



Stock code:000559

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- 01 U-Joint
- 02 Transmission Shaft
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Contents



Company Profile----Wanxiang Group



Startup

« In 1969



Founder

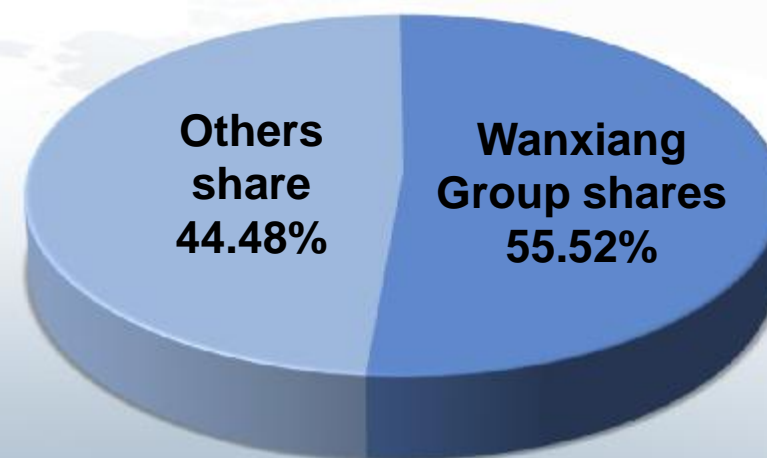


Main Business

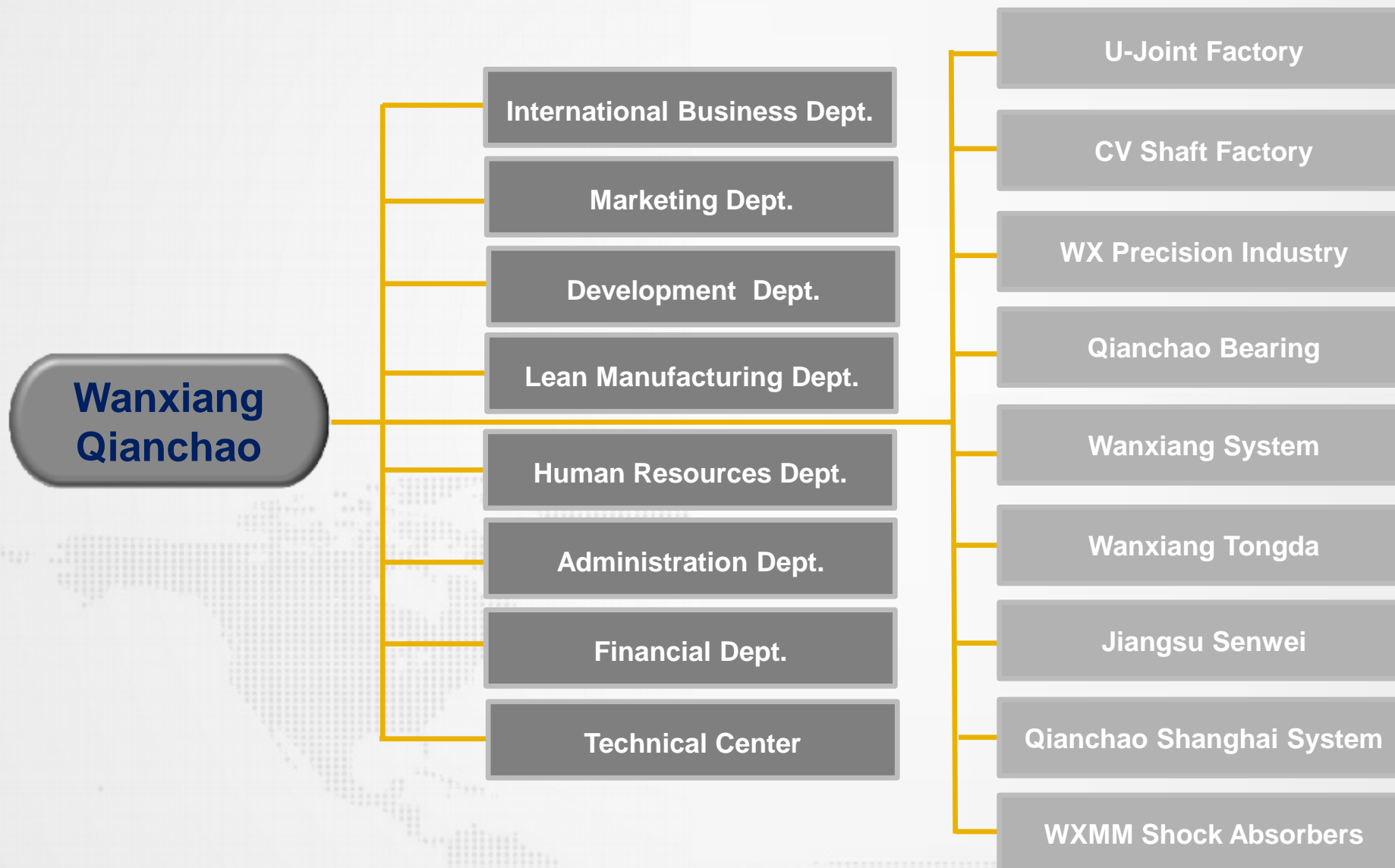
« Auto Parts

One of the largest automotive parts suppliers in China

- « Wanxiang Qianchao (000559) was listed on the Shenzhen Stock Exchange in 1994
- « U-joints, transmission shaft, CV shaft, bearing, fuel tank, exhaust system, and other products have been identified as China Famous Brand Products
- « "QC" trademark was identified as China Famous Trademark
- « U-joint product won the World Famous Brand in China, the Recognition Awards of China Industrial Awards
- « Won the first Zhejiang provincial government quality award
- « **Won the Nomination Award of the First China Quality Award**



Company Profile---Organization Structure






Company Profile---Main Products

Wanxiang Qianchao is consistently committed to the development and manufacture of auto parts with products range from components to assembly to system integration, and concentrates on production specialization, production serialization as well as supply modularity.





Current products cover universal joints, hub units, bearings, automotive chassis & suspension systems, brake systems, transmission systems, exhaust systems, fuel tanks, engineering machinery spare parts and so on.



Company Profile---Core Products

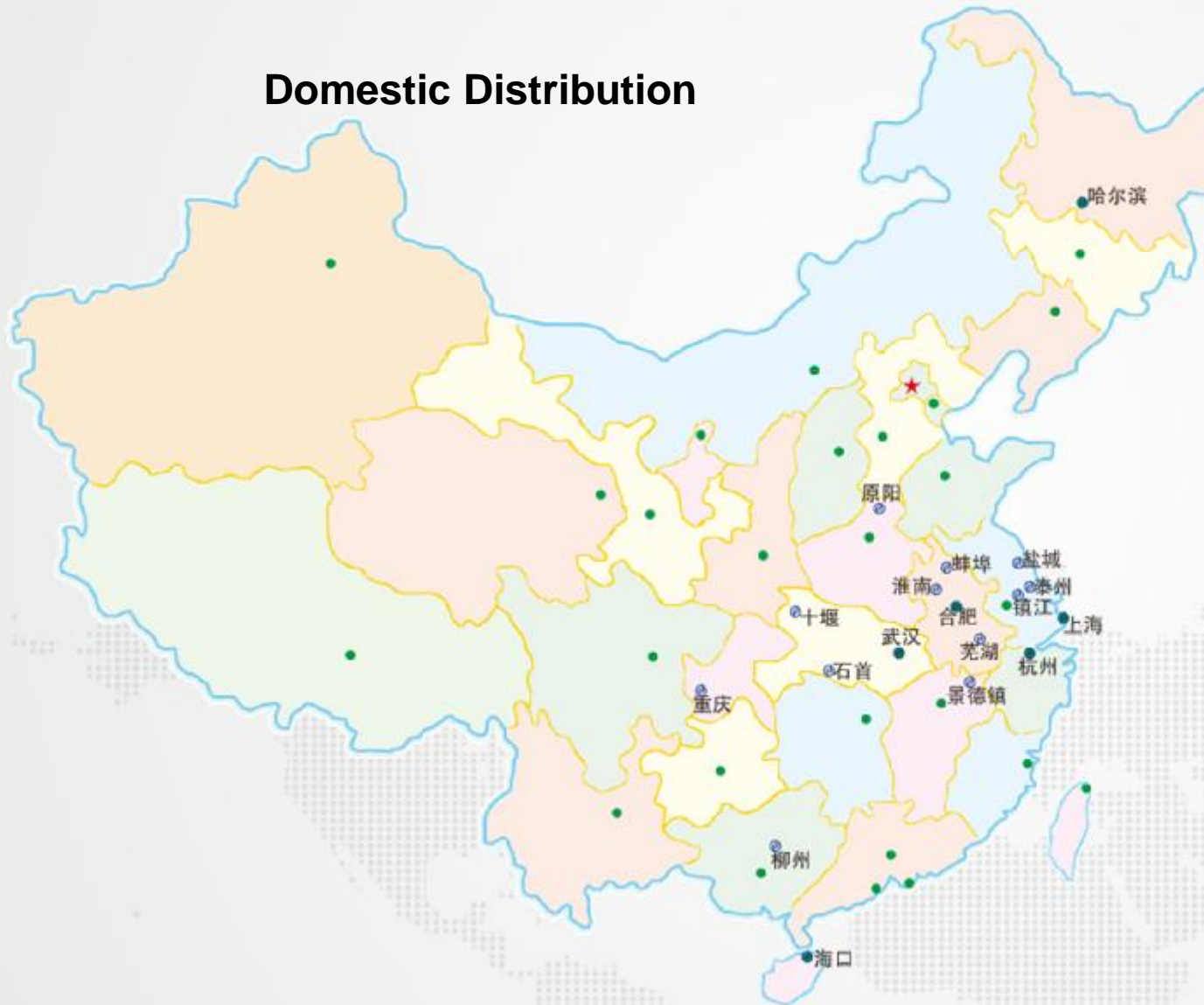
Product	Diagram	Industrial position
U-Joint		With an annual capacity of more than 60 million sets; hold No.1 global market share and 65% of domestic market share.
Transmission Shaft		Seven manufacturing bases located separately in Detroit, Mexico, Hangzhou, Liuzhou, Chongqing, Hefei and Shiyang, with an annual capacity of 10 million sets; Scale ranks first in China, while the scale of aluminum transmission shafts ranks first in the world.
CV Drive Shaft		Five production bases located in Germany, Poland, Hangzhou, Wuhu and Chongqing with an annual production capacity of 12 million sets CV shafts, ranks third largest in the world, market share ranks second in China, accounting for 25%.
Hub Unit		Annual capacity of more than 20 million sets, the scale ranks first in China with domestic market share accounting for 30%.
Bearing		Annual capacity of 60 million sets with tapered roller bearings remain dominant position in domestic market.

Company Profile---Core Products

Product	Diagram	Industrial position
Chassis System		Specializing in manufacturing automotive front suspension assembly, rear suspension assembly, rear axle assembly, disc brake assembly, drum brake assembly, vacuum booster assembly and master cylinder assembly, it is one of the largest and most advanced automotive chassis module system manufacturers in China.
Brake System		Main product capacity: Caliper 15 million sets/year, Brake corner 2 million sets/year.
Precision Forging Parts		With an annual capacity of 100,000 tons of all kinds of precision forgings, the technology level and product quality are in the leading position in China. It is the only domestic member of International Cold Forging Organization (ICFG), the most authoritative international academic organization in the field of precision forging.
Exhaust System		With an annual capacity of 800,000 fuel tanks, 2.2 million sets of exhaust muffler and post-processing systems. China's largest national high-tech enterprise in automobile exhaust aftertreatment system and metal fuel tank industry.

Company Profile---Production Base

Domestic Distribution



Wanxiang Qianchao owns 35 factories in 18 cities in China.

Company Profile---Main Customers

Domestic



Overseas



Company Profile---Innovative Platform



- « Established in 1994, and became National Enterprise Technology Center in 1996, with technical personnel accounting for 38.4%;
- « Has a post-doctoral research station, academician workstation and the North American R & D center;
- « CNAS / CQC / CCAP certification laboratories, the reports issued are recognized by 54 countries or regions;
- « 1967 domestic patents (279 invention patents)
- « Formulation of 38 national and industrial standards on CV drive shafts, u- joints, bearings and other products .

Company Profile---Test Platform

Attained CNAS recognition in 2001, passed CNAS review in 2017.

Get through TS16949 assessment as the outside test site for all plants of Wanxiang Qianchao.

Passed the on-site assessment of the laboratory testing ability and the management evaluation of the quality system by GM, GM Shanghai, VW, SVW, BMW, Mercedes.



CNAS Certification



VW certification



Raw Material Inspection



NVH Tester



Four Square Machine



Durability Tester

Company Profile---- Manufacturing Technology



Production line of CV drive shaft

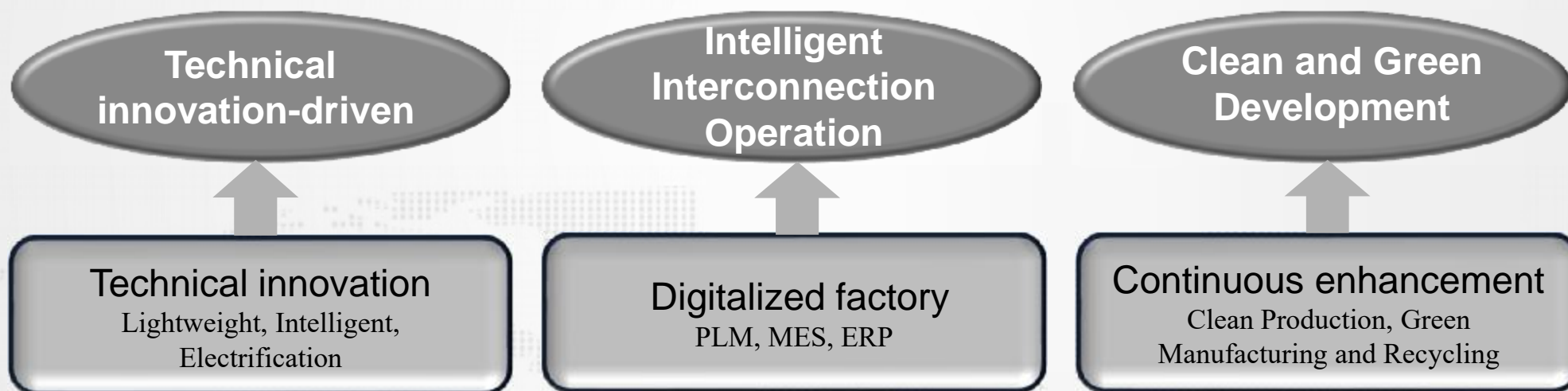


Intelligent Production line of Hub Unit



Assembly line of Hub Unit

***Become a high-tech, clean and
advanced manufacturing
representative***



U-Joint--- Plant Profile

Wanxiang Qianchao U-Joint Plant

Established

01

Established in 1969
A new and high-tech enterprise awarded
by national government



Qualification

02

Famous Brand Export Products
Recognized by the Ministry of
Commerce
Won the National Quality Award
"Qian Chao QC" brand U-joint product
won the world famous brand in China

03

Employees

1500 staff, 145 engineers including 3
doctors

U-Joint--- Products and Customers

Main products and customers

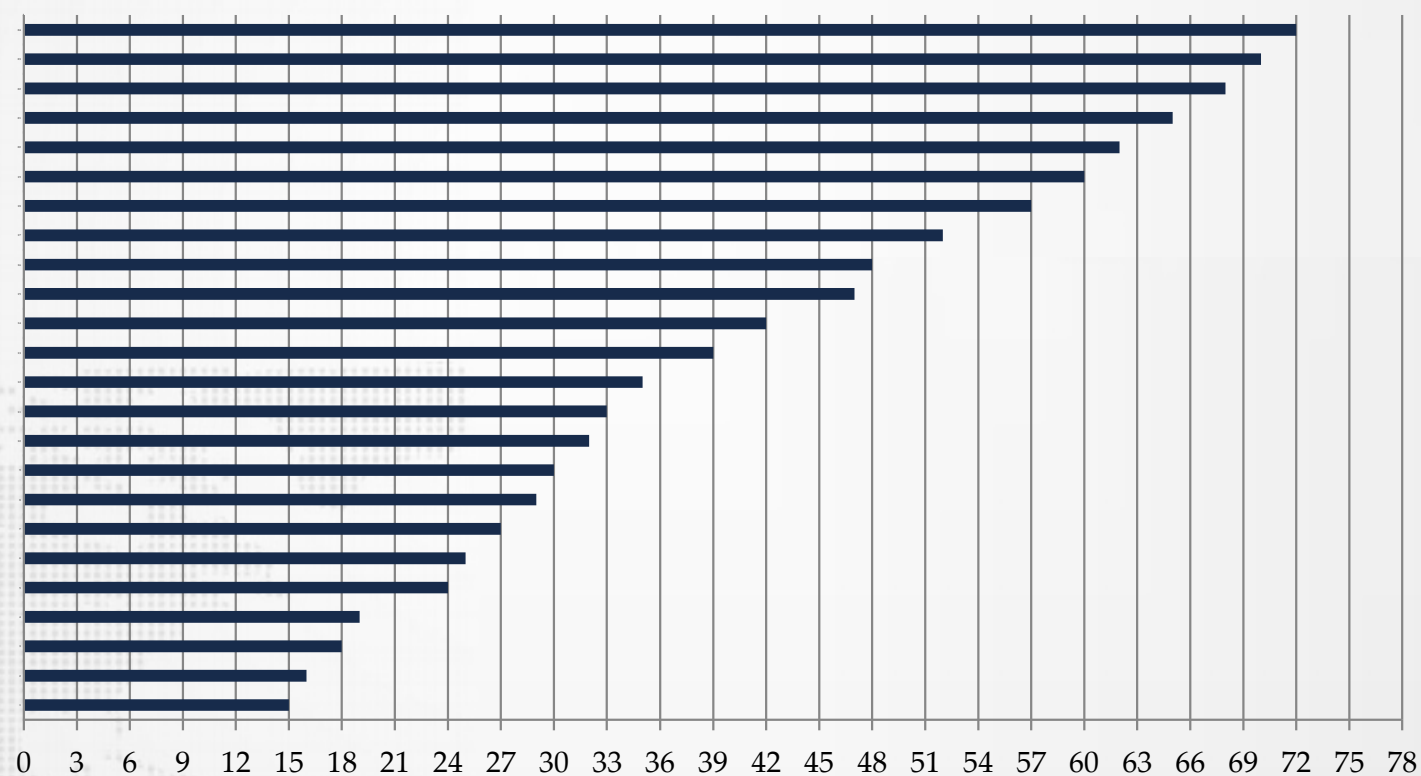


U-Joint--- Products Sizes

U-joint Assembly Serialization

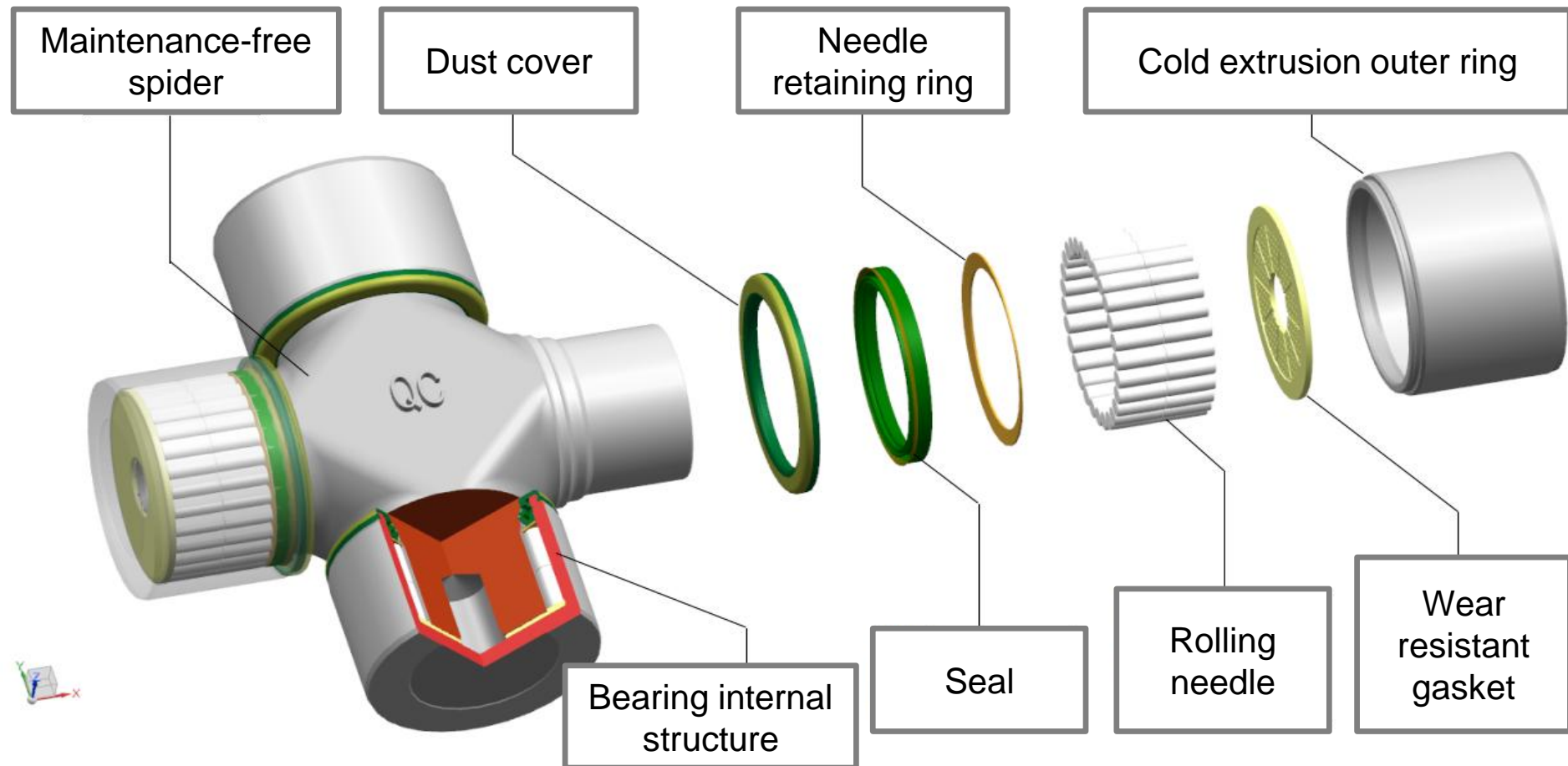


Serialization of U-Joint Assembly Sizes



U-Joint---Innovative technology

Heavy Type Maintenance-free U-Joint



The lifetime of Maintenance-free u-joint has exceeded 600,000 kilometers without failure.
This series of products are widely used in the domestic market.

U-Joint---Innovative technology

Heavy Type Maintenance-free U-Joint

Maintenance-free u-joint

Diameter(mm)	Length(mm)
47	140
48	135
52	133
52	17
53	147
57	144
57	152
57	172
59	167.7
62	160
65	172
68	89/165.5
68	165.5
72	185



Characteristics of Maintenance-free U-Joints

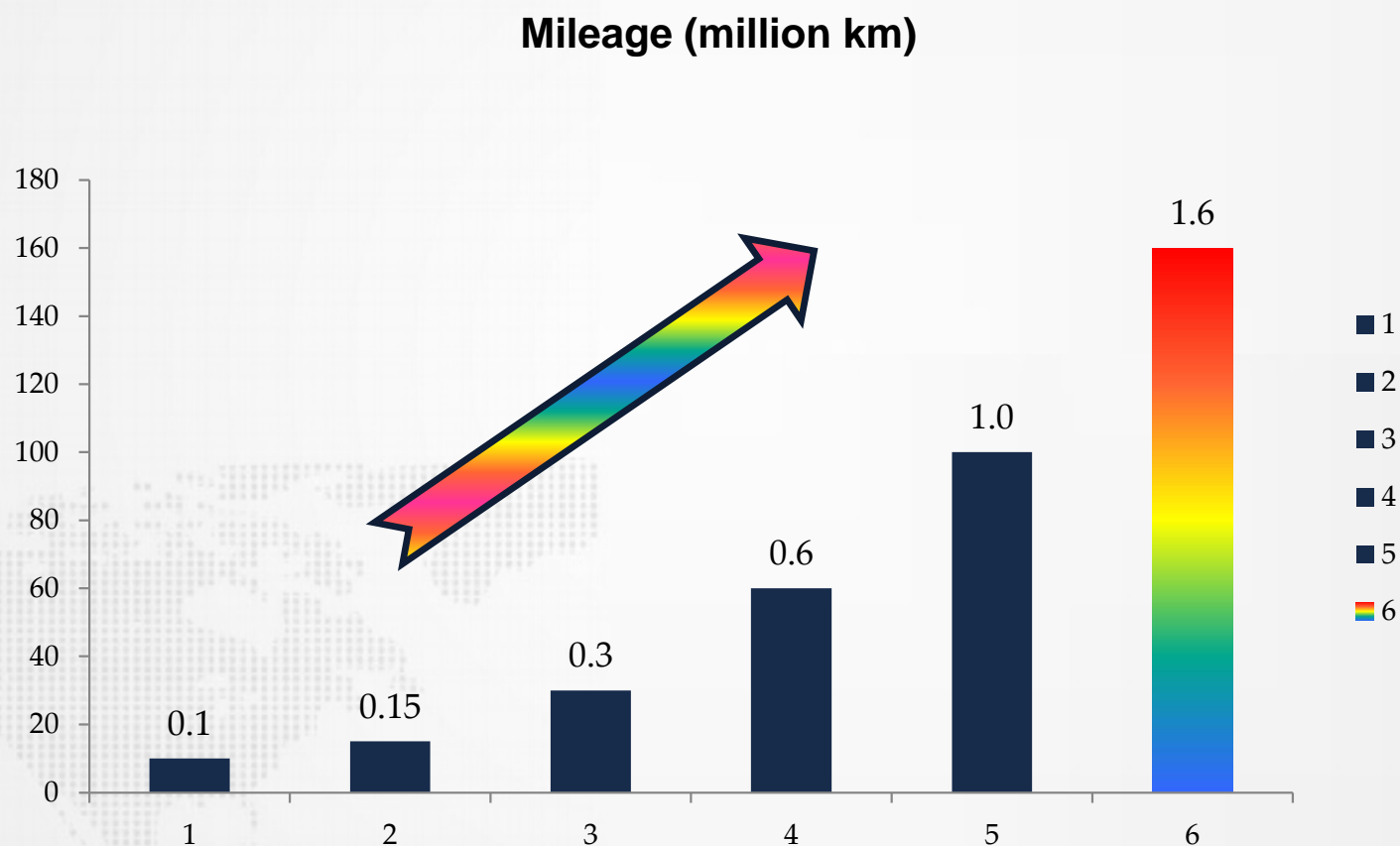
1. No need to add grease, no pollution to the environment
2. Great sealing performance, waterproof and dustproof
3. No parking maintenance, high efficiency
4. After 500 hours of mud test, no mud enters the bearing

Other Series U-Joint Products



U-Joint---Innovative technology

U-joint assembly mileage upgrading



U-Joint---Manufacturing Quality



Transmission Shaft---Plant Profile

Wanxiang Qianchao Transmission Shaft Plant

Established

01

Established in 1992

**A new and high-tech enterprise
awarded by state government.**



Area

02

**It covers an area of 80,000 square
meters and building area of
50,000 square meters.**

03

Employees

800 staff, 85 engineers

Transmission Shaft---Products and Customers

Main products and customers

Transmission shaft of mini,
light passenger Vehicle



Transmission shaft of medium,
heavy duty commercial vehicle



Transmission shaft of engineering
and agricultural machinery

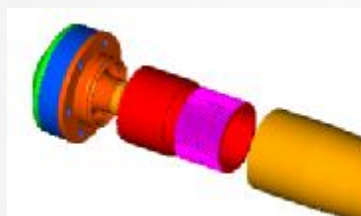


Transmission Shaft---Innovative technology

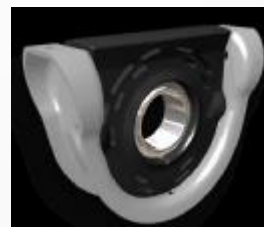
**New material-
aluminum alloy**



**New material-
carbon fiber**



Free-maintenance



High NVH Performance



Transmission Shaft---Design verification

Bench test

Test capability matching the requirements of OEM :

- Static torsion test
- Dynamic torsion test
- Wear life test
- Spline wear test
- Critical rotation speed simulation test
- Heavy duty transmission shaft wear test



Static torque test



Dynamic torque test



Spline wear test



Critical rotation
speed simulation test



Heavy duty transmission
shaft wear test

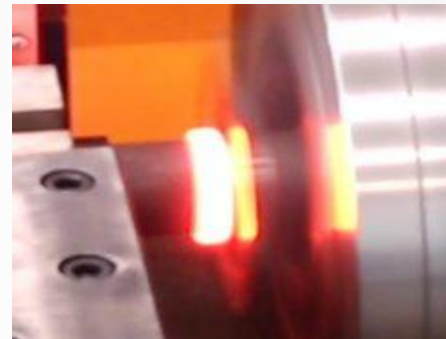


Wear life test

Transmission Shaft---Manufacturing Process

Manufacturing process

**Shaft tube
friction welding**



**Machining
Heat treatment
Nylon coating**



Transmission Shaft---Quality Assurance



Precision Measurement Laboratory



CMM



Spline measuring machine



CV Shaft---Plant Profile

Wanxiang Qianchao CV Shaft Plant

Established

01

Established in 1992
A new and high-tech enterprise
awarded by national government.



Area

02

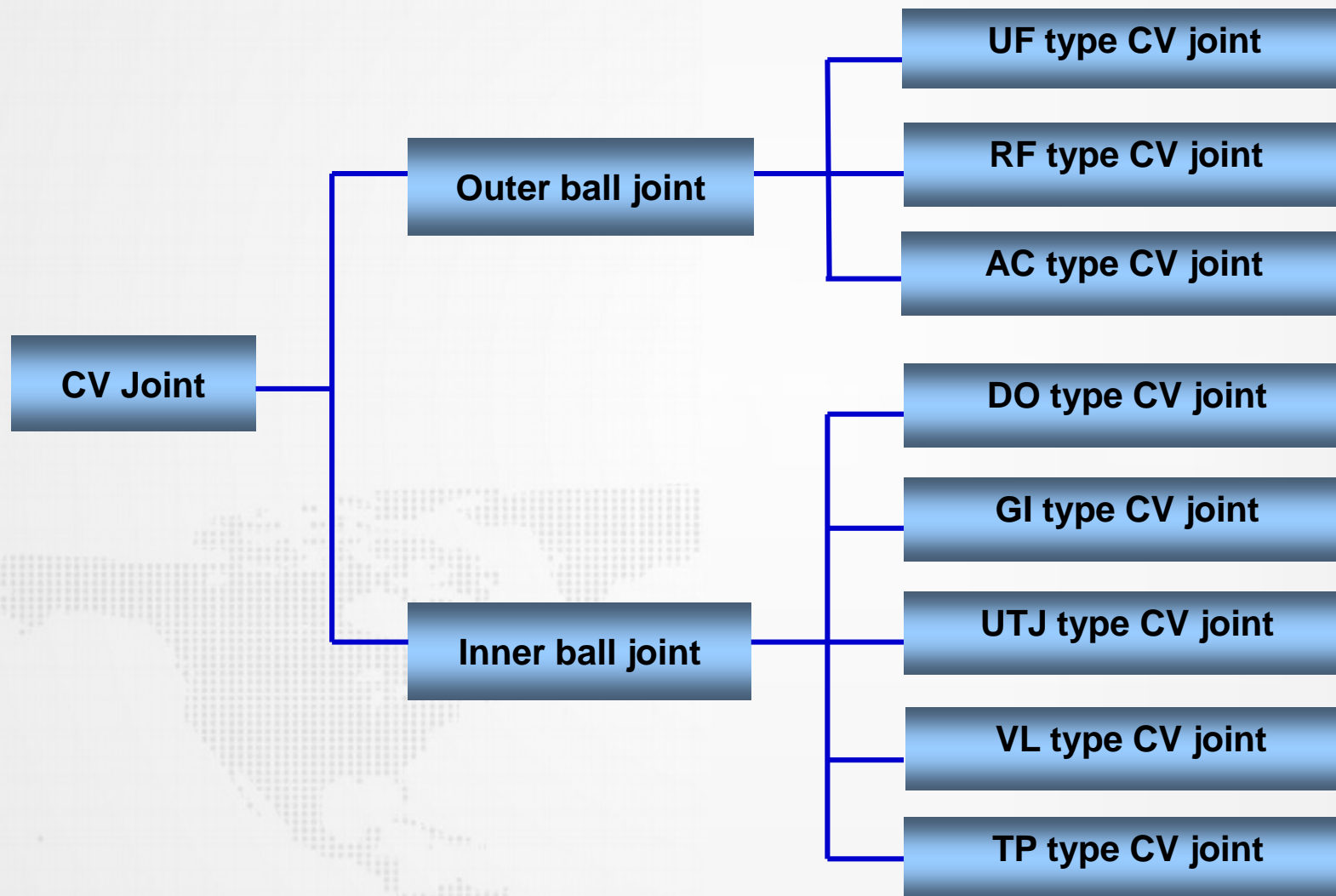
Three plants (Hangzhou, Chongqing, Wuhu) cover the area of 120000 square meters, construction area of 90000 square meters and the total asset is 1.2 billion

03

Employees

1200 staff including 180 engineers

CV Shaft---Product Type



CV Shaft---Main Customers

Main customers



CV Shaft--- Innovative technology

CV joint assembly with high NVH Performance



Left Assembly Torsion stiffness: $114\text{Nm}/^\circ$



Right Assembly Torsion stiffness: $113\text{Nm}/^\circ$



Face spline technology used in fixed joint
(Improved NVH, easily assembly, weight reduction)



CV Shaft---- Innovative technology

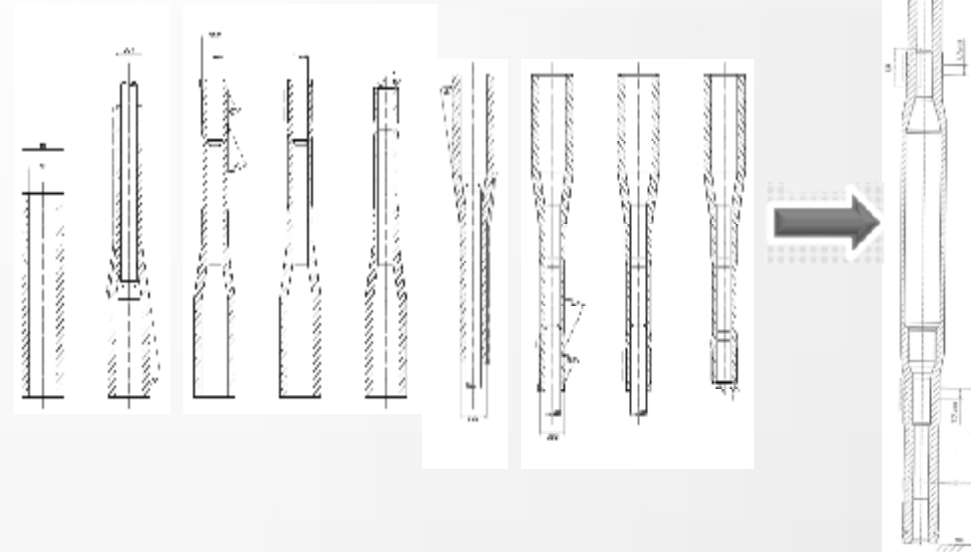
Tubular shaft








Rotary swaging technology used in shaft

Advantage:

weight reduced 20% , high torsional rigidity,
high bend frequency, NVH performance improved



CV Shaft---- Design verification

DV item	Test equipment
Functional test(Swing angle, slip, circumferential clearance, axial clearance, swing torque, starting torque, slip resistance)	
Static and quasi-static torsion test	
Torsion fatigue test	
Life endurance test	
NVH test	

CV Shaft--- Manufacturing Quality



Hub Unit---Plant Profile

Wanxiang Precision Industry Co.,Ltd.

Established

01

Established in 1998
A new and high-tech enterprise
awarded by state government



02

Area

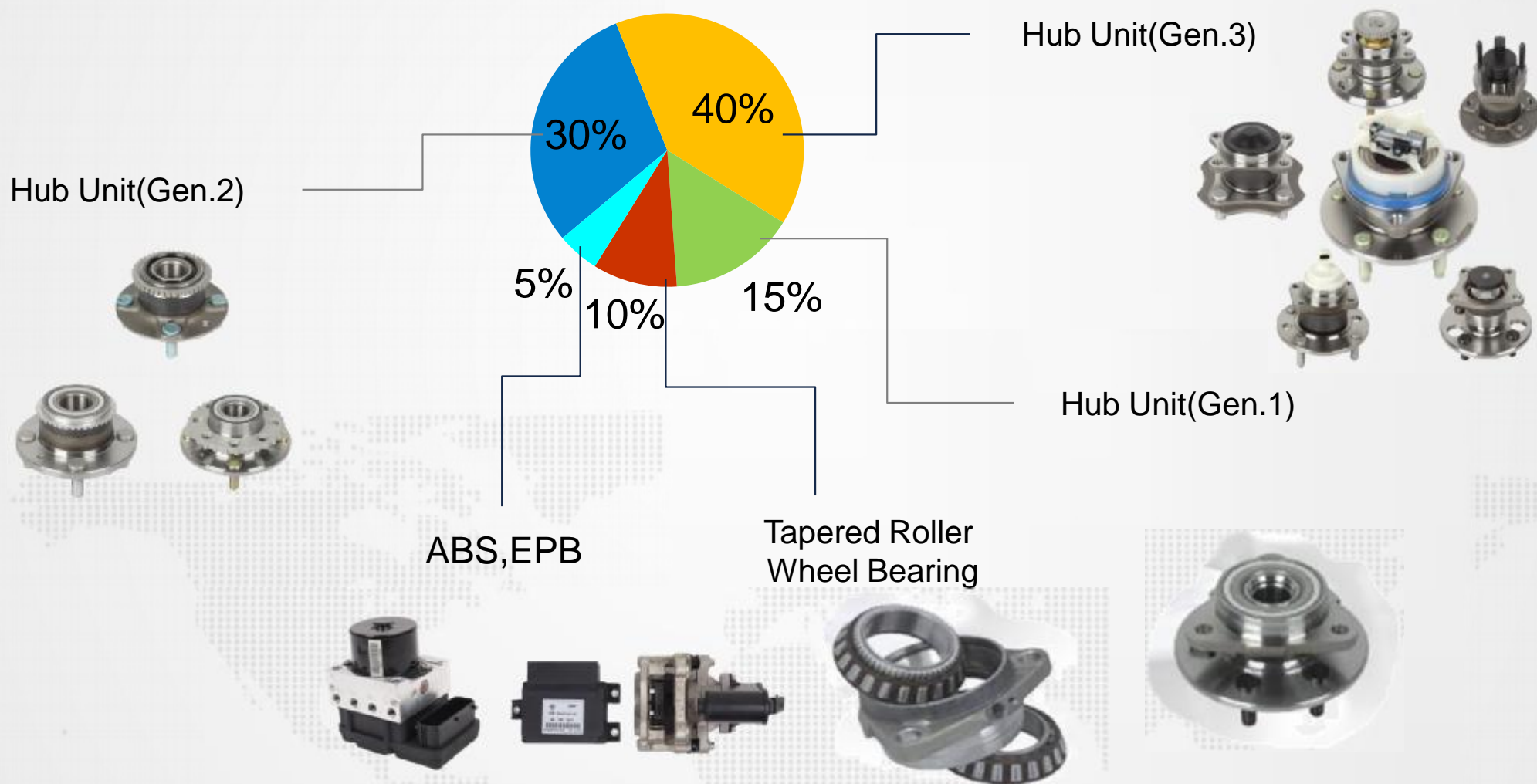
Wanxiang Precision Industry Co. has
land area 82,000 square meters ,
building area 52,000 square meters

03

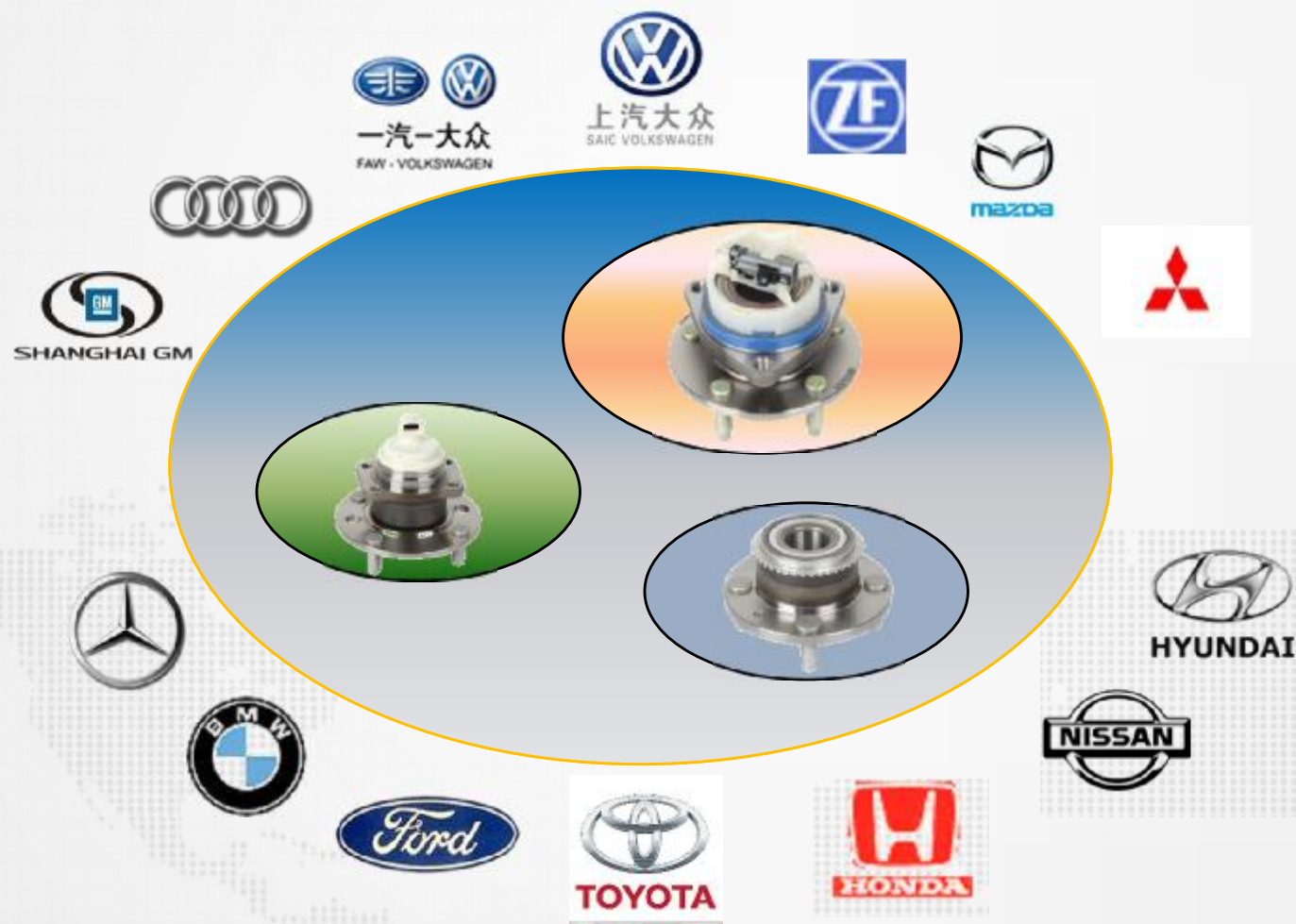
Employees

1300 staff including 142 engineers

Hub Unit---Product Type



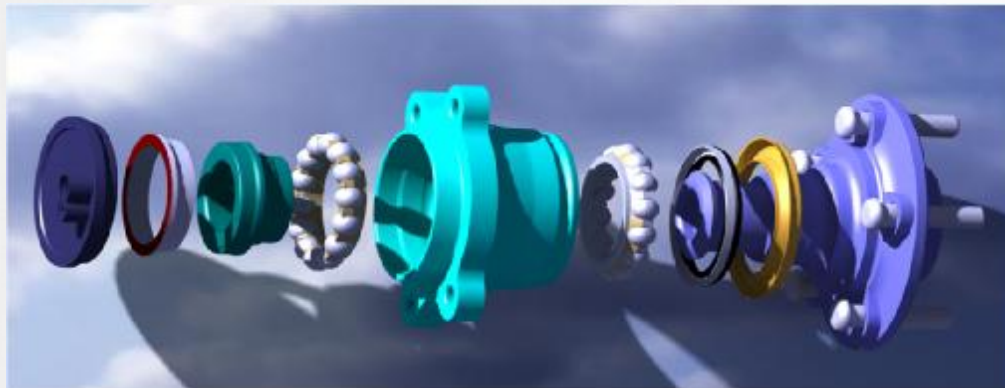
Hub Unit---Main customers



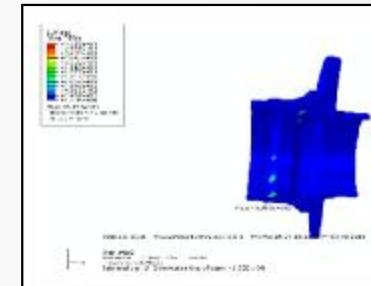
Hub Unit---Design Technology



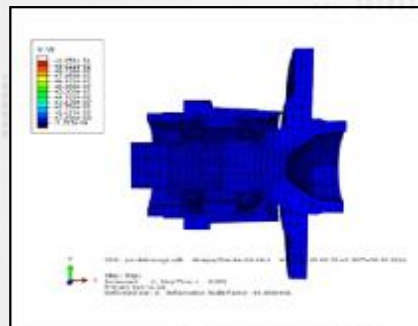
Simulation analysis



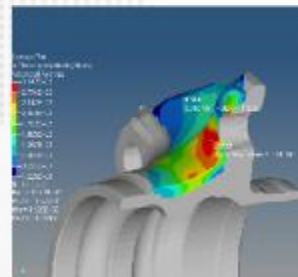
3D Model



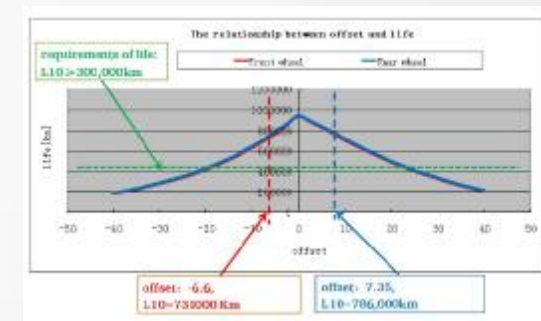
Contact stress analysis



Stiffness analysis



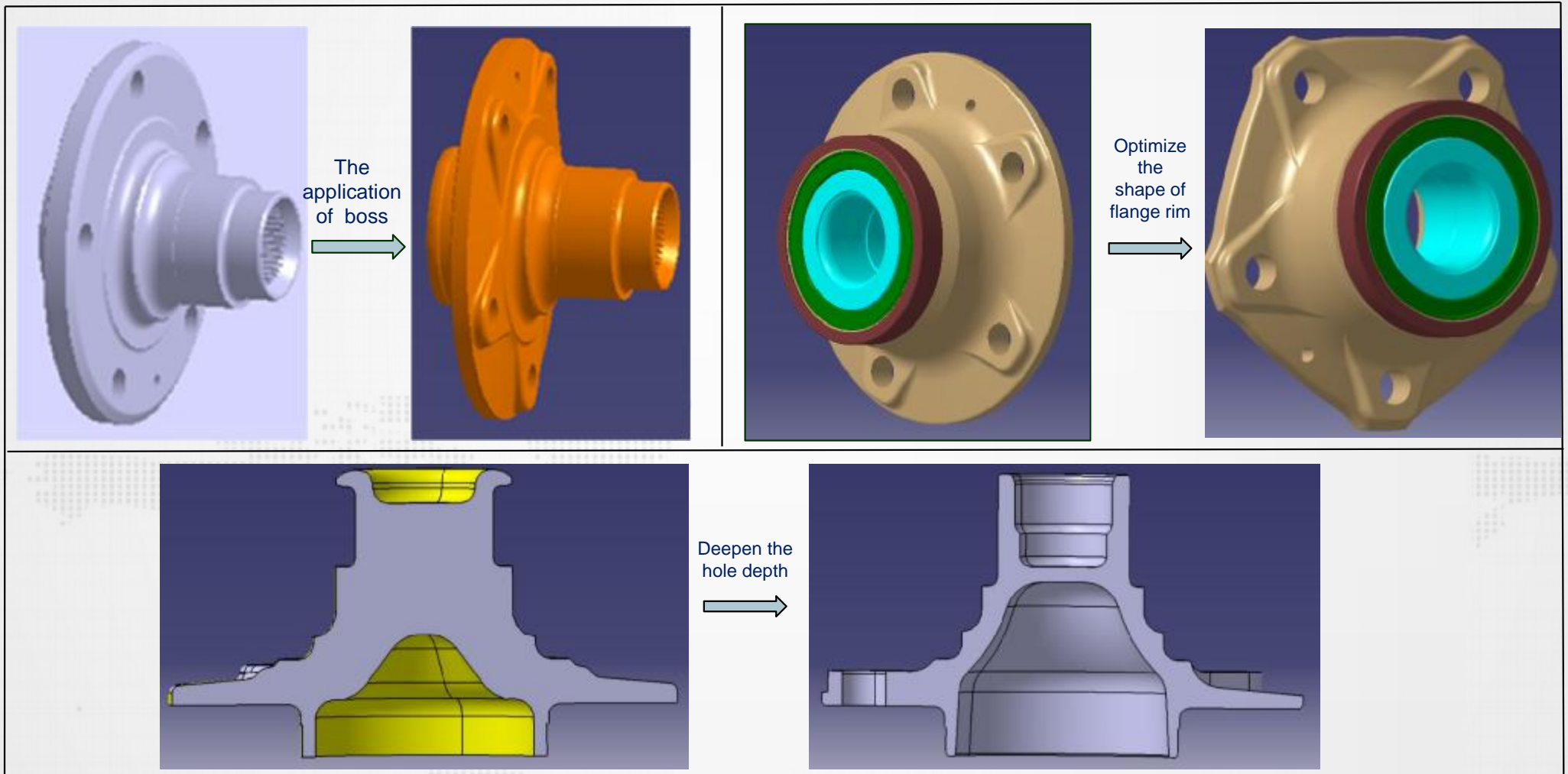
Intensity analysis



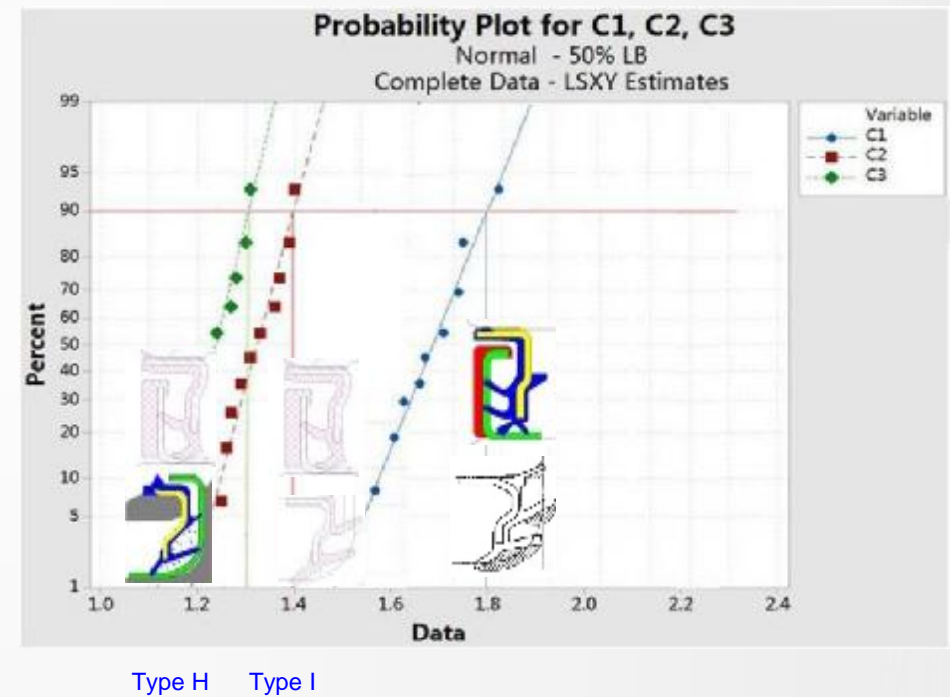
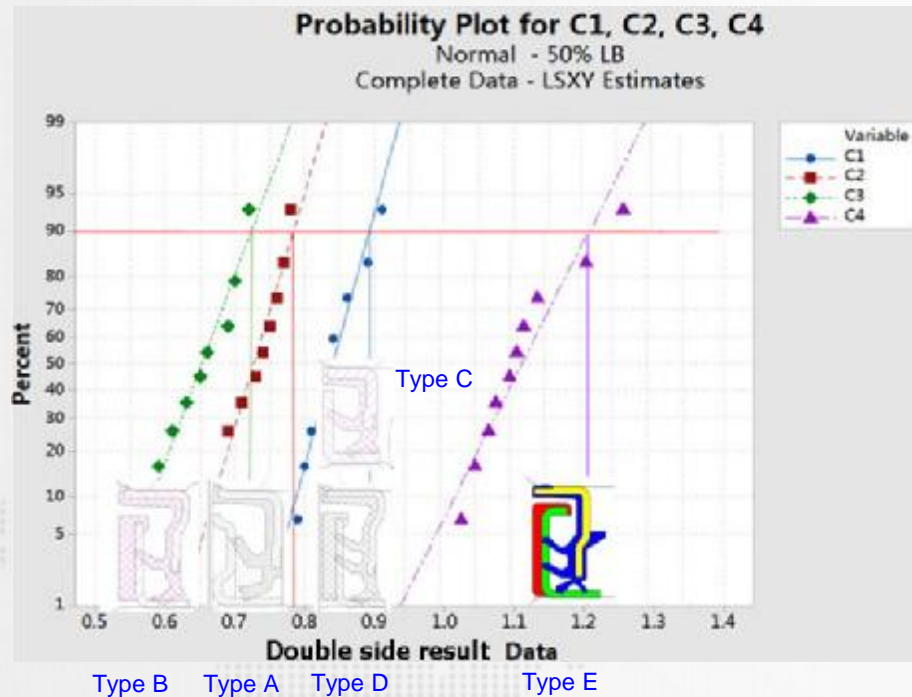
Life check

Hub Unit--- Innovative technology

Weight reduction design



Low friction torque design



Study of low friction torque

Hub Unit--- Benchmarking Analysis

Benchmarking analysis with NSK、SKF、FAG、ILJIN

Runout of end face



Radial runout



Durability life



Friction torque



Hub Unit--- Design verification

Bench test

Test capability matching the requirements of OEM :

- Durability life test
- Impact test
- Grease leakage test
- AK45 test
- High/Low temperature durability test
- Friction torque test
- Mud and Slurry Bearing test
- Bending Fatigue test
- Spindle Rotary Fatigue test
- Transport Simulation test



Rotating bending test



Dynamic fatigue test



Durability life test



Bending Fatigue test



Stiffness test



High/Low temperature durability test

Hub Unit--- Manufacturing Technology



中国机械工业集团有限公司 Industry 4.0 Western leading model workshop

Intelligent Manufacturing Workshop



Intelligent assembly line



Machining line



Heat treatment line



Grinding line

Hub Unit--- Quality Assurance

After-sales quality performance of main products

编号 No	产品结构 Product structure	车型 vehicle model	位置 position	IPTV				
				3 Mis	6 Mis	12 Mis	24 Mis	36 Mis
1	驱动轮 Driving Wheel G.3	乘用车 Passenger Vehicles	前轮 Front	0.02	0.15	0.30	1.52	2.3
2		SUV	前轮 Front	0.02	0.14	0.50	1.89	—
3		乘用车 Passenger Vehicles /SUV	前轮 Front	0	0.18	0.46	1.44	—
4	非驱动轮 Non-Driving Wheel G.3	乘用车 Passenger Vehicles /SUV	后轮 Rear	0	0.05	0.22	0.87	—
5		乘用车 Passenger Vehicles	后轮 Rear	0.2	0.5	0.75	1.5	3.5
6		乘用车 Passenger Vehicles	后轮 Rear	0.02	0.06	0.25	—	—
7	G.1	乘用车 Passenger Vehicles	前轮 Rear	0.1	0.2	2.5	1.8	1.9
8	G.2	乘用车 Passenger Vehicles	后轮 Rear	0.1	0.2	0.4	1.8	2.1

Customer recognition

“Excellent Development Award” awarded by FAW-VW,SVW
 “A-Class Supplier” of FAW-VW
 “Quality Excellence Award” twice awarded by SVW
 “Quality Excellent Award” by FAW-VW



通过ISO9000, QS9000, ISO/TS16949, ISO14001, OHSAS18001认证
 Certified by ISO9000, QS9000, ISO/TS16949, ISO14001, OHSAS18001

Bearing---Plant Profile

Qianchao Bearing Co.,Ltd.

Established

01

Established in 1990

**A new and high-tech enterprise
awarded by state government**

**“QC” tapered roller bearing is well-
known in China**



Area

02

**Qianchao bearing Co. has land area
180,000 m², building area 120,000 m²**

03

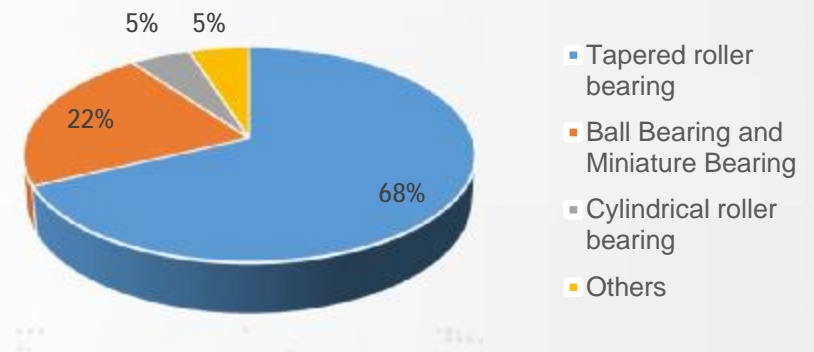
Employees

1200 staff including 122 engineers

Bearing---Main Product

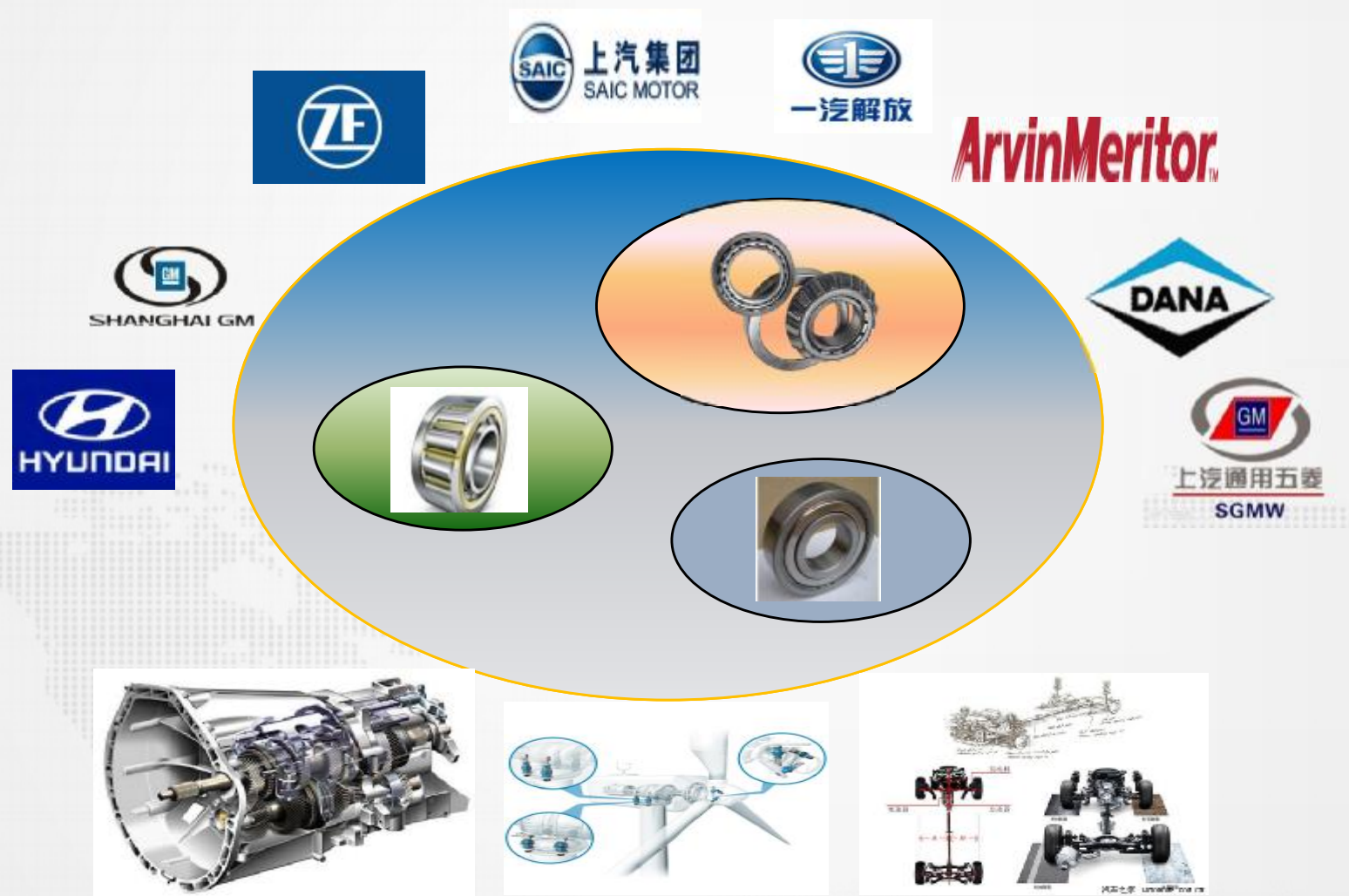


Product type



The core product is the taper roller bearing for automotive and machine tool industries. There are more than 1000 types of single/double-row taper roller bearings with P0, P6, P5 class.

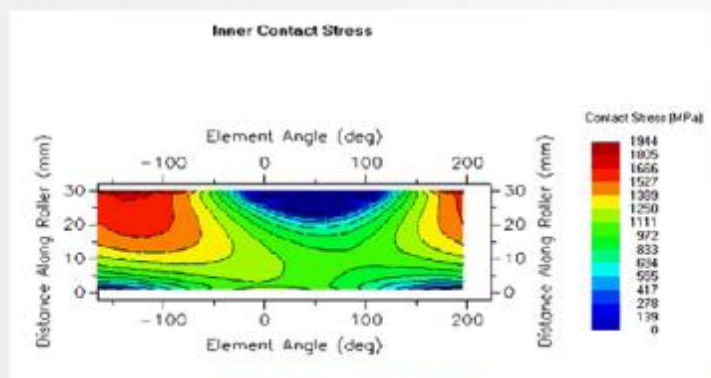
Bearing---Main Customers



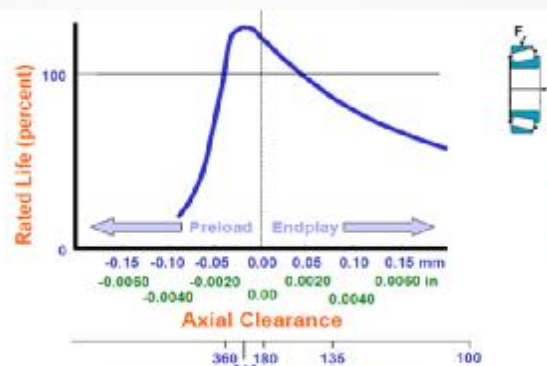
Bearing---Design Technology



Simulation analysis



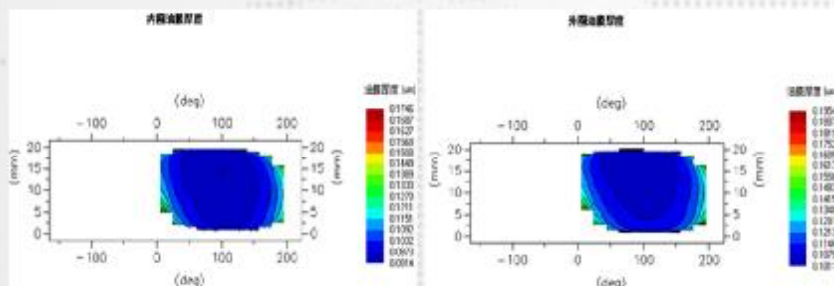
轴承接触应力分析
Analysis of contact stress



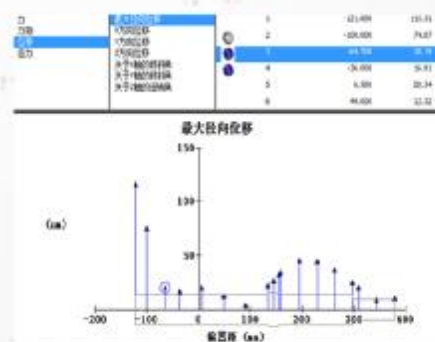
轴承游隙与寿命分析
Analysis of end play and life test



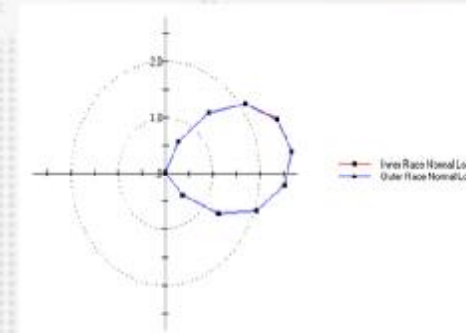
轴承内圈和轮毂过盈配合有限元分析
Finite element analysis of the interference between inner circle of the bearing and the hub



轴承接触区滚道油膜分析
Oil film analysis of raceway in contact area



轴和轴承受力和位移量分析
Bearing capacity and displacement analysis between axes



轴承滚动体受力位置分析
Force position analysis of the rolling body

Bearing---Design Verification

Test capability matching the requirements of OEM :

- Stiffness test
- Impact test
- Friction torque test
- Dynamic Fatigue test
- Durability test
- Bend fatigue test
- High/Low temperature durability test
- Mud splash test
- Grease leakage test



Bend fatigue test



Dynamic fatigue test



Durability test



High/Low temperature durability test



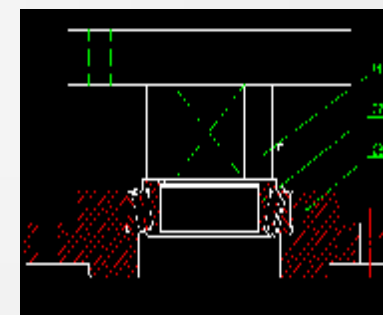
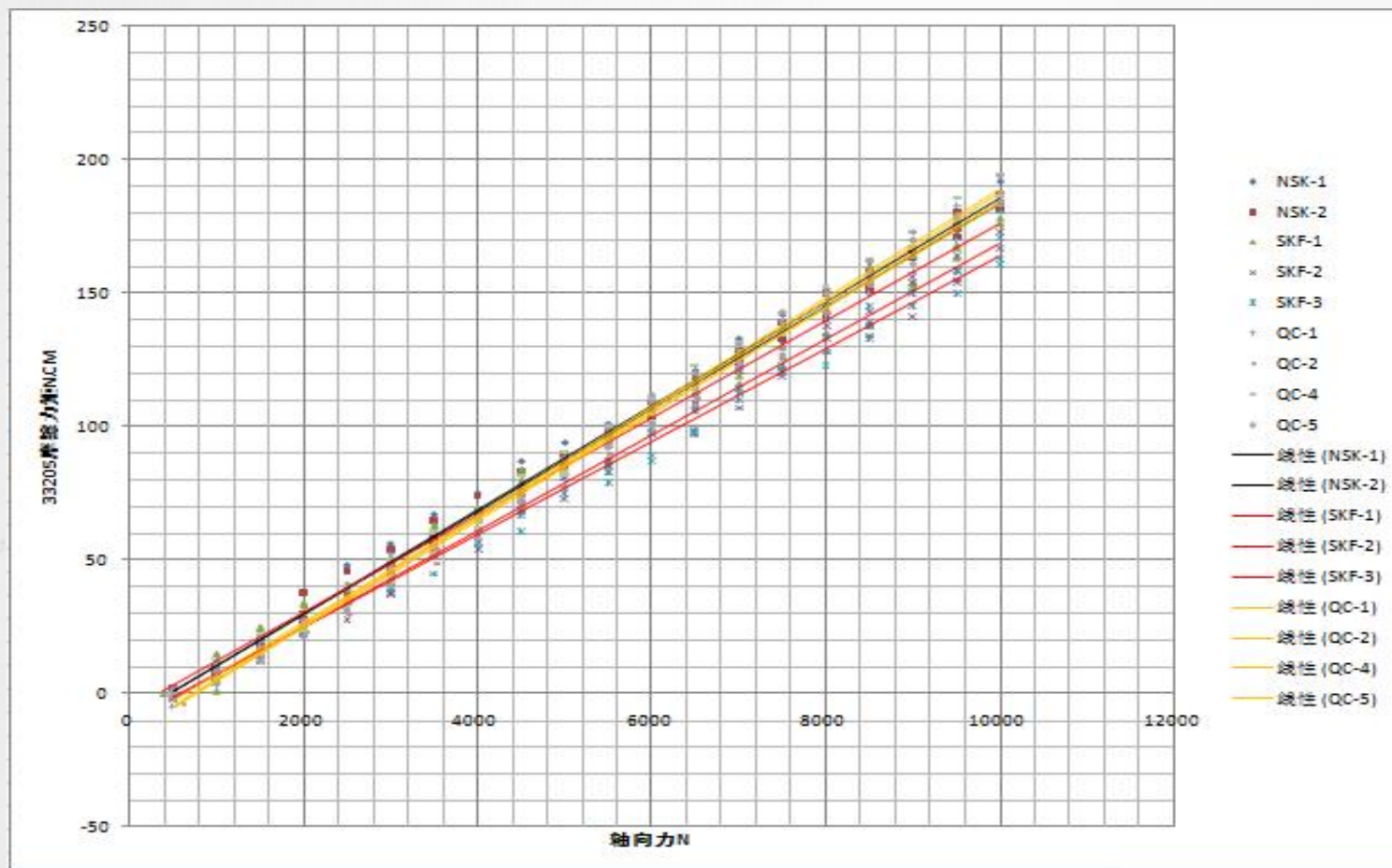
Stiffness test



Impact test

Bearing---Benchmarking analysis

Friction torque benchmarking



Bearing---Manufacturing Technology

The plant has invested hundreds of millions RMB in importing advanced international production equipments from Germany, Britain, Italy and Japan to realize full automatic online operation, and has gradually reached international advanced level in technology testing, overall production equipment capacity and quality testing level.



Intelligent assembly line



Assembly line



Machining line



Heat treatment line



Grinding line

Bearing--- Quality Assurance



Chassis System-----Plant Profile



Zhejiang Wanxiang System Co.,Ltd.

Established

01

Established : December 2002



Area

02

Land area 180,000 square meters.

03

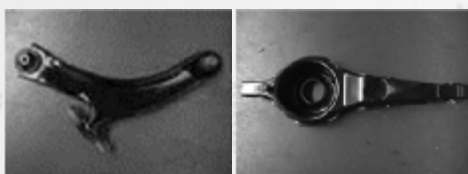
Employees

More than 2400 people including R&D personnel account for 12%.

Chassis System---Main Products

Main Products

Suspension products



Lightweight products



Basic brake products



Automotive Electronic Products



EPB



Modular products



Chassis System---Basic brake products

R&D and Manufacturing Capability of Basic Brake Products

R&D Capability: At present, there are more than 120 R&D personnel of brake system technology, with more than 30 years of experience in research and development of automobile brake system.



Caliper production line



Corner assembly line



Brake inertia test bench



Brake comprehensive test bench

Chassis System---Vacuum booster

R&D and Manufacturing Capability of Vacuum booster

R&D Capability: There are 272 employees, more than 30 technicians and 5 senior engineers



Vacuum booster Assembly line



Brake main cylinder assembly line



Booster performance test bench



Master cylinder performance test bench



Short-time test bench



High and Low Temperature Durable test bench



High and Low Temperature Durable test bench

Vibrating Durable test bench



Noise test bench



Roughness tester



Hardness tester

Test capability

Chassis System---Automotive Electronic Products

R&D and Manufacturing Capability of Automotive Electronic Products(ABS/EPB/ESC)

R&D capability: R&D and manufacturing team of automotive electronics has more than 100 people, including more than 40 technicians and has established a test lab for automotive electronics products, which can carry out EMC test, high and low temperature test, salt spray test, reliability test, pressure resistance test and sealing test for electronic products.



ABS&ESC Automatic production line



EPB Caliper production line



EPB ECU production line



EPB Vehicle test



EPB Vehicle test

Chassis System---Sub-frame Products

R&D and Manufacturing Capability of Sub-frame Products

R&D capability: Relying on Wanxiang Qianchao Technical Center, it has more than 40 R&D personnel, including 8 doctors and experts, and has formed more than 20 sub-frame product design and analysis specifications and standards.



Stamping Production Line



Automatic Welding Production Line



Electrophoresis Production Line



Chassis part flexible test system



Brake fatigue test



Longitudinal force fatigue test



Lateral force fatigue test

Sub-frame test capability

Brake System-----Plant Profile



Wanxiang Qianchao Shanghai System Co.,Ltd.

Established

01

Established : August 2010



02

Area

Land area 36,000 square meters and building area 12500 square meters.

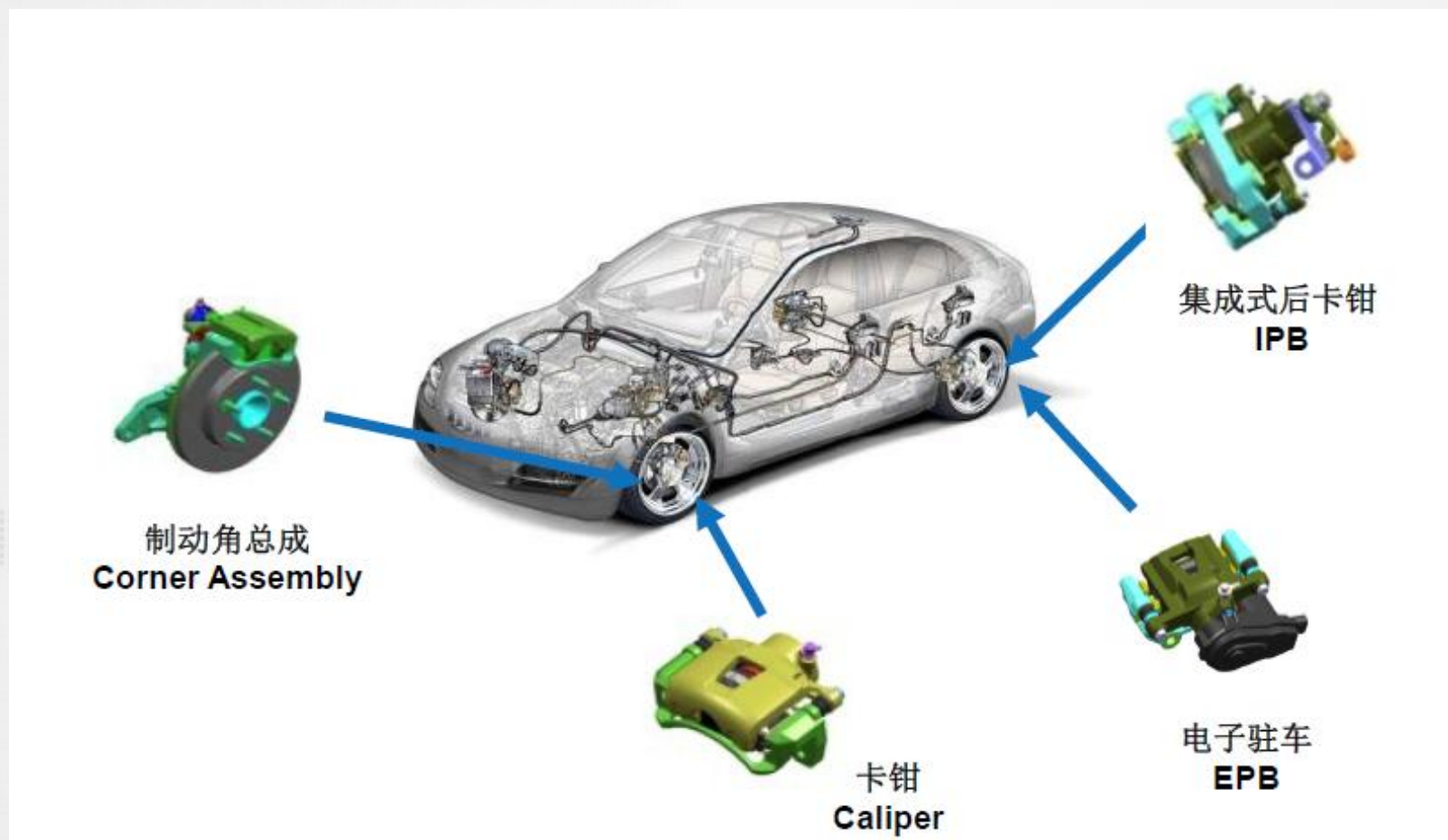
03

Employees

More than 180 people including 30 technicians

Brake System---- Main Product

Brake Module Development, System Integration and solution



Brake System---- Main Product

Brake Product

Ø Corner Assembly

Advantage:



- Knuckle structure design and optimized capability
- Rotor design and thermal analysis capability
- Corner assembly design, validation and manufacture capability

Ø Integrate Caliper

Advantage:



- Ball ramp structure with stable parking efficiency
- Excellent durability performance, guaranteed to pass 100,000 fatigue tests
- Stable automatic compensation for brake disc wear

Ø Caliper

Advantage:



- Balanced design of housing and bracket
- Optimize the dragging and displacement
- Performance of caliper to reduce BTV
- Reduce the wear imbalance and improve the life of friction disc
- Better slipping force control and DTV
- robustness of brake caliper

Ø EPB

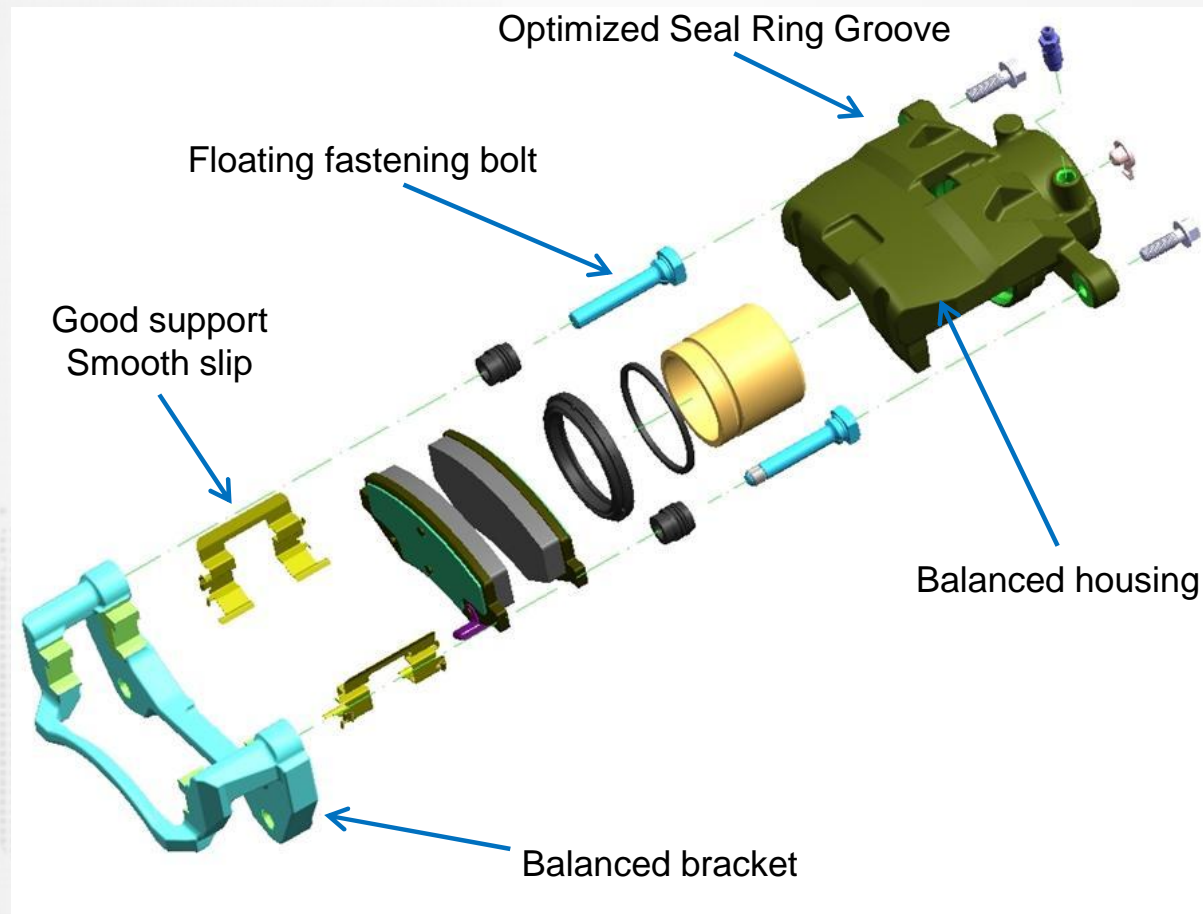
Advantage:



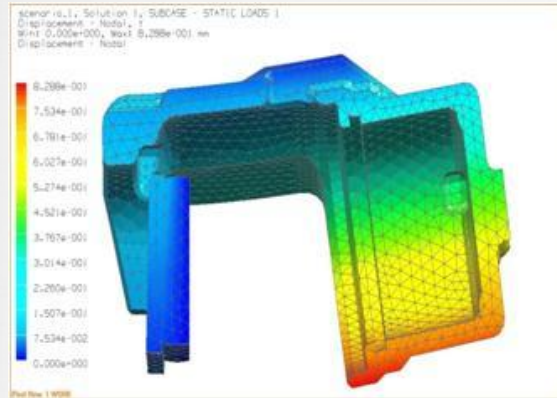
- High output parking torque, constant performance
- Motor-gear integrated parking brake mechanism
- EPB Integration Scheme Based on VDA305 Standard Definition
- PBC Software Controls EPB Calipers and Provides Open Interface

Brake System---- Design Technology

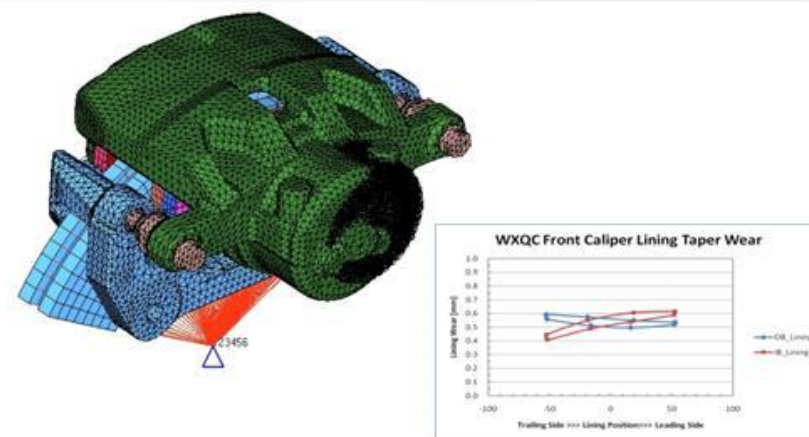
Product characteristics of brake calipers



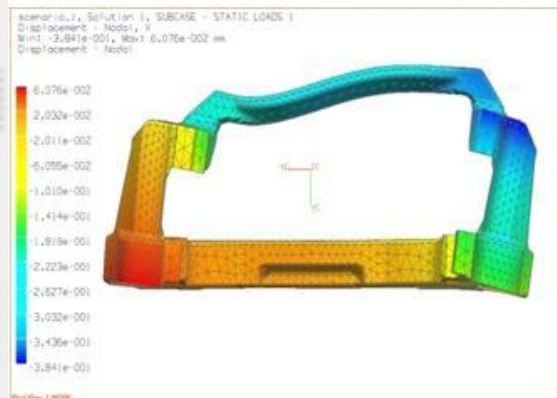
Brake System---- Design Technology



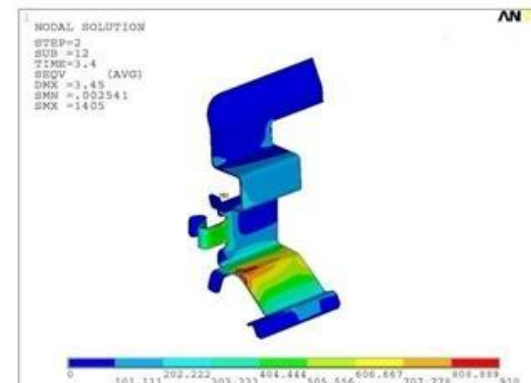
Housing optimization



Analysis of Wear Uniformity



Bracket optimization



Spring piece analysis

Brake System---- Manufacturing capability

- Ø Advanced equipment design, automation and error prevention system
- Ø Advanced quality measurement tools and facilities
- Ø Strict quality assurance and process control
- Ø Widely use PPAP, six sigma and lean production Process
- Ø World-class production site organization, standardized operation and visual management system
- Ø Smooth pull system and just-in-time Logistics



Brake System---- Manufacturing capability



LINK3900 NVH Brake testers



LINK3000 Performance Brake testers



Brake Comprehensive performance testers



Vehicle Brake Performance and Noise Evaluation



EPB Vehicle Test

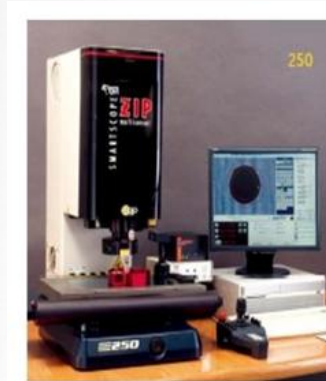


Chassis system flexibility testers

Brake System---- Quality Assurance



Zeiss CMM



OGP Video
Measuring



Mahr Profile Meter



Precision Forging -----Plant Profile

Jiangsu Sunway Precision Forging Co.,Ltd.

Established

01

Established : April 2006



Area

02

Land area 120,000 square meters and building area 55,000 square meters.

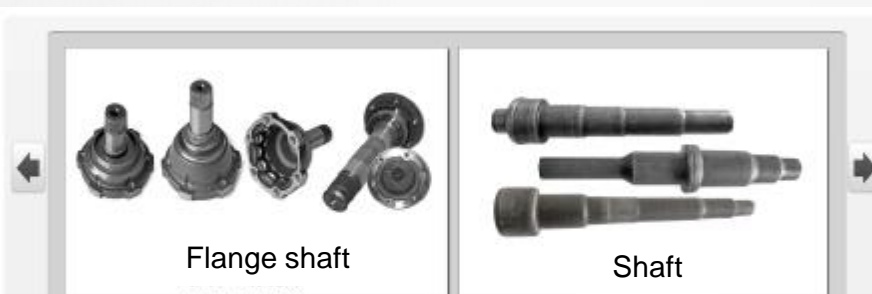
03

Employees

More than 530 people including 58 technicians.

Precision Forging---Main Products

Main Products



CV Shaft serial products



CV Shaft serial products



Gear



Steering system products



Hydraulic motor pump and valve products



Cutting tooth products



Cam blank products



Other products



Precision Forging---Main Customers

Main Customers



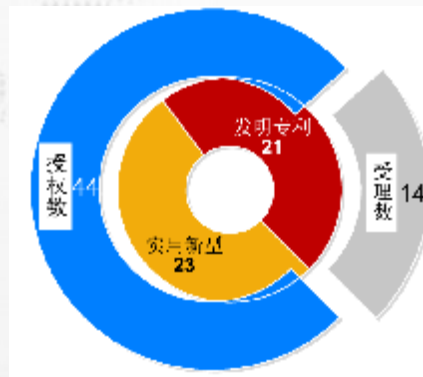
Precision Forging---Technical and R&D Capability

The application of CAD/CAE/CAM runs through the design and manufacturing cycle of products and dies.



Patent situation

Authorized quantity:44
Patents of invention:21
Patents for utility models:23



Pending quantity:14

Precision Forging---Manufacturing Capability



Five-station press machine



Five-station press machine



Automatic production line



High speed forging machine



Three-station press machine



Cold forging production line



Warm forging production line



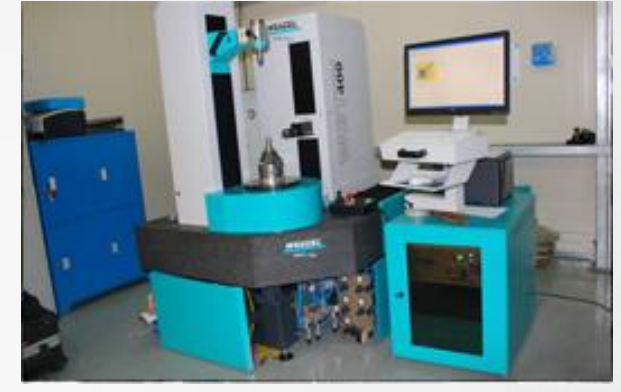
Precision Forging---Quality Assurance



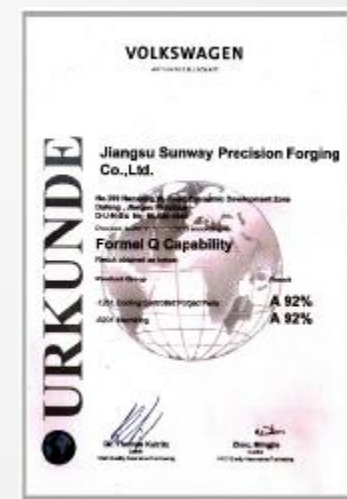
CMM



Spectrograph



Gear measuring instrument



Exhaust System-----Plant Profile

Wanxiang Tongda Co.,Ltd.

Established

01

Established : 1967



02

Area

Land area 200,000 square meters.

03

Employees

More than 1210 staff.

---Main Products

Main Products

Exhaust muffler system of passenger car



Post-processing system of commercial vehicle
conforming to Phase 5 national standard



Automotive metal fuel tank



EGR High temperature intake pipe



EGR outlet pipe



Exhaust System---Main Customers

Main Customers



Exhaust System----R&D and Test Capability

Innovation Platform: Provincial Enterprise Technical Center

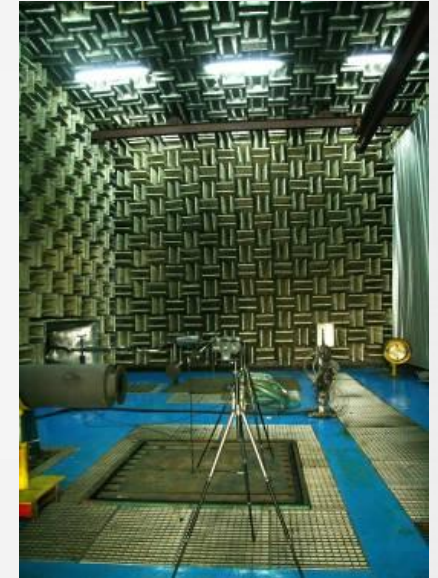
1. Established in 1990, it has a post-doctoral industrial base. Ninety-two patents have been authorized in China (nine of them are invention patents). Chairman of China Automobile Exhaust System and Metal Fuel Tank Industry Association.
2. In the first phase, technical center invested 21 million yuan, and imported 30 sets of international advanced test and testing equipment, and built light (car), heavy engine bench, performance, noise and emission laboratories, reaching the advanced level of the domestic industry.
3. In the second phase, 20 million yuan was invested to build engine noise simulation test-bed and exhaust system simulation vibration test-bed. Through hardware and software investment, technical center improve independent R&D strength continuously, and reach the advanced level of international counterparts.



Exhaust System---R&D and Test Capability

Professional testing projects and related hardware and software facilities

- ∅ Performance test of muffler for automobile and construction vehicle;
- ∅ Sealing and pressure resistance test of muffler for automobile and construction vehicle;
- ∅ Performance test of engine under 500KW;
- ∅ Performance test of catalytic converter;
- ∅ Noise test of medium, heavy engine;
- ∅ Model test of exhaust system;
- ∅ Noise and vibrating test of vehicle;
- ∅ Water quick-cooling test of exhaust system;
- ∅ Thermal vibrating test of exhaust system.



Exhaust System---Manufacturing Capability

Manufacturing Capability

- Ø 6 fuel tank welding production lines with annual capacity 800,000;
- Ø 45 small and medium-sized stamping equipments of 15-800 tons;
- Ø 18 production lines of exhaust muffler system and post-processing system with annual capacity 2.2 million sets;
- Ø Introducing flexible production line for exhaust muffler system from Canada
- Ø Introducing key production equipment from Britain and France



Exhaust System---Quality Assurance



Quality assurance system

ISO/TS16949 Quality System Certification

IATF16949 Quality System Certification

ISO14000 Environment Management System Certification

GB/T28001 Occupational Safety and Health System Certification





Welcome to Wanxiang