



# 宝钢汽车板

BAosteel AUTOMOTIVE SHEETS

Early Vendor Involvement

# 先期介入

EVI



创享改变生活  
CREATION BEYOND VISION

宝钢汽车板  
Baosteel Automotive Sheet

## 宝钢EVI理念 | Baosteel EVI Concept

成为用户真诚可靠的汽车板及其解决方案的合作者，实现可持续、共赢发展。

To be customers' sincere and reliable partner in providing automotive steel and their solutions to achieve win-win collaboration.

## 宝钢EVI文化 | Baosteel EVI Culture

**用户思维**——源于用户、服务用户、成就用户

**Customer Thinking**——From customer, Serve customer, Achieve customer

**协同思维**——同一目标、网式工作、众口同声

**Synergy Thinking**——Same target, Net-working, One word

**进取思维**——精于专业、诚于奉献、超越期待

**Enterprising Thinking**——Professional, Sincere dedication, Beyond expectation

## 宝钢汽车板EVI | Baosteel EVI for Automotive Sheets

**宝钢为汽车厂提供从设计到量产全过程的技术支持:**

- 汽车设计选材支持、零部件同步开发、焊接与涂装技术支持, 达到设计控制成本和质量;
- 汽车用材和结构持续优化, 实现技术降本;
- 模具设计与验收技术支持, 获得模具与钢材的最佳匹配;
- 新材料、新技术的推广应用, 提升汽车产品竞争力。

Baosteel could offer a variety of specialized services and technical support from concept design stage of auto body and components to launching the products and quality control, including:

- Material selecting in auto design and modification, Simultaneous Engineering in components development, Welding and Painting technical support, and quality/cost control in production.
- Optimization of steel application for auto structures in terms of cost and performance purposes.
- Tooling design and pre- and post-production evaluation to ensure the best steel performance.
- Recommendation of new materials and technologies to promote the competitiveness of automotive products.

## 宝钢EVI合作模式 | Cooperation Models of Baosteel EVI

**宝钢在长期与汽车用户的EVI活动中, 形成了三种合作模式:**

- 白车身EVI: 开展白车身整车合作, 结合新车型在车身轻量化、性能(弯曲刚度、扭转刚度、NVH)、碰撞安全、材料利用率、成本等方面的设计要求, 宝钢全面介入并参与整车设计开发的各个阶段, 通过双方组建项目合作团队及驻在式+远程支持的工作模式, 利用在材料和技术方面的优势提供全面支持, 确保新车型的设计要求满足开发目标;
- 零部件EVI: 开展车身零部件合作, 针对新车型的关键总成件、复杂成形件, 在新车型设计阶段介入, 宝钢利用在材料和技术上优势, 参与选材、结构优化、工艺设计和安全性分析, 确保零部件在设计、功能及成本方面满足设计要求;
- 模具支持EVI: 开展模具设计合作, 针对宝钢份额的零件, 在模具开发阶段介入, 提供免费的模具验收和失效分析, 并提供相关改善建议, 确保批量生产的稳定性, 一次做对, 效率最高, 成本最低。

In longterm of EVI cooperation with automotive customers, Baosteel has established Three types of cooperation models:

- BIW EVI: Establish the cooperation team. Baosteel fully involved and participated in the vehicle design process (bending stiffness, twisting stiffness, NVH, crash performance, etc.). Auto sheet material selection and other aspects to ensure the lightweight vehicle or cost/material utilization will be conducted.
- PARTS EVI: Aimed at critical assembly parts and complex shaped parts, Baosteel uses its materials and technology advantages to participate in material selection, structural design, process design and safety analysis to ensure the requirements of safety and cost.
- DIE EVI: Provide free stamping die inspection and failure analysis to ensure the stability of mass production with the highest efficiency and lowest cost.

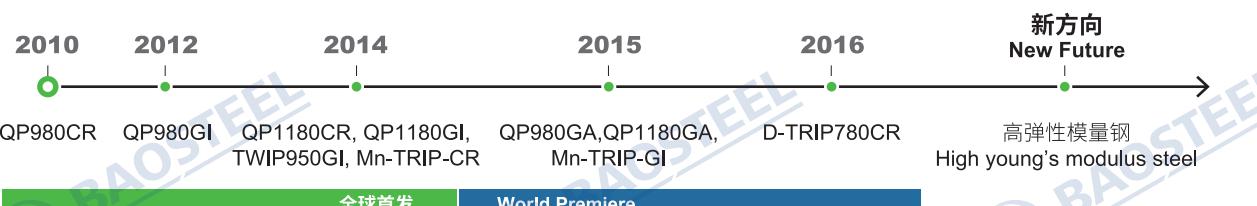
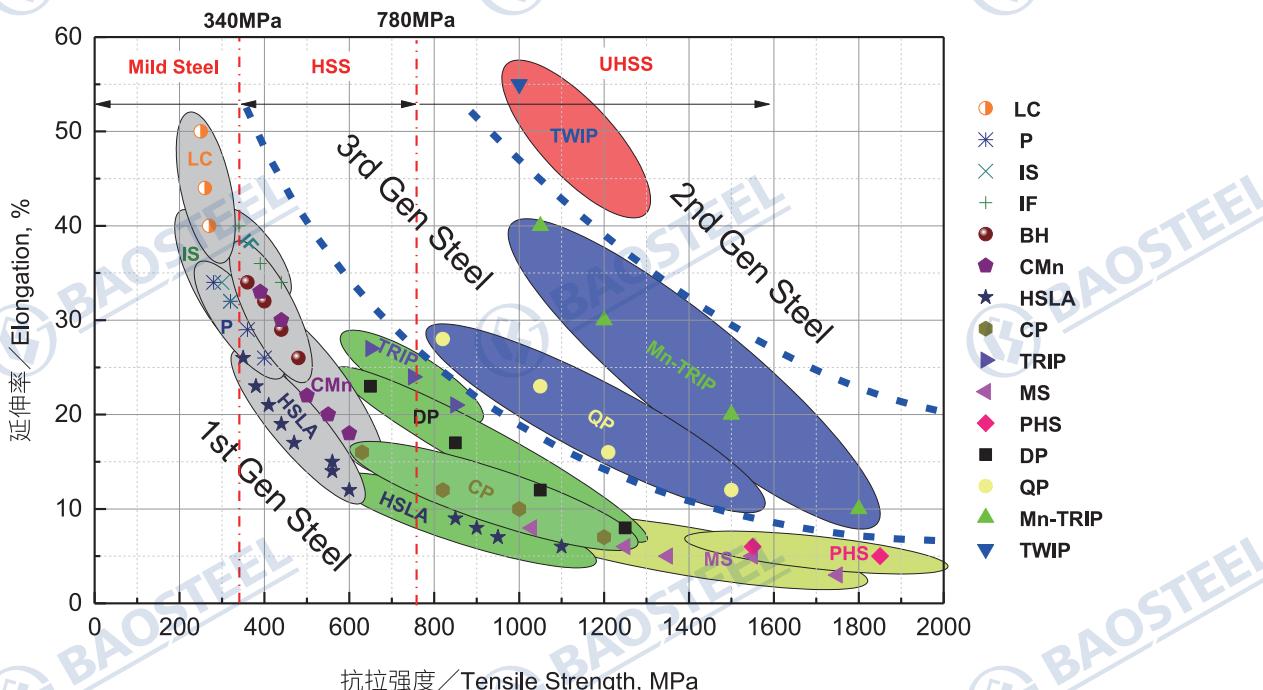
## 宝钢汽车板EVI路线图

## Baosteel EVI Road Map



## 完善的汽车板产品体系 | Perfect Product System of Automotive Sheets

- **经验:** 近30年汽车板、超20年高强钢、超15年先进高强钢研发、生产、应用技术
- **品种:** 热轧酸洗、冷轧、热镀锌、电镀锌等，国内唯一全品种
- **等级:** 最高普冷1700MPa, 热镀锌1200MPa, 电镀锌780MPa
- **能力:** 世界首家能同时批量生产第一、二、三代先进超高强钢的企业
- **Experiences:** Devoted in Auto Steel about 30 years ago, with a complete capability of R&D, manufacturing and application, over 20 years experiences in HSS and over 15 years in AHSS
- **Products:** The only domestic steel company with a great variety of products, including hot rolled and pickled sheets, cold rolled sheets, hot dip galvanized sheets, galvanized sheets, electro-galvanized sheets
- **Grade:** Max CR 1700MPa, GI & GA 1200MPa, EG 780MPa
- **Ability:** The ever first steel company in the world with the commercialization of all three Generations of AHSS products



## 宝钢汽车板全面技术解决方案 | Comprehensive Technical Solutions for Automotive Steel

完整的汽车用材数据库支持 Complete Database Support of Automotive Materials

不断更新和完善的汽车用材性能数据库，为用户提供从基础性能、使用性能到服役性能等一系列全套的数据支持。根据用户的多样化需求，可提供性能指标与原始曲线数据、材料数据包和仿真用材料数据卡等各种形式数据。

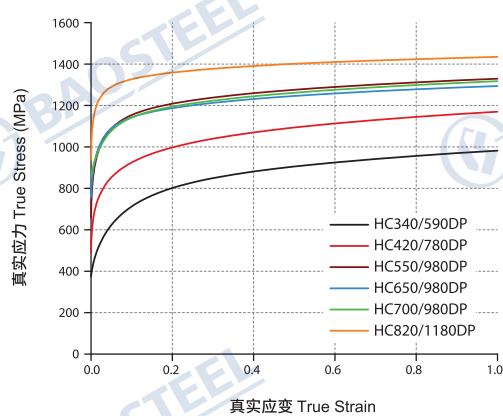
Continuously updating and improving properties database of Baosteel automotive materials , support customers with a range of full set of data from basic properties to performance of application and service. According to the diverse requirement of customers, Baosteel can provide performance indicators with the original curve data, material data packets, CAE material cards, and other forms of data.



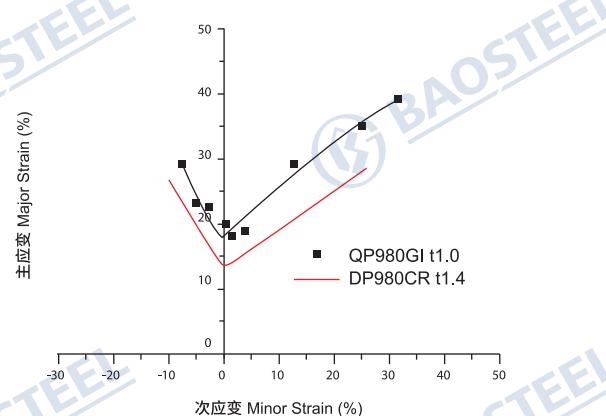
### 基础性能数据 Basic Properties Data

牌号 Steel Grade	厚度 (mm)	屈服强度 (MPa)	抗拉强度 (MPa)	延伸率 Elongation %	n	$r_0$	$r_{45}$	$r_{90}$
HC340/590DP	1.2	365	641	26	0.17	0.93	0.89	0.99
HC420/780DP	1.4	494	849	17	0.13	0.71	0.93	0.79
HC550/980DP	1.4	740	1051	12	0.09	0.71	0.91	0.80
HC820/1180DP	1.2	866	1192	8	-	-	-	-

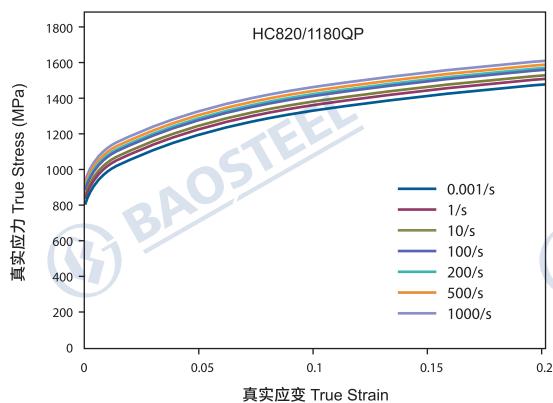
### 应力应变曲线 Strain Stress Curve



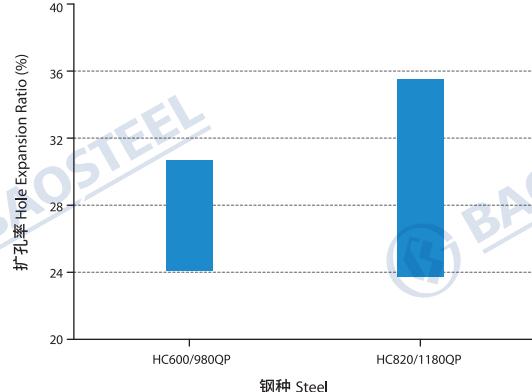
### 成形极限曲线 Forming Limit Curve



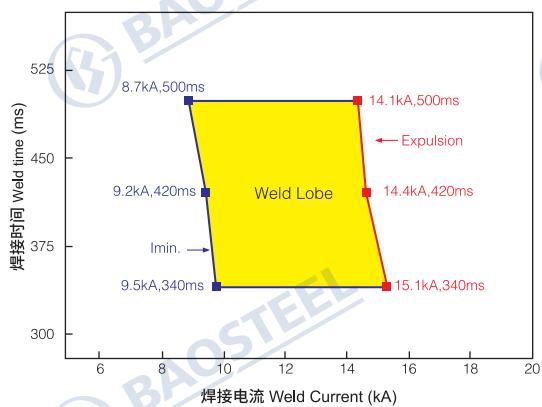
## 高速应力应变曲线 High Strain Rate Data



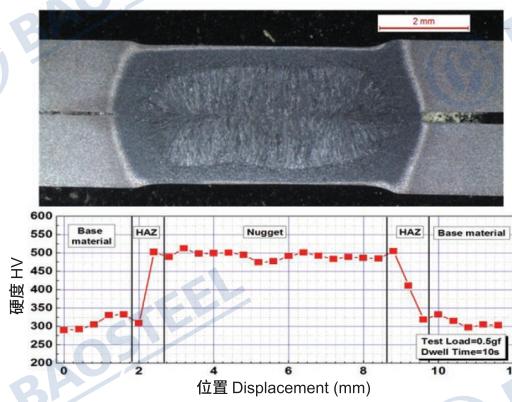
## 扩孔率 Hole Expansion Ratio



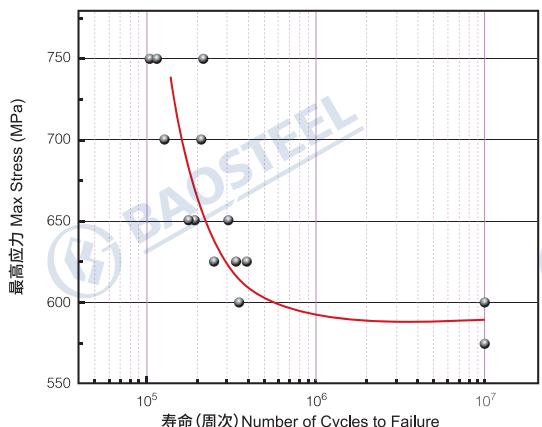
## 可焊区间数据 Weld Lobe



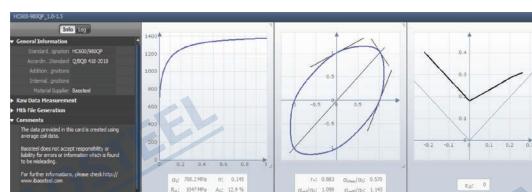
## 焊点显微硬度 Micro-Hardness of Joint



## 疲劳特性 Fatigue Data



## 仿真用材料数据卡 数据卡 CAE Material Card



宝钢材料库已集成在AutoForm R8, 或访问慧创平台、  
宝钢智选小程序获取

Embedded in AutoForm R8, or visit iBaosteel website and  
mini app for WeChat.



慧创APP  
ibaosteel



宝钢慧选  
ibaosteel for WeChat

## 冷冲压成形技术支持 Cold-Forming Technology Support

## 1. 具备全流程CAE分析能力 Full Process CAE Analysis



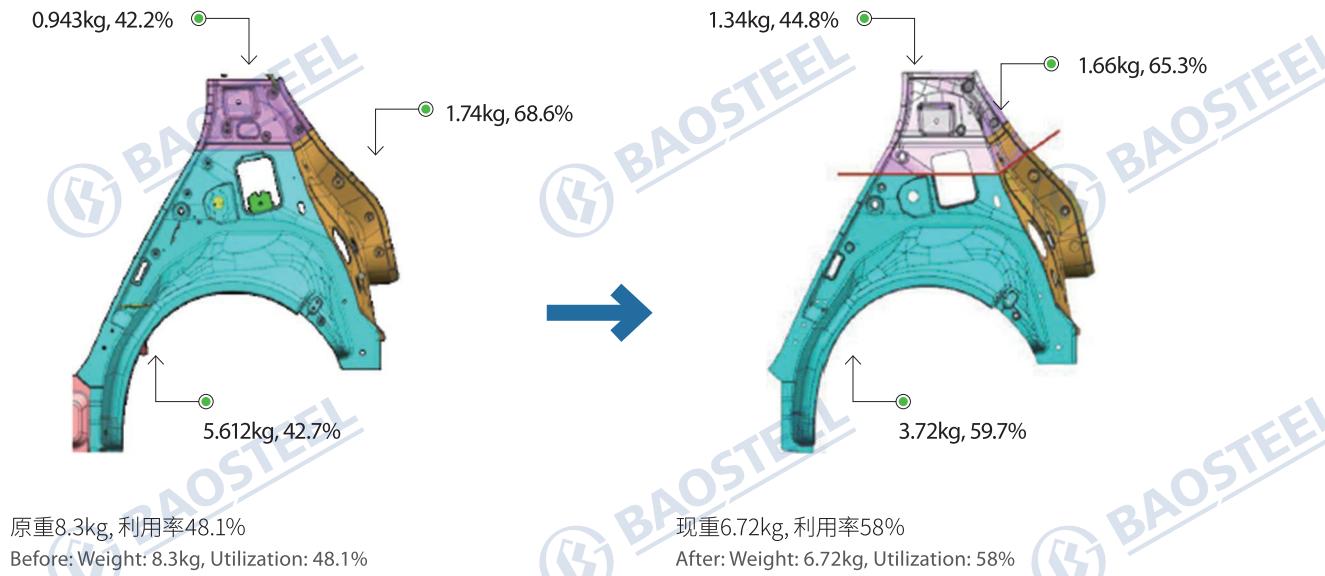
## 2. 冲压缺陷预测, 覆盖件冲压外观质量分析, 提供零件优化建议

Stamping Defect Prediction, Stamping Quality Analysis of the Panel, offering the Optimization Suggestion



**3. 零件分块优化, 材料利用率提升, 降低生产成本**

Part Optimization to Increase the Utilization, and Decrease the Cost

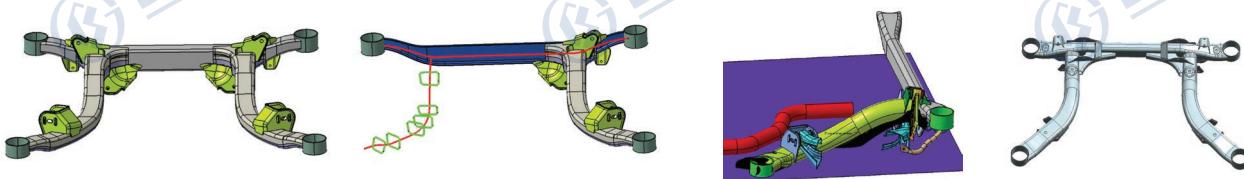
**先进成形技术 Advanced Forming Technology****1. 液压成形 Hydroforming**

具备为液压成形技术提供全面技术解决方案的能力

- 液压成形用原板开发及原管性能评估标准
  - 协同用户开展液压成形零件设计及优化
  - 工艺规划及可成形性评估
  - 模具设计开发及样件提供
- Providing complete technical solutions for hydroforming
- Hydroforming material development and tube assessment standard
  - Technical support of part design and optimization
  - Process design and formability analysis
  - Die design and prototype parts supply

**案例 Case**

后副车架零件协同设计及样件开发 Rear Subframe SAPH440, 2.5mm



原冲压设计

Original stamping design

空间轴线及截面设计

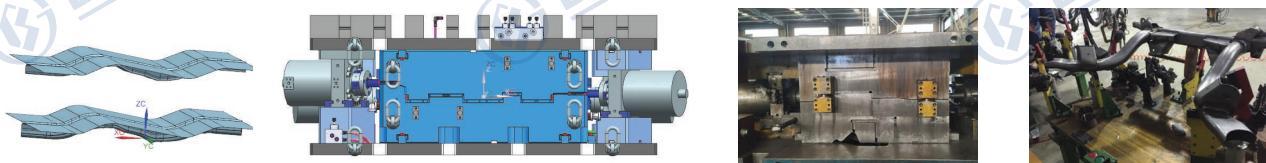
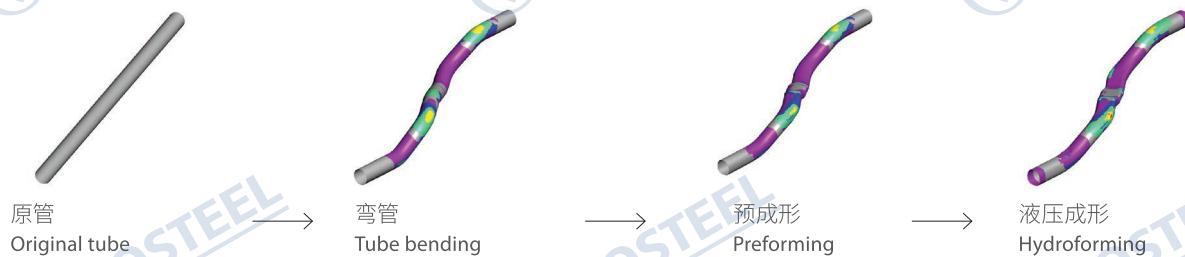
Spacial axis and cross section design

协同初步设计

Concept model co-design

协同细化设计

Refinement model co-design



实施效果: 实现后副车架减重13%, 成本相当且性能达标, 首次实现48天液压成形副车架快速高质交样

Results: Weight reduce 13%, Cost comparable and performance improving, realizing 48 days prototype development

	冲压焊接 Press and Welding	管件液压成形 Tube Hydroforming
零件数量 Parts number	6	2+1
总体重量 Total weight	12.2kg 60%-70%	10.54(↓13.6%) 90%(/20%)
材料利用率 Material utilization	286MPa	223MPa(↓22%)
深坑工况最大应力 Max stress of Deep Pit condition		

### 其他案例及应用 Other Application Cases



后副车架横梁 Rear Subframe Cross Beam  
QStE340TM, 2.7mm

后副车架纵梁 Rear Subframe Stringer Beam  
QStE340TM, 2.5mm



前副车架 Front Subframe  
S315MC, 2.5mm

## 2. 热冲压成形 Hot Stamping

- 具备为传统热冲压提供全面的一揽子技术解决方案的能力
- 具备提供绿色热冲压(低成本、低能耗、快节拍)一揽子技术解决方案的能力
- 具备提供补丁板热冲压的全面技术解决方案能力
- 具备提供VRB板热冲压的全面技术解决方案能力
- Ability to provide comprehensive package of technical solutions for traditional hot stamping
- Ability to provide package of technical solutions for green hot stamping (low cost, low energy consumption and rapid cycle time)
- Ability to provide comprehensive technical solutions for patch hot stamping
- Ability to provide comprehensive technical solutions for VRB hot stamping

### 传统热冲压技术 Traditional Hot Stamping

从零件协同设计、样模样件开发到正式工装开发、工艺设计优化，全过程实现本土化，最大程度降低开发成本。

From the collaborative design, model prototype to production tooling development, optimization of process design, the whole process achieves localization with the maximum reduction of development costs.



零件协同设计  
Collaborative design



样模样件开发  
Model prototype



正式工装开发  
Production tooling development

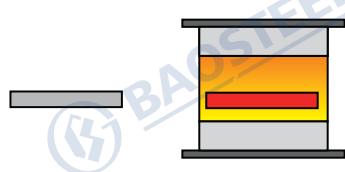


工艺设计优化  
Optimization of process design

### 绿色热冲压技术 Green Hot Stamping

新型低温加热钢板+高耐磨高导热模具钢材料+模具、工艺适应性优化+轻量化夹持器+热冲压零件冷切边=能耗、成本降低，生产节拍提高。在实际热冲压B柱开发案例中，零件保压时间可以控制在6秒之内，生产节拍和模具寿命达到行业领先水平。

Green means new low temperature steel, high wear resistance high conductivity steel for tooling, optimization design for tooling and process, lightweight gripper and edge cutting. Actually in B pillar development, the hold time is controlled within 6 seconds and the production cycle and the life of the tooling are to achieve the industry leading level.

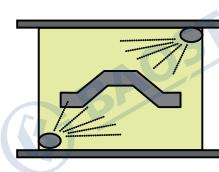


低温加热专用钢板  
Low temperature steel



低温加热  
Low temperature heating

轻量化夹持  
Lightweight gripper

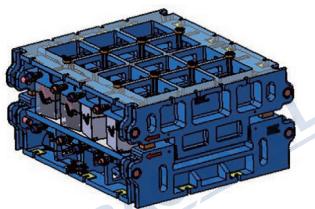
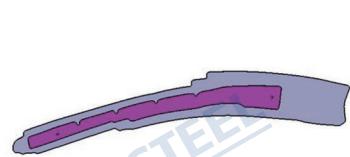


低温加热专用模具与工艺  
Special tooling and process for low temperature heating

零件冷切边及抛丸  
Edge cutting and blasting

## 先进热冲压技术-补丁板热冲压

Advanced Hot Stamping: Patch Hot Stamping



补丁板零件设计优化  
Design and optimization of part

补丁板模具设计优化  
Design and optimization of toolings

补丁板热冲压工艺设计优化  
Design and optimization of process

## 先进热冲压技术-VRB板热冲压

Advanced Hot Stamping: Hot Stamping with VRB Panel



VRB热冲压零件设计优化  
Design and optimization of part

VRB热冲压工艺设计优化  
Design and optimization of process

VRB热冲压模具开发  
Prototype development

## 3. 轧压成形 Roll Forming

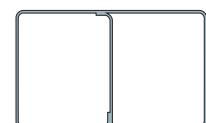
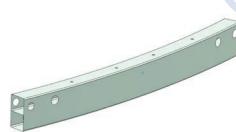
## 超高强钢辊压成形一揽子技术支撑与解决方案

- 先进高强钢材料辊压成形特性评估与推荐
- 零件设计与优化支持
- 辊压工艺及样件同步开发

## UHSS roll forming

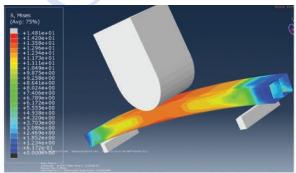
- AHSS characteristic evaluation and recommendation for roll formed parts
- Technical support of profile design and optimization
- Synchronized development of roll forming process and prototype

## 案例 Case

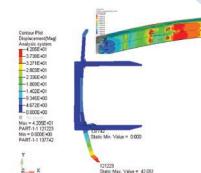


结构优化  
Structure optimization

零件数模及截面  
3D Model and section

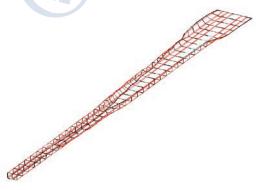


# 产品使用性能CAE分析及仿真 CAE for product performance

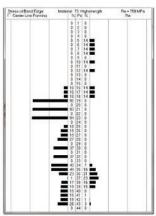


A visualization of a complex neural network architecture, likely a Transformer model, showing multiple parallel attention heads represented by colored lines. The diagram consists of several parallel rows of curved lines, each row representing an attention head. The lines are colored in various shades of red, orange, yellow, green, blue, and purple, indicating different heads or layers. The overall structure is highly symmetrical and fan-like, with lines converging and diverging across the frame.

## 辊压工艺设计及辊花图 Roll forming fower



# 辊压成形过程应力分析 Deformation simulation



# 辊压成形过程CAE分析 CAE for deformation

## 其他案例及应用 Other Application Case



日字形保险杠 B Shape Bumper  
HC820/1180DP 1.4mm

#### 4.热辊弯成形 Hot Roll-bending

- 热辊弯电磁-热-力场耦合仿真分析 Magnetic-Thermo-dynamic coupling simulation for HRB process
- 热辊弯成形零件成形缺陷预测与优化改进 Prediction and improvement of defects
- 感应加热线圈与模具设计 Design of Induction heating and forming tools
- 热辊弯成形零件样件试制技术支持 Technical support for prototype trial production
- 热辊弯零件服役工况结构性能试验评估 Performance test under real working condition

#### 案例 Case

B字型热辊弯前防撞梁 HRB Bumper (B Section)

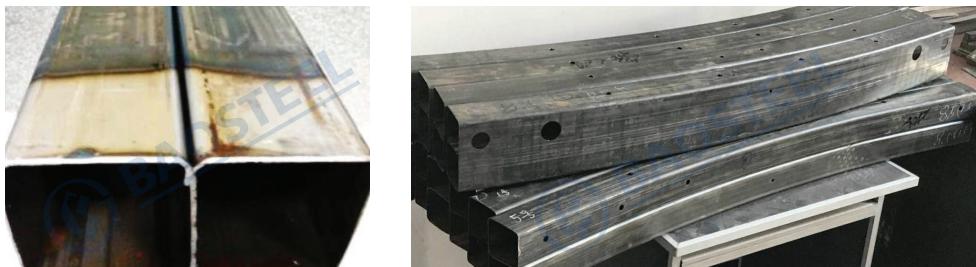


B字型热辊弯前防撞梁  
B Section HRB Bumper B1500HS 1.5mm

- 特殊感应强化工艺, 截面强度>1500MPa Strength over 1500MPa due to special heating method
- 良好的抗弯曲截面特性 Good bending resistance characteristics
- 变曲率弯曲, 满足SORB新碰撞工况保险杠造型曲率要求 Variable bending radius to meet styling requirements under SORB crash test

## 案例 Case

日字型热辊弯前防撞梁 HRB Bumper (日Section)

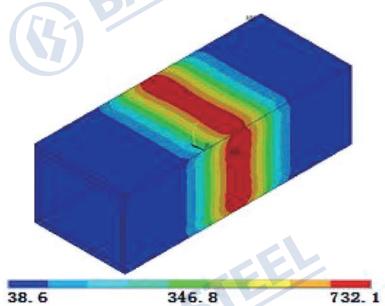
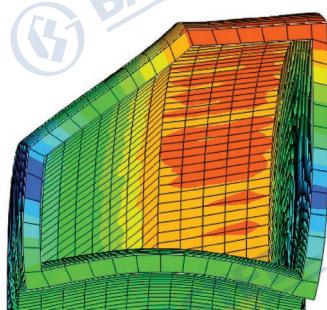
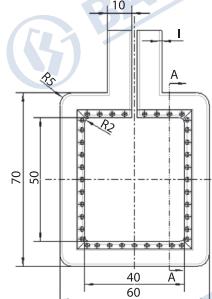
日字型热辊弯前防撞梁 日Section Bumper  
B1500HS 1.4mm

- 特殊感应强化工艺, 截面强度>1500MPa
- 良好的抗扭转抗弯曲截面特性
- 弯曲成形质量好,无表面起皱

- Strength over 1500MPa due to special heating method
- Good bending and torsion prop.
- No wrinkling after bending

## 案例 Case

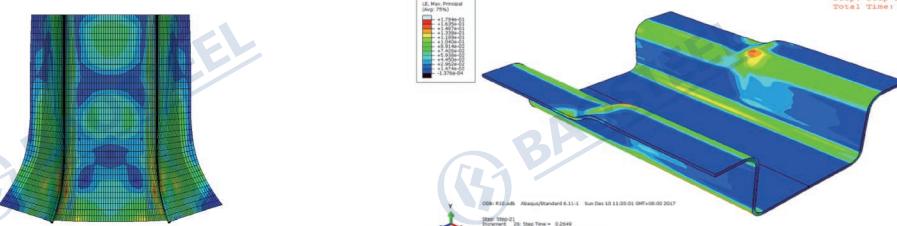
分析和设计 Analysis and design

电磁感应加热温度场分析  
Thermo analysis for  
induction heating异型管弯曲过程分析  
Bending process analysis for  
special-shaped tubes感应线圈设计  
Design of induction  
heating device

## 5. 轧冲成形 Roll-stamping

- 高强钢轧冲成形特性评估与推荐
- 高强钢轧冲零件协同设计
- 轧冲零件工艺开发及仿真分析
- 轧冲模具设计与优化
- 轧冲样件试制
- HSS properties evalution and recommendation for roll-stamping parts
- UHSS Roll-Stamping Parts Collaborative Design
- Process Design and FEA
- Die design and Optimization
- Prototype Trial

### 案例 Case



变截面零件轧冲成形FEA仿真分析  
Roll-Stamping FEA of Variable cross-section parts



超长大梁整体轧冲成形仿真分析  
Roll-stamping FEA of whole super long longitudinal beam



超长大梁整体轧冲成形模具开发  
Die design of roll-stamping whole super long longitudinal beam



轧冲成形样件试制  
Roll-Stamping UHSS samples



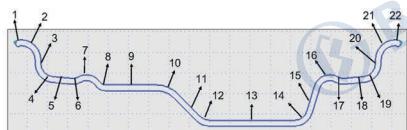
## 6. 旋压成形 Spin Forming

- 材料旋压特性评估 Evaluation on material spinning formability
- 工艺开发、可制造性分析 Process design and formability FEA

### 案例 Case



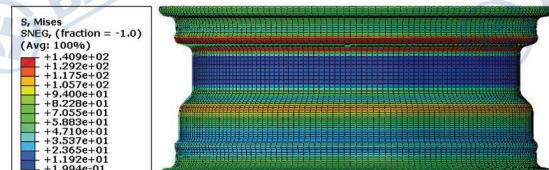
传统等截面钢轮轮辋  
Traditional steel wheel rim section



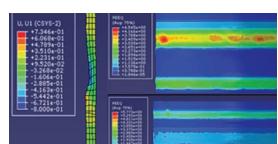
轻量化不等厚轮辋截面  
Light-weight steel wheel rim section



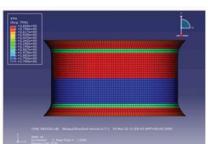
车轮应力及疲劳FEA分析  
Stress and fatigue FEA simulation of steel wheel



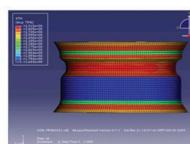
轮辋强度分布  
Stress distribution of rim



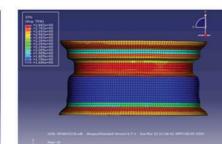
旋压  
Spinning



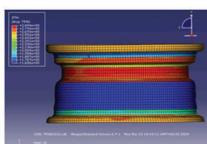
扩口  
Flaring



一滚  
1<sup>st</sup> roll-forming



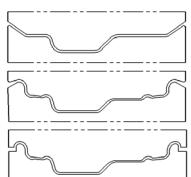
二滚  
2<sup>nd</sup> roll-forming



三滚  
3<sup>rd</sup> roll-forming



轮辋旋压模具开发  
Rim spinning die development



全新滚型模具型面设计  
New roll-forming die design



轮辋坯料旋压后  
Rim bandage after spinning



轻量化旋压轮辋样件  
Light-weight steel wheel sample



性能实测评估  
Performance evaluation with real test

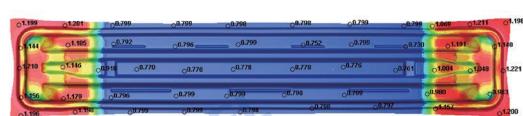
## 7. VRB技术 Variable-Thickness Rolled Blank

在VRB技术领域,在车身零件开发全流程提供概念设计、工艺设计、模具技术及现场技术支撑工作,协助客户解决VRB技术应用过程中的各种问题。

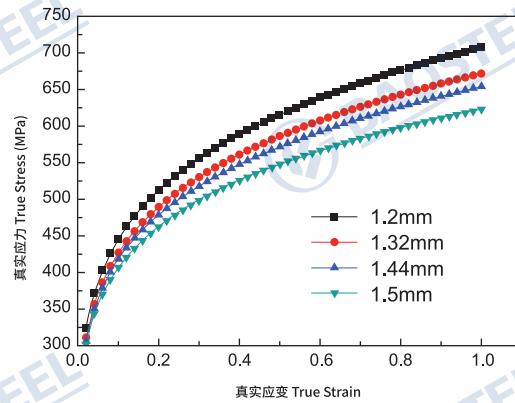
In the field of VRB technology, Baosteel could provide various technical support including concept design, process design, tooling design, and on-site service.prototype



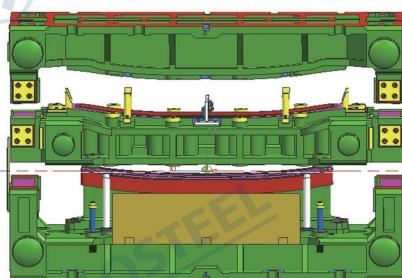
概念设计  
Concept design



CAE分析  
CAE analysis



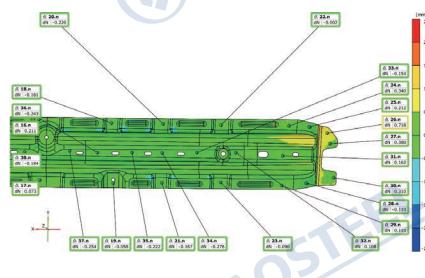
材料技术  
Materials technology



模具技术  
Tooling technology



成形跟踪  
Quality track



质量评价  
Quality evaluation

## 整车结构分析 Body Structure Analysis

车身结构优化、整车性能评估能力

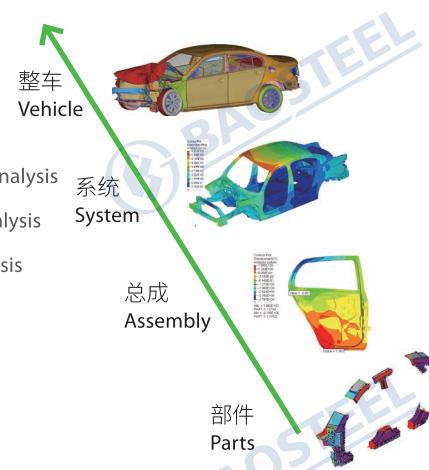
Body structure optimization and vehicle performance evaluation

### 设计/优化 Design/Optimization

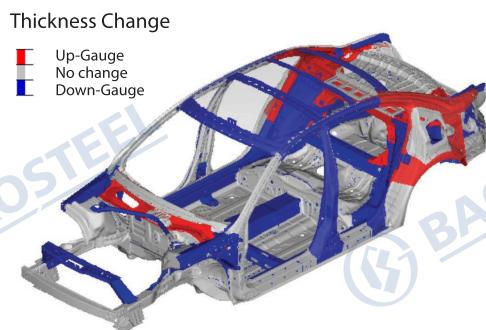
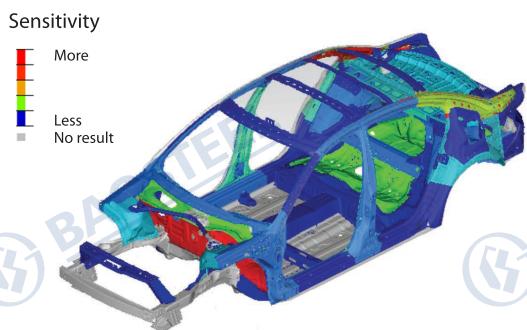
敏感度分析	Sensitivity analysis
接头性能分析	Joint analysis
厚度灵敏度优化	Gauge optimization
梁骨架快速建模	Frame structure modeling
截面优化设计	Section optimization
拓扑优化	Topology optimization
传力路径分析	Load path analysis
结构设计数据库	Structure database

### 评估/验证 Evaluation/Verification

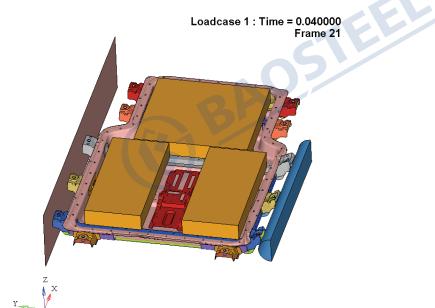
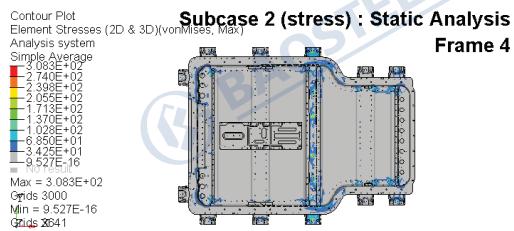
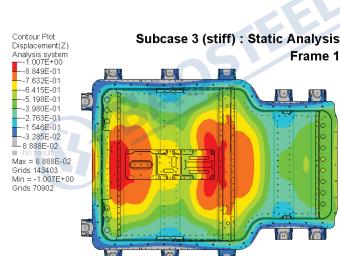
刚度工况分析	Stiffness analysis
强度工况分析	Strength analysis
C-NCAP法规分析	C-NCAP regulations analysis
C-IASI法规分析	C-IASI regulations analysis
IIHS法规分析	IIHS regulations analysis
开闭件总成分析	Closure analysis
座椅总成分析	Seat analysis
电池包总成分析	Battery pack analysis



## 案例 Case



基于车身用材数据库的厚度灵敏度分析优化，实现某白车身减重10kg  
10kg light-weight in BiW through material gauge sensitivity optimization based on AutoSteel Database

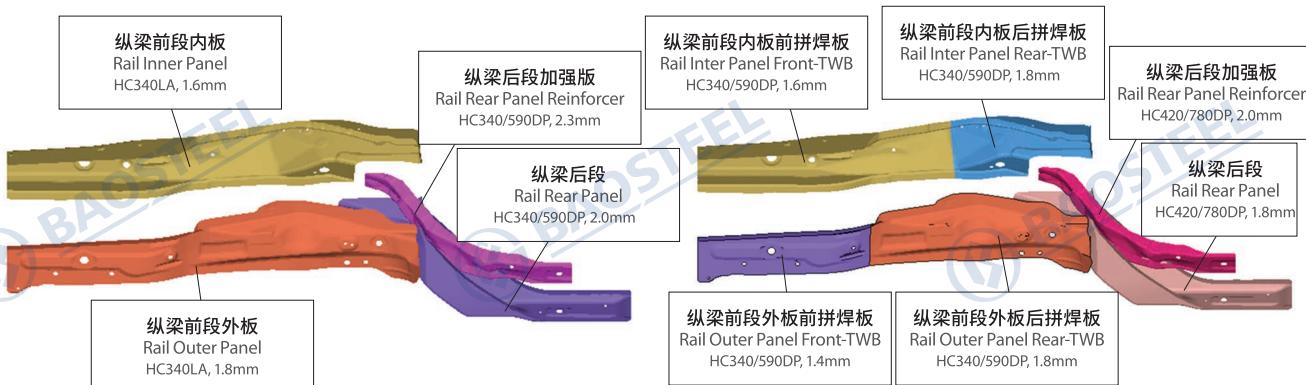
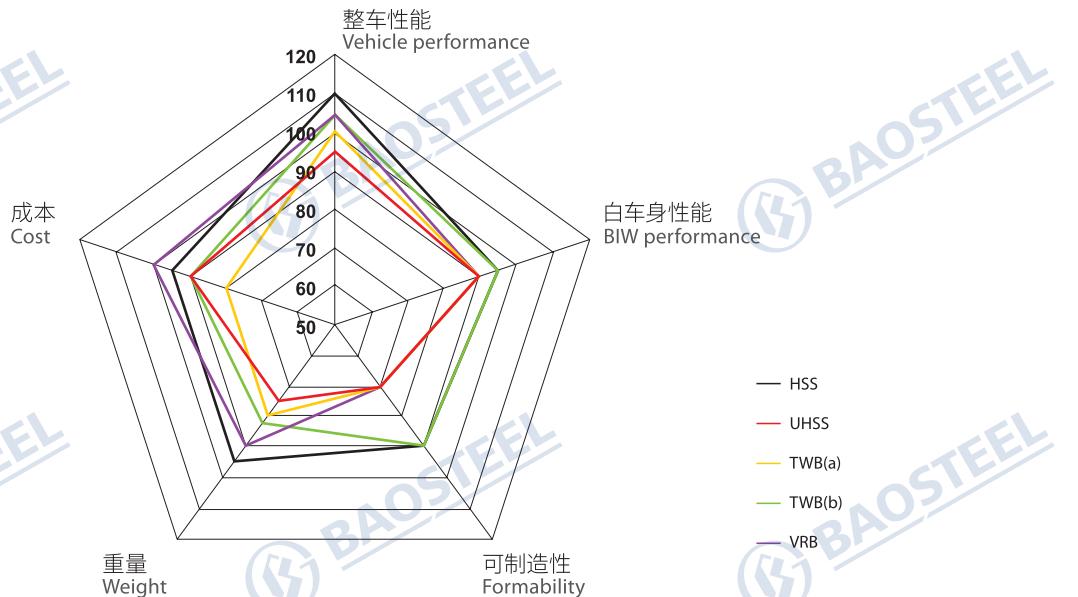


在关键工况性能通过验证同时，实现某电池包框架总成减重10.3kg  
10.3kg light-weight in Battery Pack with performance in key load cases validated

## 典型小总成不同解决方案 Different Solutions for Typical Component

方案 Design Plan	纵梁内板 材料/厚度 Rail Inner Panel Material/Thickness	纵梁外板 材料/厚度 Rail Outer Panel Material/Thickness	纵梁后段 材料/厚度 Rail Rear Panel Material/Thickness	纵梁后段加强版 材料/厚度 Rail Rear Panel Reinforcer Material/Thickness	减重 Weight Reduction	成本 Cost Comparing	正面碰撞安全 Front Impact	评价 Design Evaluation
原设计 Original design	HC340LA 1.8mm	HC340LA 2.3mm	HC340/590DP 2.3mm	HC340/590DP 2.0mm	-	-	★★★★	
HSS	HC340LA 1.8mm	HC340LA 2.3mm	HC420/780DP 1.8mm	HC420/780DP 2.0mm	-3.2%	+3.27%	★★★★★	性能最佳 Performance best
UHSS	HC340/590DP 1.6mm	HC340/590DP 1.6mm	1180DP 1.8mm	1180DP 1.5mm	-13.3%	-11.32%	★★★★	轻量化最佳 Lightweight best
TWB(a)	HC340/590DP, 1.6mm + HC420/780DP, 1.8mm	HC340/590DP, 1.6mm + HC420/780DP, 1.6mm	HC420/780DP 1.8mm	HC420/780DP 2.3mm	-9.6%	-18.26%	★★★★	材料成本最低 Lowest cost
TWB(b)	HC340/590DP, 1.6mm + HC340/590DP, 1.8mm	HC340/590DP, 1.4mm + HC340/590DP, 1.8mm	HC420/780 DP 1.8mm	HC420/780DP 2.0mm	-7.8%	-8.46%	★★★★★	成本性能 综合最佳 Optimal synthesis
VRB	HC420LA 1.6mm	HC420LA, 1.4mm + HC420LA, 1.6mm	HC420LA 2.0mm	HC420LA 2.3mm	-6.4%	+0.13%	★★★★★	

## 典型小总成不同解决方案 Different Solutions for Typical Component



基础设计方案 Original design plan

成本性能综合最佳设计方案 Optimal synthesis plan

## 提高材料利用率解决方案 The Solution of Improving Material Utilization Rate

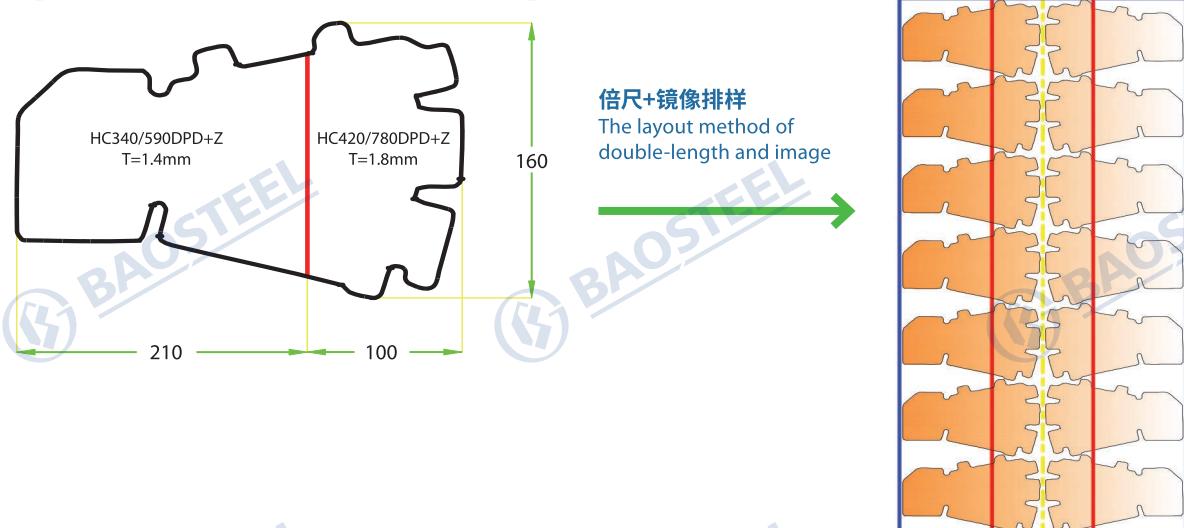
### 倍尺镜像法 Method of Double Length and Image

针对小规格激光拼焊零件，采用倍尺镜像排样法，从激光焊接加工到后续落料，开辟了此类零件高效率、低成本的工艺路径。

解决拼焊可制造性，提升材料利用率24.39%，并可提高落料效率30%。

In the small size of TWB parts, using the layout method of double-length and image, from the laser welding processing to the blanking, opening up the process of high efficiency and low cost.

To solve the laser welding manufacturing, improve the material utilization rate of 24.39% and can improve the efficiency of blanking 30%.



### 现场技术支持 On-site Technical Support

在汽车板冲压成形领域,综合运用材料技术、全流程冲压仿真技术、模具及工艺技术,开展大量现场技术支持工作,协助客户解决汽车板零件成形中的质量问题。

In the field of automotive sheet stamping and forming, with comprehensive use of material technologies, the whole process of stamping simulation technologies, tooling and process technologies related a large number of on-site technical supports can be provided to help customers to solve quality problems.

### 冲压成型问题解决方案 Solution of Stamping or Forming Problem



## 连接技术 Joining Technology

在汽车用材连接领域，基于对金属材料可连接性的认识，宝钢可为用户提供连接工艺与优化、接头性能改进、接头缺陷控制及预防等解决方案。

In the field of automotive sheet jointing, based on the understanding of jointability, Baosteel has ability to support customers for jointing solution, including joint schedule design and optimization, joint performance improvement, joint defect control and prevention.

### 控制前 Before Control

连接成本高  
High cost of joining

能耗大  
High energy consumption

焊点强度波动大  
High fluctuation of joint strength

电极寿命低  
Low electrode endurance

易产生接头缺陷  
More defects

工作环境恶劣  
Poor working environment

影响涂装质量  
Influence coating quality

### 控制后 After Control

连接成本降低  
Low cost of joining

能耗小  
Low energy consumption

焊点强度波动小  
Low fluctuation of joint strength

电极寿命提高  
High electrode endurance

接头缺陷少  
Less defects

工作环境友好  
Good working environment

不影响涂装质量  
Without coating quality influence

### 案例 Case

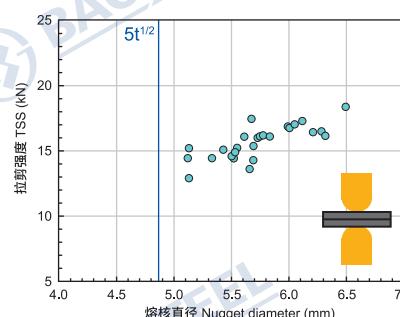


▲ 优化前  
Before

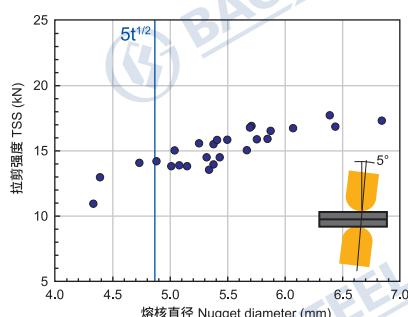
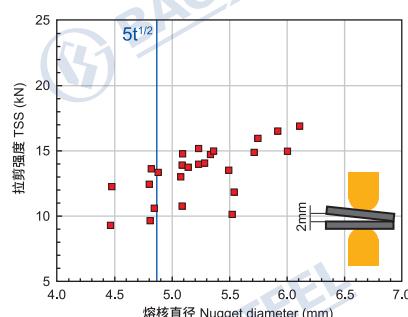


▲ 优化后  
After

焊接工艺对焊接质量的影响  
Influence of welding schedule on welding quality



装配与操作对焊接质量的影响  
Influence of fit-up & operation on welding quality



## 涂装技术 Painting Technology

在汽车涂装技术领域，聚焦涂装外观优化、整车防腐优化及新材料应用的技术研究，可为用户提供涂装性能最优的钢铁产品及其应用过程的系统解决方案。

**涂装外观优化**——免中涂工艺下车身外覆盖件选材优化及全涂装外观质量控制

**整车防腐优化**——车身用钢涂装防腐选材优化及车身防腐解决方案

**新材料应用**——新型车身用钢及非钢材料涂装使用技术解决方案

In the field of automobile coating technology, we are focusing on the technology of painting appearance optimization, vehicle anti corrosion optimization and new material application. We can provide the best painting performance steel materials and system solution for painting application of steel materials.

Painting appearance—Selection and optimization of outer covering parts of the body and full coating appearance quality control for 2C1B process

Vehicle anticorrosion—Optimize steel material for car body anticorrosion and provide corrosion protection solution

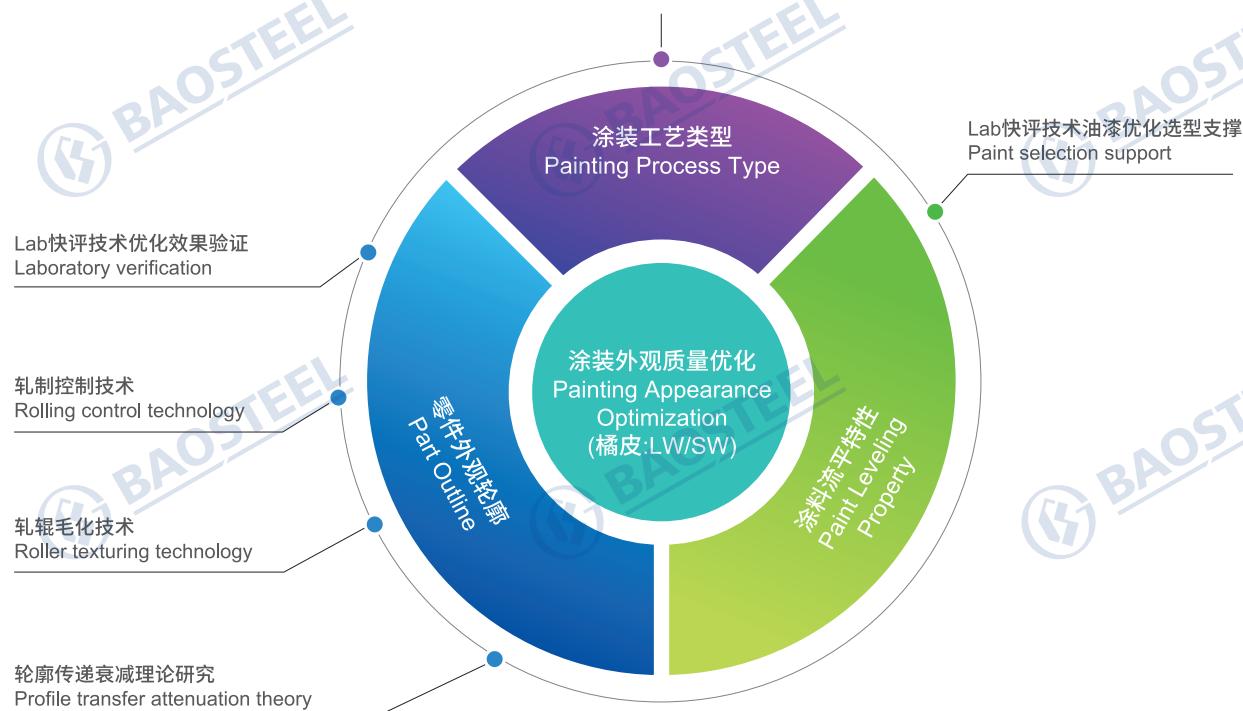
New materials—Technical solution for the application new type material for car body

零件实际变形模拟 Simulation of actual deformation of parts  
涂装前处理实验室模拟 Simulation of painting pretreatment  
涂装电泳实验室模拟 Simulation of painting electrophoresis  
外观轮廓测试 Profile test (Ra、Pc、W、LW、SW)

支撑车厂优化涂装外观的涂料体系选型优化  
Support paintings system selection and optimization  
指导钢厂优化材料外观轮廓适应用户工艺  
Guide material appearance contour optimization

实验室轮廓传递快速模拟平台  
Fast simulation platform for profile transfer

Lab快评技术工艺特征模拟  
Laboratory process characteristic simulation





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