限工况

刹车转弯组合极限



锻造铝合金摆臂的设计开发

结构设计 → **结构分析** → 工艺开发试制 → 台架试验 → 道路试验

输入条件：

满载各工况的力或力矩；

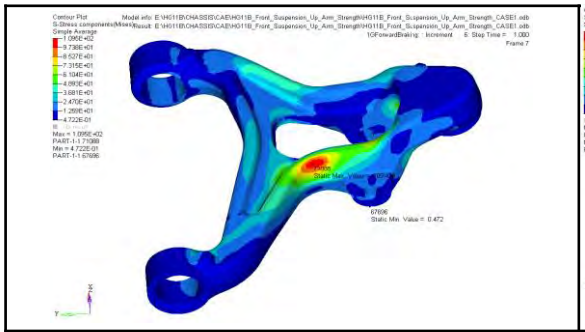
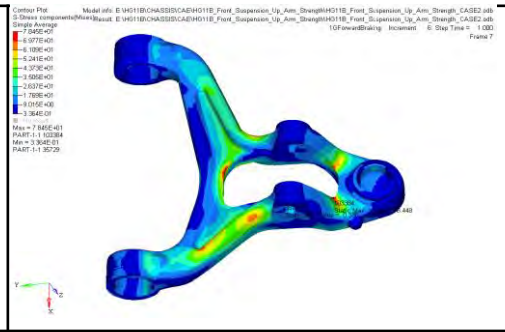
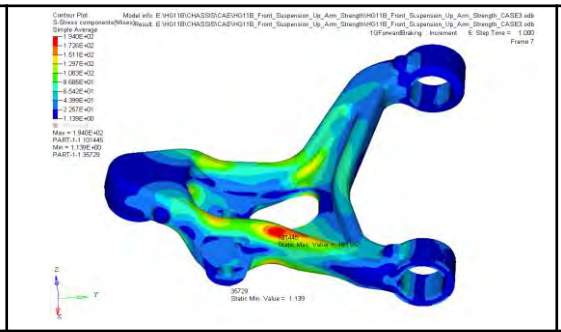
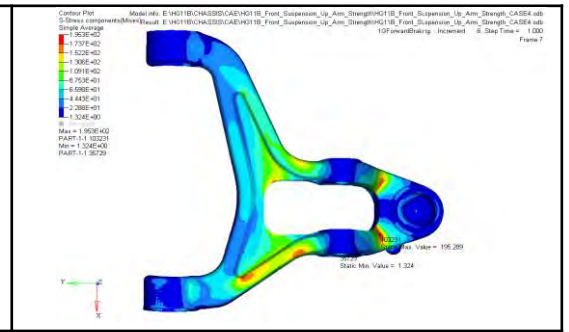
材料牌号：铝合金6082-T6

抗拉强度≥310MPa；屈服强度≥280MPa；

延伸率≥10%

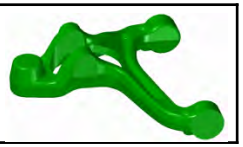
判定条件：

分析得到的最大应力满足材料的性能。

			
1. 1GForward Braking Max. Stress (MPa)：109.5	**2. 1.5G Conering（RH) Max. Stress (MPa)：78.45**	**3. Reverse Curb Strike Max. Stress (MPa)：194**	**4. Bump&Cornering Max. Stress (MPa)：195.3**

锻造铝合金摆臂的设计开发

结构设计 → 结构分析 → **工艺开发试制** → 台架试验 → 道路试验

毛坯锻造	
基准面铣削镗孔	
铣内轮廓	
粗钻头部孔	
车头部内孔和外圆外槽	
铣内双面槽	

锻造模具

总成成品

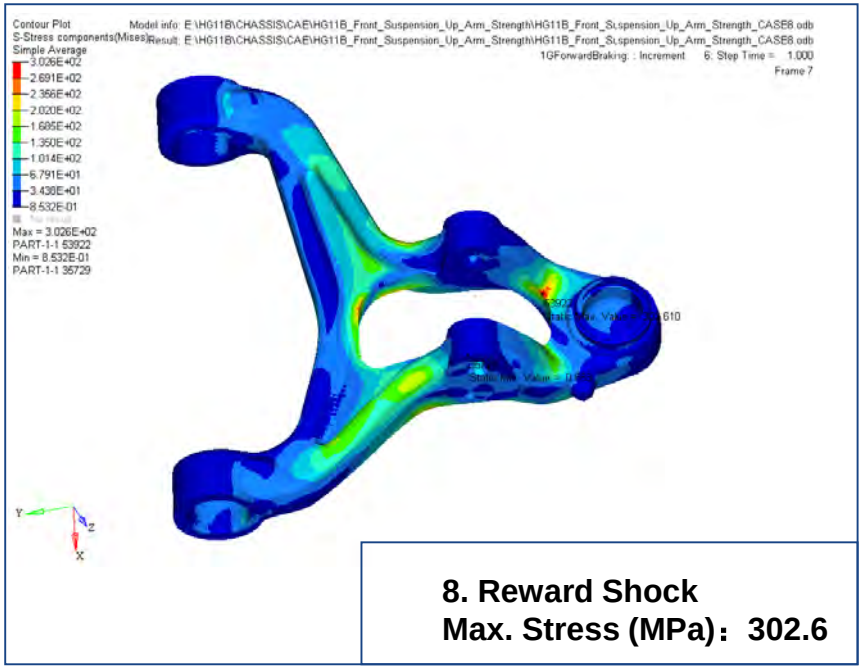
锻造铝合金摆臂的设计开发

结构设计 → 结构分析 → 工艺开发试制 → **台架试验** → 道路试验

按试验大纲，经过150h整车耐久性台架试验后，摆臂表面无裂纹，经渗透探伤分析，未发现线性及非线性显示。

锻造铝合金摆臂的设计开发

结构设计 → 结构分析 → 工艺开发试制 → 台架试验 → **道路试验**

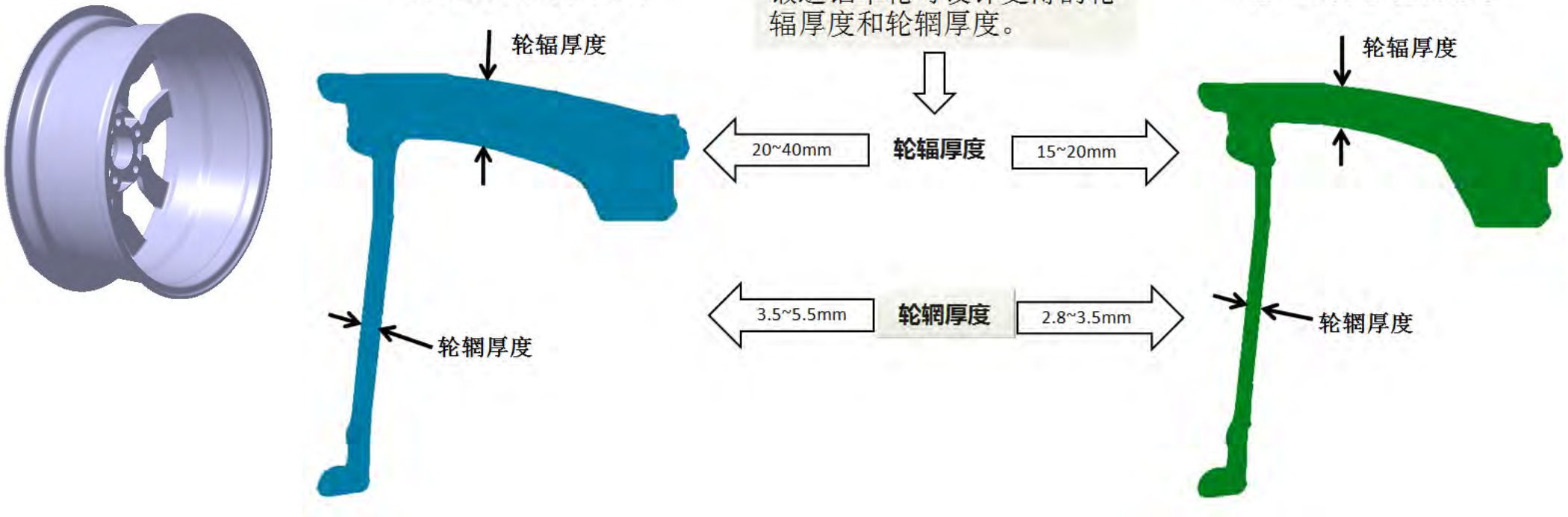


30000公里可靠性试验完成后，摆臂表面无可见损伤，经渗透探伤分析，未发现线性及非线性显示。

工况8的应力超出屈服强度(280MPa)，经整车台架试验和道路试验摆臂此处并未发生不良，建议通过零件试验进一步跟踪。

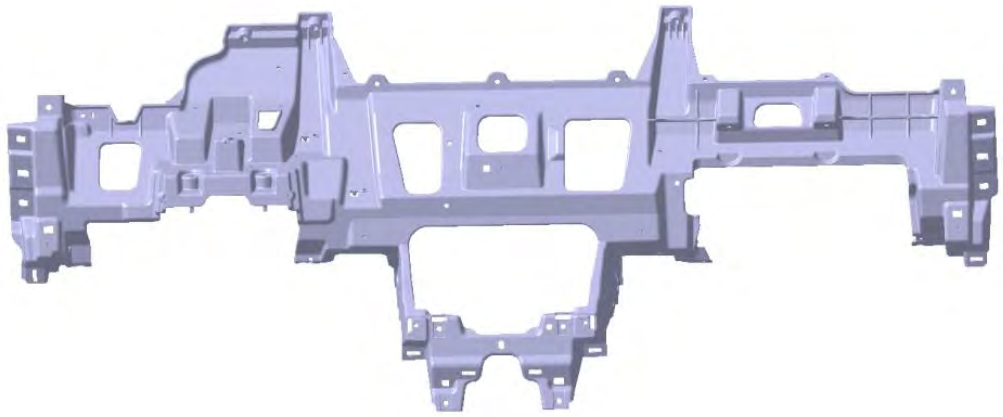
铝合金锻造轮辋：

铝合金车轮采用锻造工艺，相对与传统的铸造工艺，减重15% ～25%。



仪表板横梁：

K50采用铸镁工艺：主体镁合金AM50A压力铸造，重量：5Kg。



传统钢管焊接工艺：

材料：钢管+钣金支架；工艺： CO2焊

重量：一般在8-10Kg

座椅骨架（坐盆和靠背）：

K50采用铸镁工艺：主体镁合金AM50A压力铸造，重量：11Kg。

传统冲压工艺：

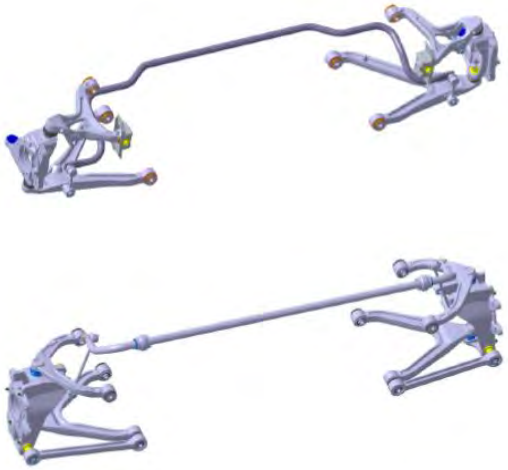
采用钢板冲压，重量大致在16Kg。

K50 – The Most Advance Lightweight Tech. Application

QIANTU MOTOR
前途汽车

锻造轮辋

减重15%-25%



悬架

铝合金锻造

减重约35%-40%

◆稳定杆

◆空心结构

◆减重约40%

◆仪表板横梁

◆铝镁合金

◆压铸一次成型

◆减重50%

◆座椅骨架

◆铝镁合金

◆压铸一次成型

◆减重31%

THANKS !

SINCE 2003
长城华冠
CH-AUTO TECHNOLOGY