



World Class Automotive Press Die Supplier

 **SHINHWAST** Co., Ltd.

Global SHINHWA ST

SHINHWA ST, established in 1995, is an industrial leader of press mold used in manufacturing in automotive parts. Our mission statement is to be the world's best cold stamping and hot stamping designer and manufacturer, by following three key mottos – "Unity, Commitment, and Creation".

SHINHWA ST is an advanced cold stamping die manufacturer.

The automotive industry is undergoing radical technological innovation for the development of environmentally friendly and high-efficiency vehicles, evolving into the mobility market. Consequently, continuous fuel efficiency regulations and expansion of the eco-friendly vehicle market are expected world-wide, leading to the increased use of ultra-high strength steel and light-weight materials for automotive body weight reduction. Generally, as the strength of the sheet metal increases or the modulus of elasticity decreases, formability worsens, demanding exceptional expertise in die manufacturing. Domestic steel companies like POSCO and Hyundai Steel possess world-class manufacturing technology for ultra-high strength steel plates for car-bodies, and the application ratio of ultra-high strength steel and light-weight materials in domestic and international mobility companies is gradually increasing. Without excellent die manufacturing technology, even the highest quality steel materials would be useless, and the development of light-weight yet robust car-bodies would be impossible.

SHINHWA ST Co., Ltd. has accumulated extensive know-how in manufacturing press dies for ultra-high strength and light-weight materials. We will continue to strive to supply the world's best cold stamping dies through innovative manufacturing technology development.

SHINHWA ST is an advanced hot stamping die manufacturer.

The use of automotive body parts that apply hot stamping (Hot Press Forming, Press Hardening) technology is continuously expanding to ensure both light-weight and safety of the vehicle body. Hot stamping technology involves heating Boron steel, which has high hardenability, to the Austenite range of 900-950°C, then rapidly transferring it to a press and forming it in a mold with an internal water circulation structure, simultaneously quenching to ensure excellent shape holdability and high tensile strength (approximately 1.5GPa/2.0GPa class). Hot stamping dies are highly technical due to the need to precisely design and manufacture them, predicting the dimensional changes of the material due to phase transformation from Austenite to Martensite during heating and cooling processes.

SHINHWA ST Co., Ltd. is a leading company in this field, supplying to customers and has a wealth of know-how in manufacturing hot stamping dies through strenuous technology development. We will continue our efforts to supply the world's best hot stamping dies through innovative manufacturing technology development.

Thank you.

SHINHWA ST Family Members

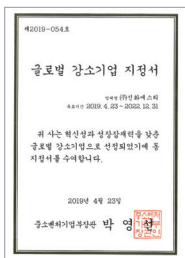
History



The CI image of SHINHWAST expresses the infinite possibilities of the company by the concept of the harmony between human and technology.



1995.	07	SHINHWAST Founded
2005.	01	Awarded Top 10 excellent SMEs
	09	Certified for S.Q. from Hyundai-Kia Motors
2007.	01	INNO-BIZ Certification
	01	Venture Enterprise Certification
	04	Established a corporate research institute
2008.	10	Certified as a Parts and Materials Specialized Company
2009.	10	Certified as a ISO 9001 / 14001
2010.	11	Established the Hot Stamping Die Factory (SHINHWAST T&B) [2,764m ²]
	10	Designated as a Best Partner by Sungwoo Hiitech
2013.	02	Commendation from Minister of SMEs and Startups
	02	Awarded Commendation from the Mayor of Daegu Metropolitan City
2014.	02	Registered as a primary supplier to Hyundai-Kia Motors
	07	Registered as a primary supplier to (Former)SsangYong Motors
	10	Designated as a Root Technology Specialist
2015.	01	Registered as a primary supplier to Hyundai Steel
	07	Named a Daegu Star Company
	10	Best awarded at SMEs(Small and Medium Enterprise) Awards
2016.	02	Commendation from K-BIZ (Korea Federation of SMEs)
	05	Commendation from Prime Minister of merit for SMEs
	05	Commendation from Minister of Trade, Industry and Energy for Smart Factory
	06	MAIN-BIZ Certification
2018.	11	Designated as a Top-performing Star Company
2019.	05	Named a Global Small Giant Company
	12	Awarded Million Dollar Export Tower Commendation at Trade Day
2023.	09	Merit Award from Korea Industrial Complex Corporation



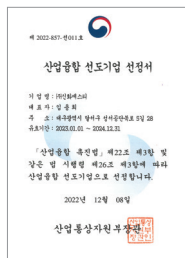
Global Small Giant Company



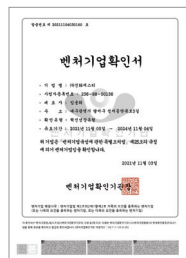
2018 Daegu Star Company 100



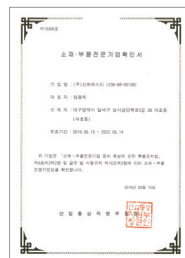
Certificate of S.Q. from Hyundai-Kia



Industrial Convergence Leading Company



Venture Enterprise



Parts and Materials Specialized Company



Certificate of Corporate research institute



QMS(Quality Management System) KS Q ISO 9001



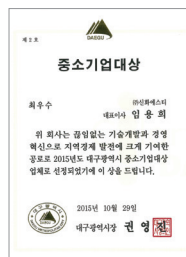
EMS(Environmental Management System) KS Q ISO 14001



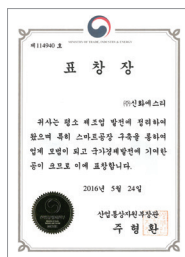
INNOBIZ (Innovative Business) Certification



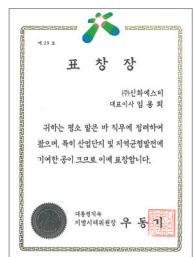
Prime Minister's Award



Best prize at Small and Medium Enterprise Awards



MOTIE Minister's Award

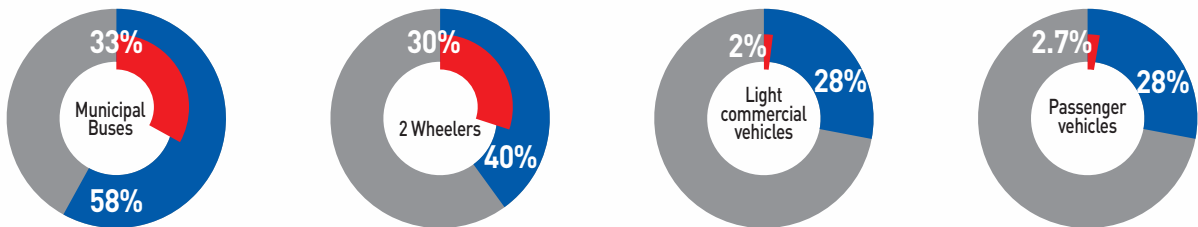
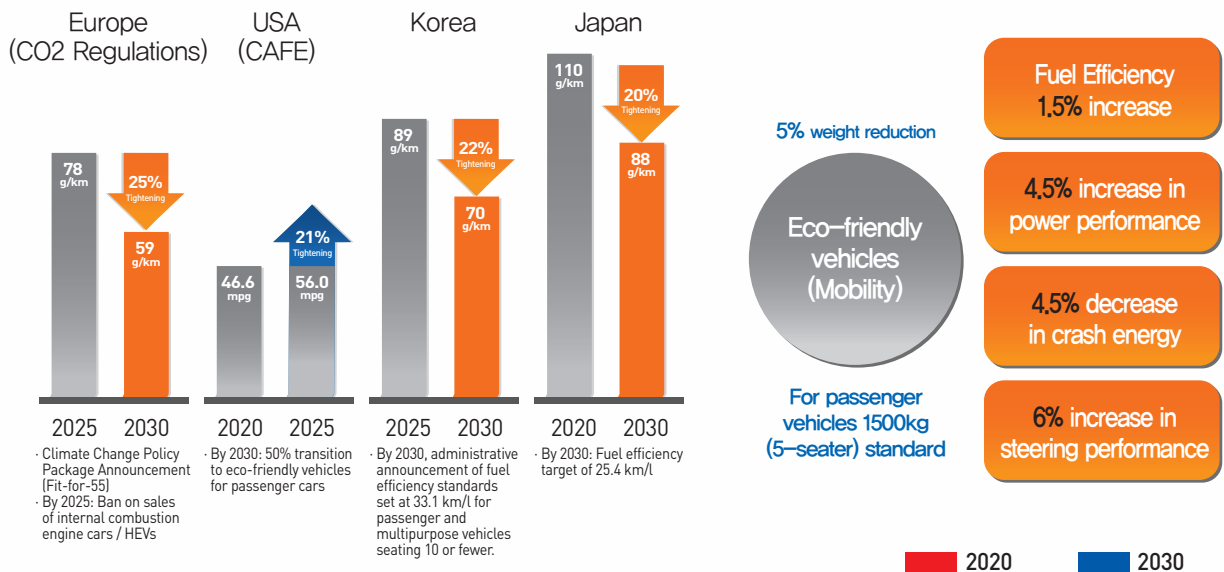


Merit Award from Korea Industrial Complex Corporation

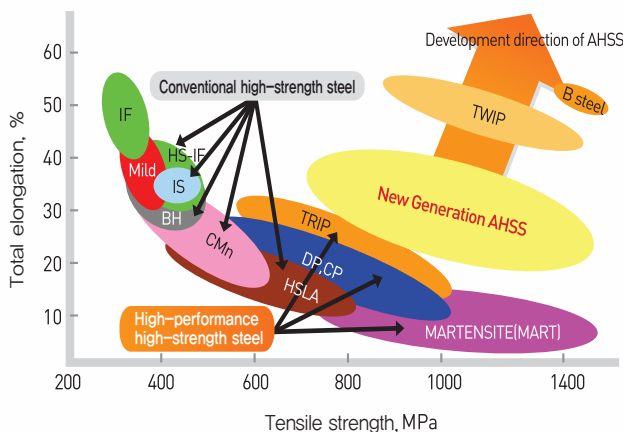


Automotive Industry & Technology

●● Stricter regulations for CO₂ and CAFE (Corporate Average Fuel Economy)



●● Types of cold-rolled steel sheet for automobiles and its development direction



Designator	Classification	Designator	Classification
Mild	Mild Steel	DP	Dual Phase
IF	Interstitial Free	HS-IF	High Strength Interstitial Free
BH	Bake Hardenable	TRIP	Transformation Induced Plasticity
CMn	Carbon Manganese	CP	Complex Phase
HSLA	High Strength Low Alloy	TWIP	Twinning Induced Plasticity
IS	Isotropic	B Steel	Boron Steel

AHSS : Advanced High Strength Steel

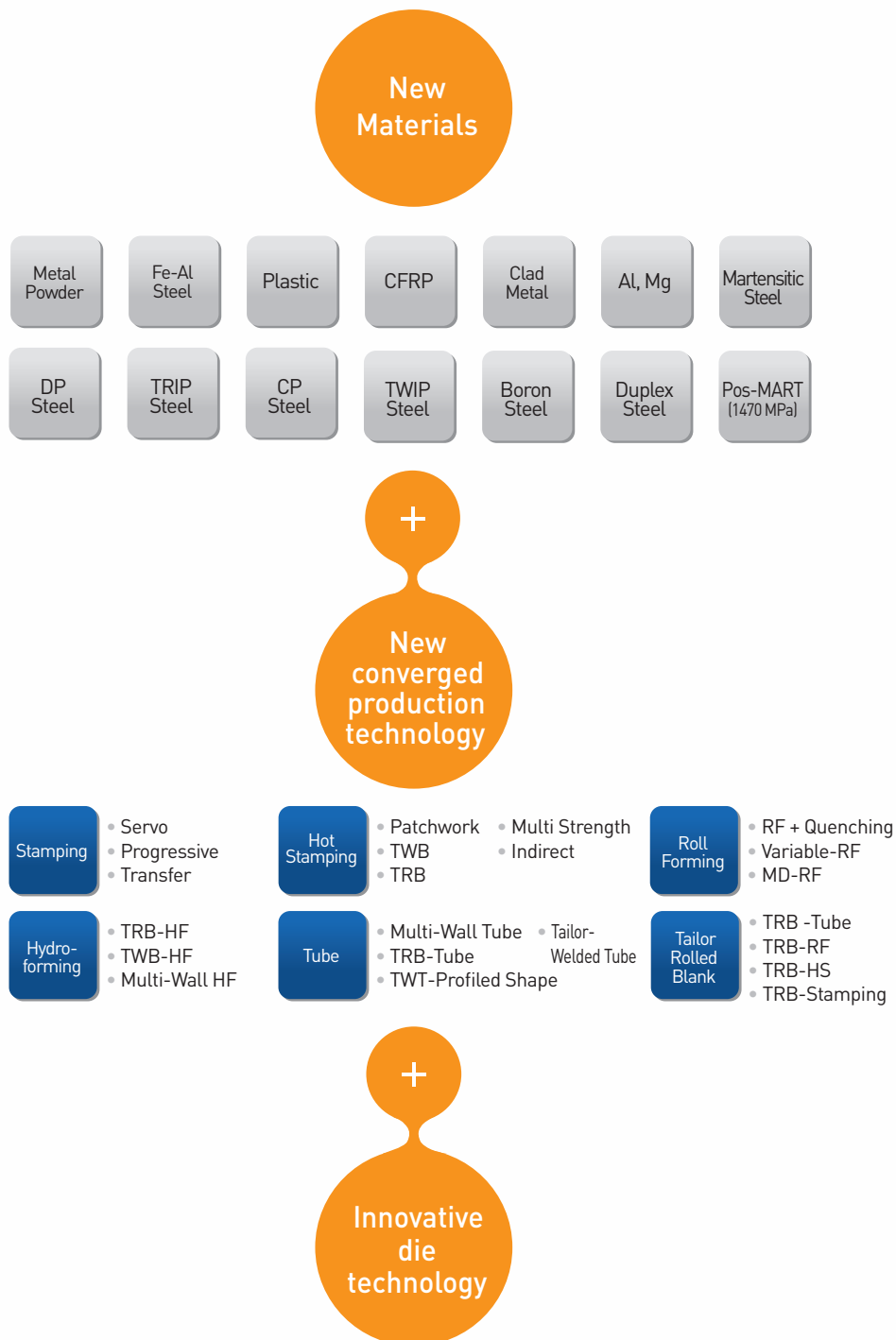


Advanced Automotive Technology



Future cars

Convergence of New material + New converged production technology + Innovative die technology.



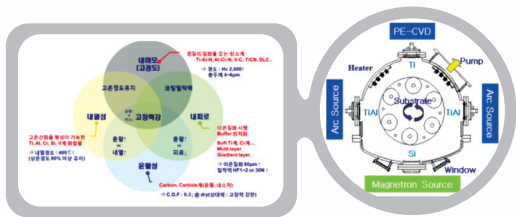


Advanced Die Technology

Innovative die technology

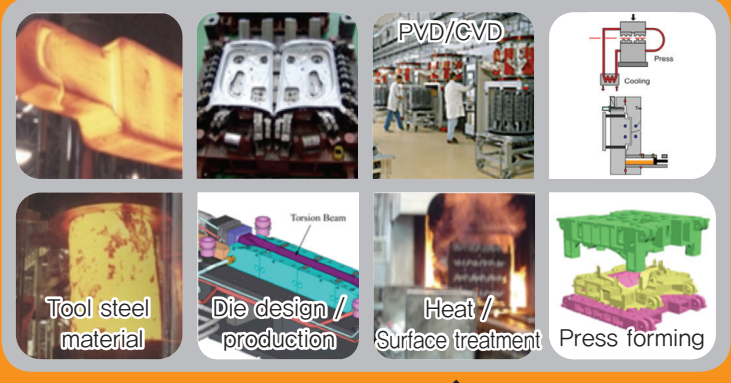
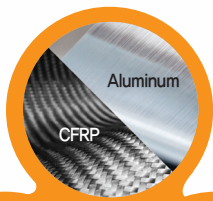
Convergence of tool steel material + die design / production + Heat treatment + Coating technology

Coating technology



Mobility

New Materials for Light-weight



Tool steel material

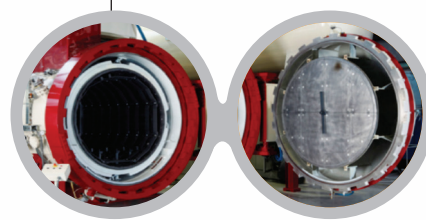
Die design / production

Heat / Surface treatment

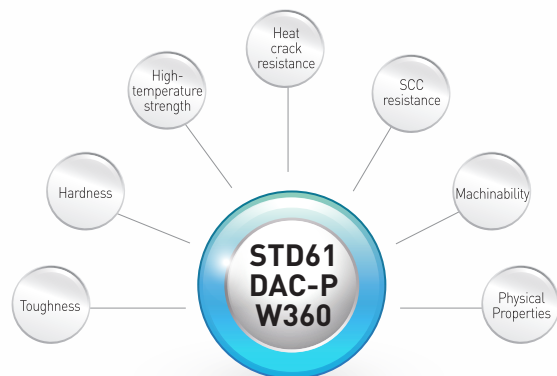
Press forming



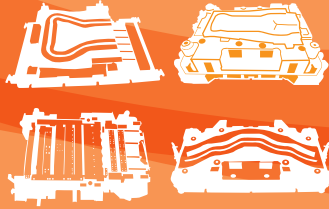
Ultra high strength steel



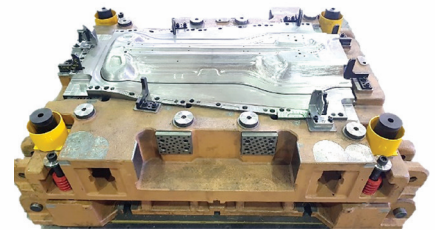
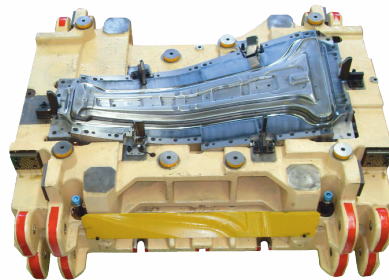
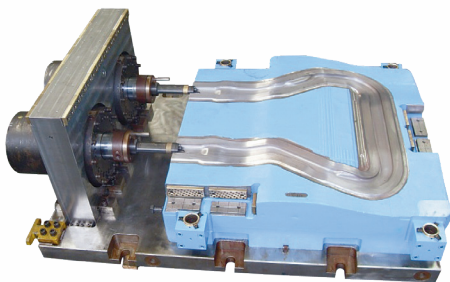
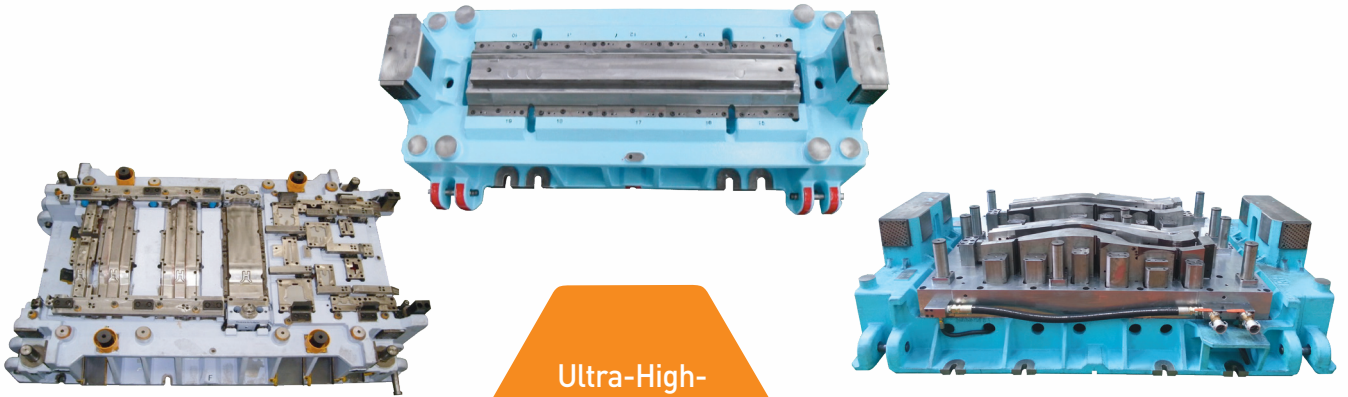
Vacuum heat treatment furnace



Required properties for dies and molds



Main Products





Cold Stamping Die for Ultra-High-Strength Steel (UHSS) Press Forming

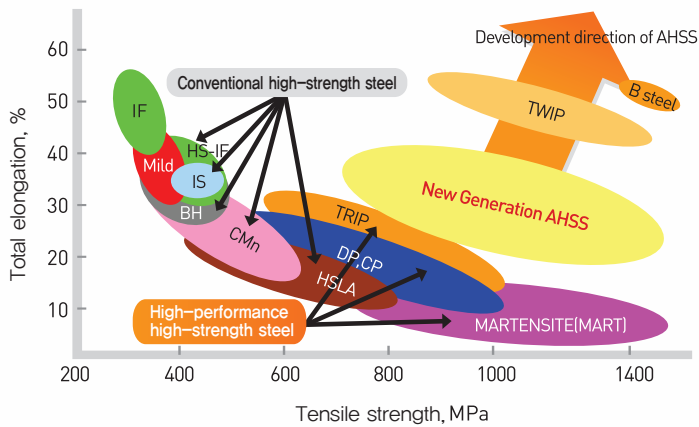
— Main Products

- Types of cold-rolled steel sheet for automobiles and its development direction

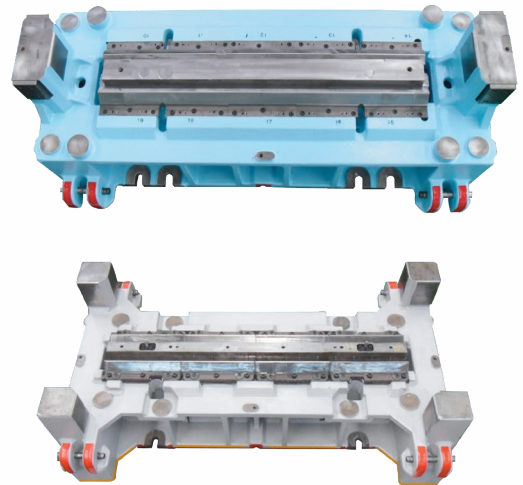
► UHSS (Ultra High Strength Steel)

Steel companies: Tensile Strength ≥ 780 (MPa)

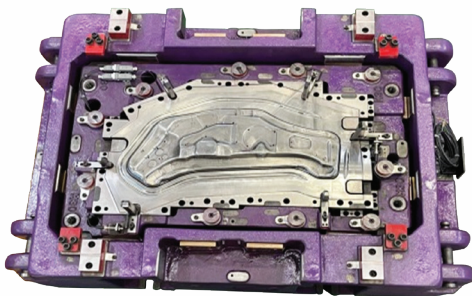
Hyundai / Kia Motors: Tensile Strength ≥ 590 (MPa)



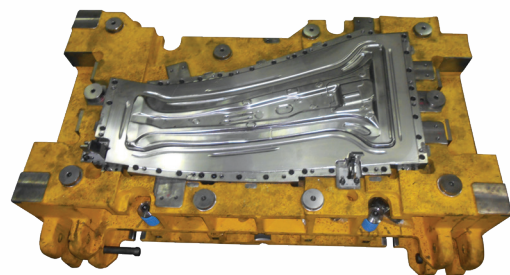
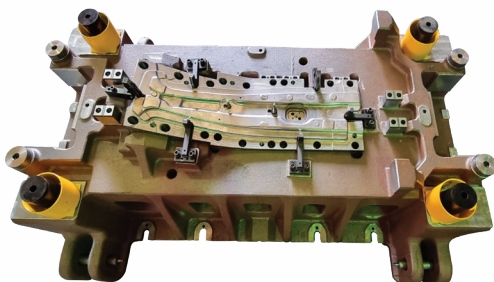
- Cold die for the press forming of 1,180MPa-grade ultra high strength steel : Side Sill



- Front Pillar Parts



- Center Pillar Parts

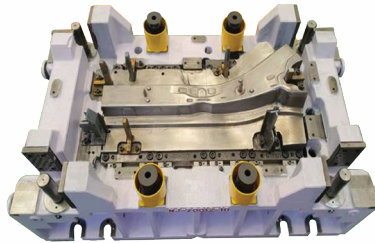
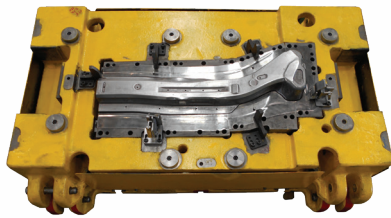
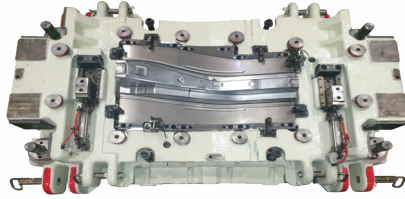
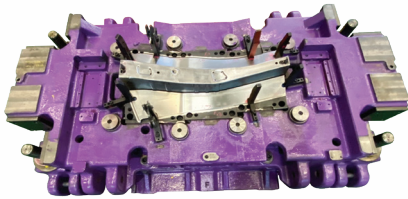




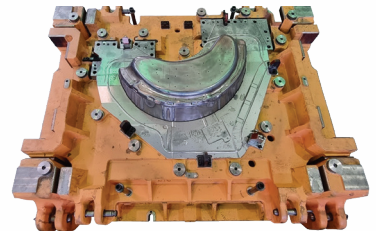
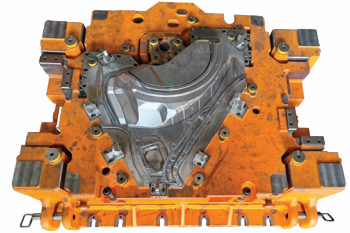
Cold Stamping Die for Ultra-High-Strength Steel (UHSS) Press Forming

— Main Products

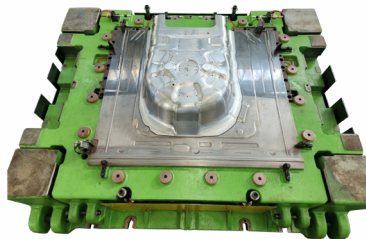
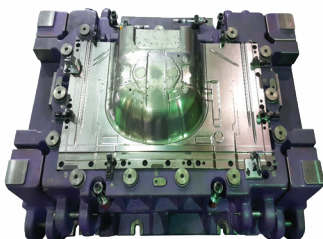
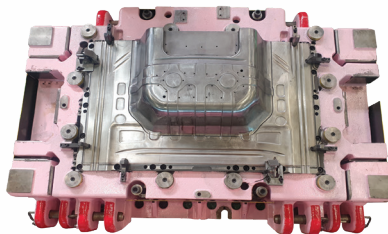
Member Parts



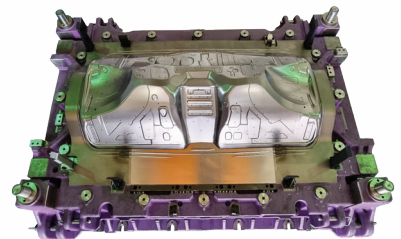
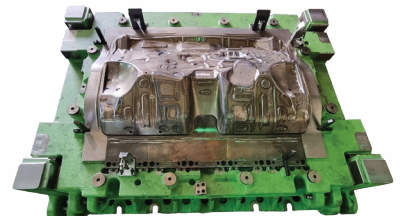
Quarter Parts



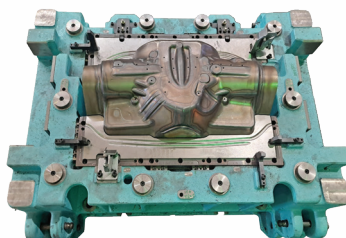
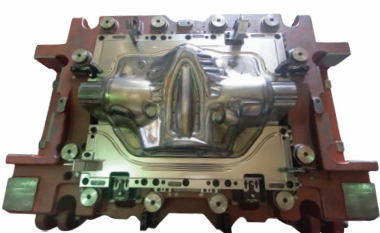
Center & Rear Floor Parts



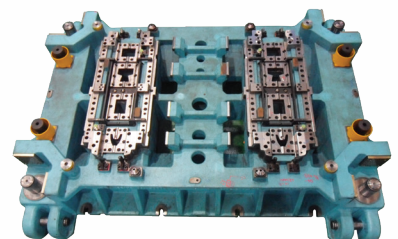
Panel Dash Parts



Shock-Absorber Housing Parts



1.5GPa grade Cold Trim





Hot Stamping Die

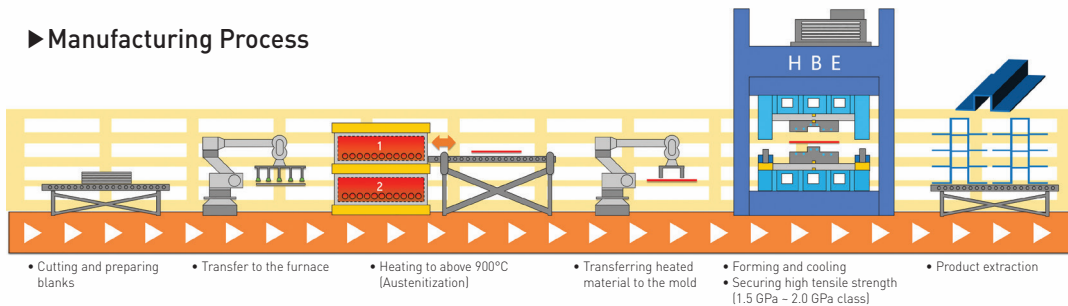
— Main Products

Hot Stamping Technology

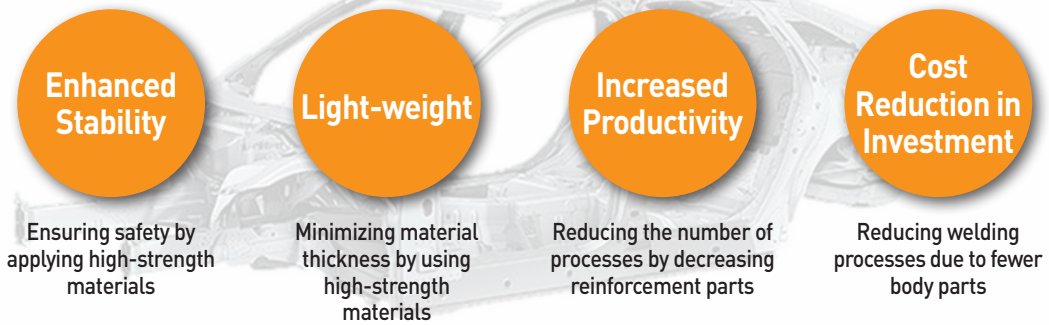
Technology Overview

A method of producing ultra-high strength parts ranging from 1.5 to 2.0 GPa by heating steel plates of 490~590 MPa grade to about over 900°C (Austenitization), followed by forming and rapid cooling in a die.

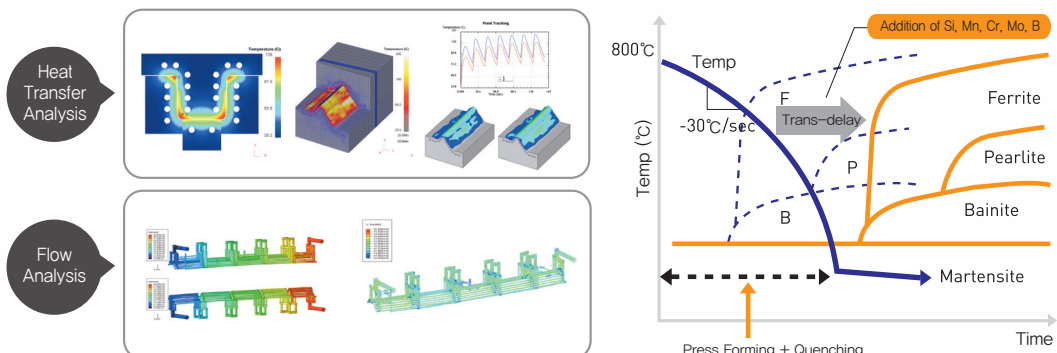
Manufacturing Process



Technical Effect



Analysis of Heat transfer and Flow



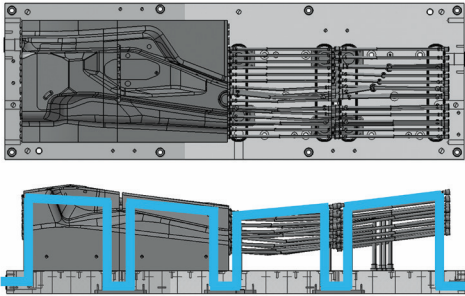


Hot Stamping Die

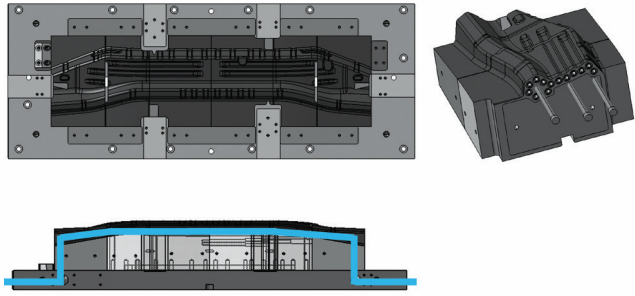
— Main Products

Types of Cooling Channels

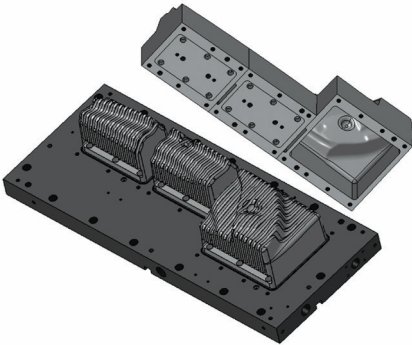
► Gun-drill Jump Type



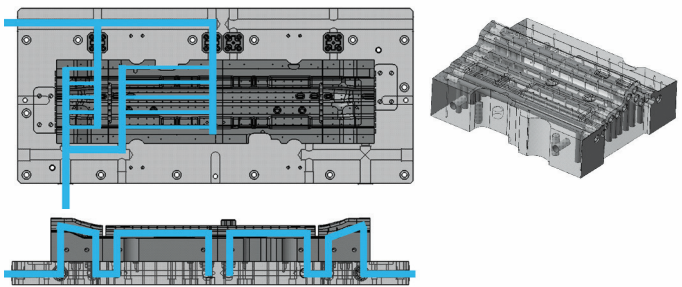
► Direct Gun-drill Type



► Shell (Pocket) Type

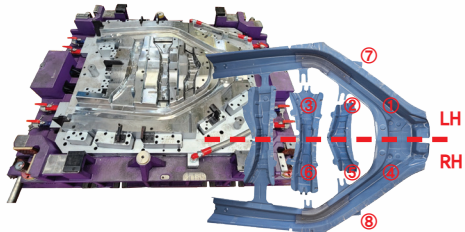


► Direct Injection Type

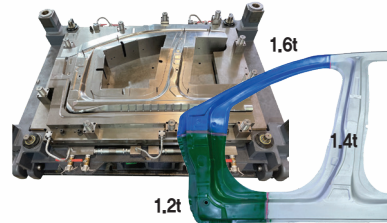


Hot Stamping Die

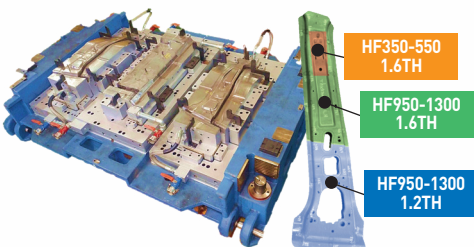
► 8 CVT Forming



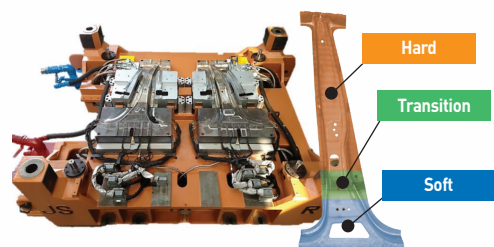
► Multi-TWB Door Ring (Side) Outer



► Patch-work



► Partial- Quenching



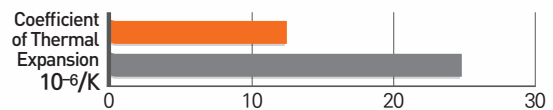
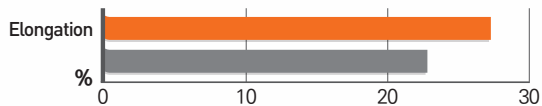
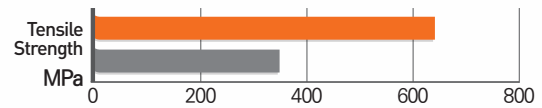
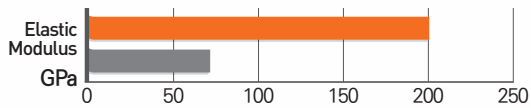
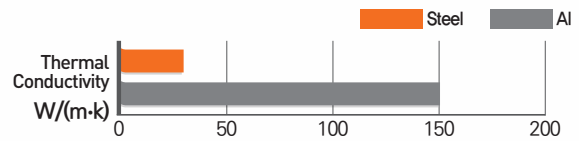
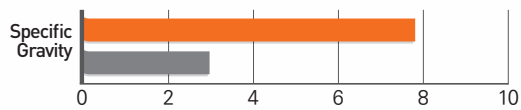
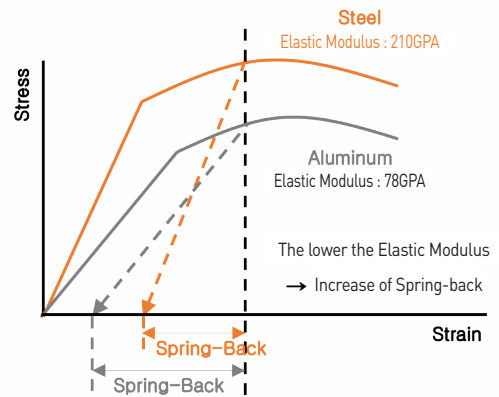


Die for Press Forming of Aluminum Parts

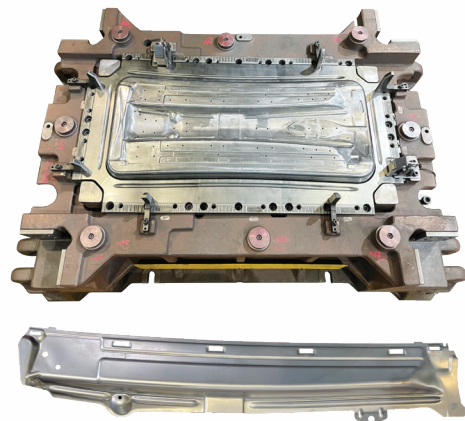
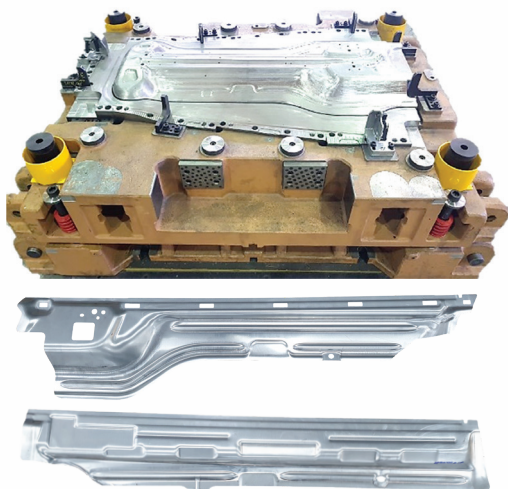
— Main Products

Major Characteristics of Aluminum Alloys

Material Properties	Units	Al Alloy (6013)	Steel (DP590)	Al / Steel
Specific Gravity	-	2.8	7.86	0.36
Thermal Conductivity	W/(m·k)	150	28	5.36
Elastic Modulus	GPa	69	200	0.35
Tensile Strength	MPa	350	630	0.56
Elongation	%	22	27	0.81
Coefficient of Thermal Expansion	10 ⁻⁶ /K	24	12	2.00



Door Belt Parts

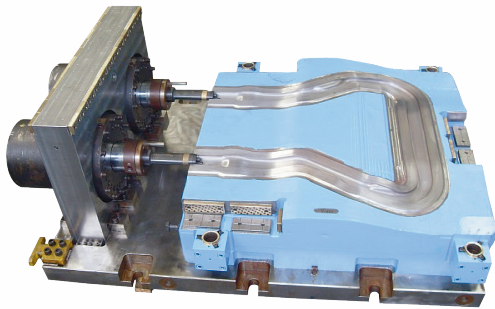
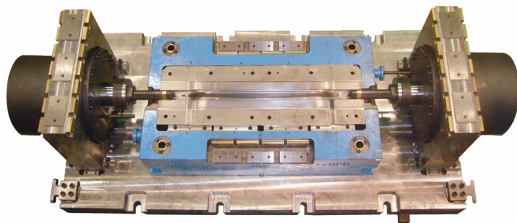




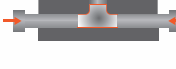



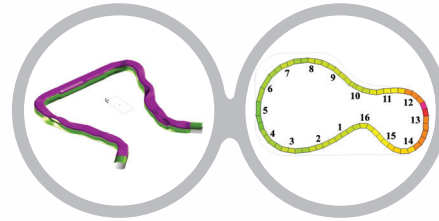
Hydroforming Die Progressive Die

— Main Products

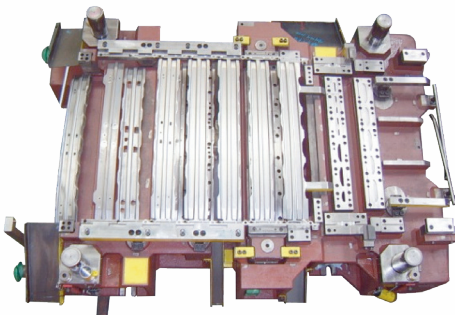
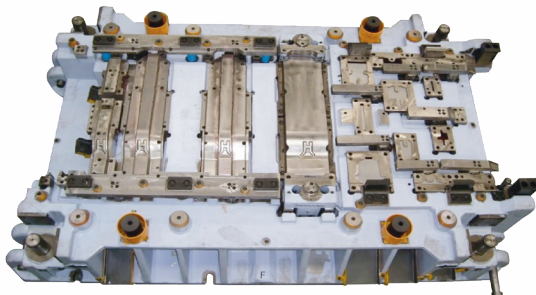
Hydroforming Die : Suspension Sub-Frame

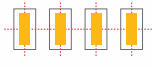
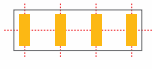
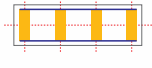


	1. Material (tube) supply
	1. Closing the press 2. Axial move of cylinder 3. Water supplying into tube
	1. Increasing the water pressure 2. Pushing the axial cylinder 3. Upper punch move
	1. Lowering the pressure 2. Opening the cylinder punch 3. Opening the press



Progressive Die: Roof, Side Sill



Types	Production Methods	Schematic View
Tandem Press	Produce products by transferring them between four presses with conveyor, robot, or loader/unloader. (4 press units, 4 die sets)	
Transfer Press	Produce products by transferring them with the finger of feed bar after fixing the die of each process in one press unit. (1 press unit, 4 die sets)	
Progressive Press	Produce products by transferring the products of process in a die with all processes in one press unit. (1 press unit, 1 die set)	



SHINHWA ST R&D



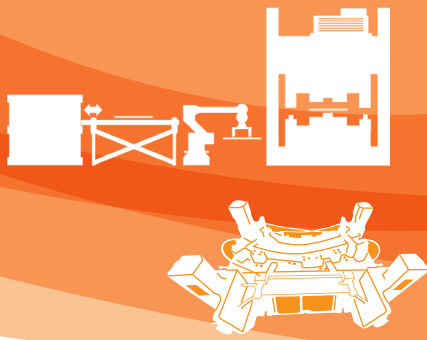
Major Research Results

3D Design

Forming Analysis

Impact Analysis

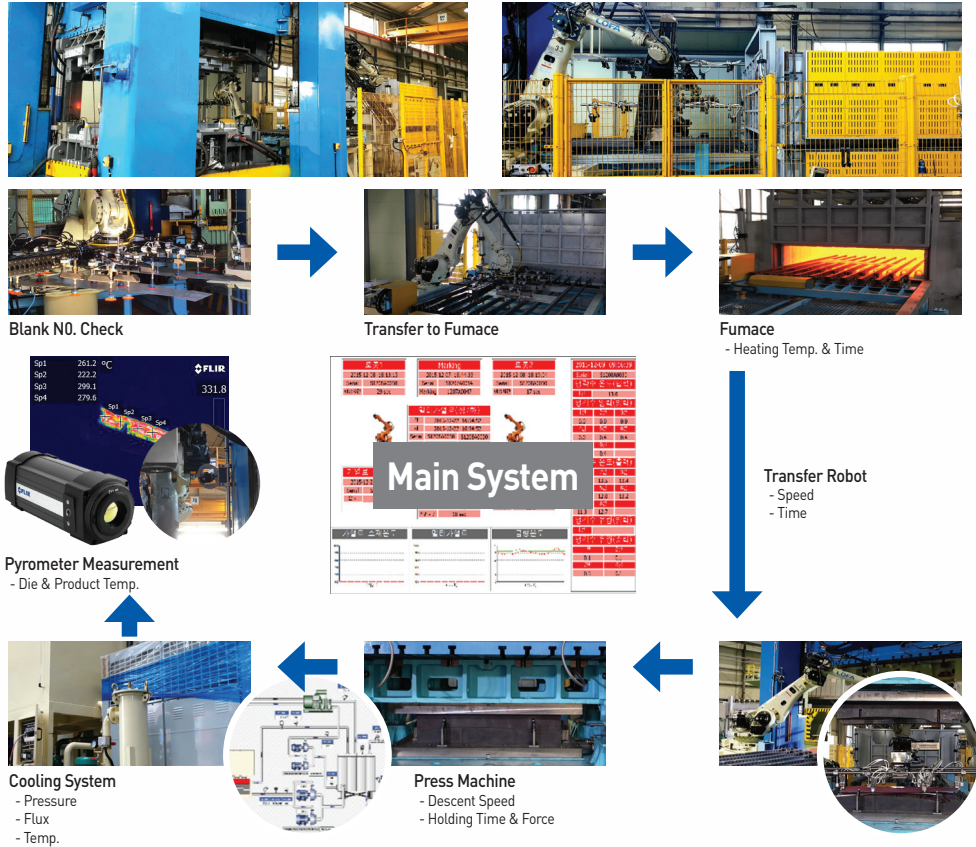
1. Development of manufacturing technology of the ring plate for automobile fuel tank by bending processing
2. Development of integrated forming technology for automobile parts by using TWIP steel
3. Development of press roll cam technology for ultra high strength steel sheet of 1.2GPa-grade
4. Development of manufacturing technology of integrated door impact beams
5. Hot Stamping Mold System - Control of AHSS automotive parts deformation and Rapid & uniform cooling system
6. Demonstration of ultra-hard cutting tools for high-hardness mold steel processing and diamond tools for high-toughness semiconductor material processing
7. Development of long-life tool steel and high-performance plastic mold steel manufacturing technology for forming ultra-high strength materials
8. Development of a cutting tool data platform based on process monitoring for application in manufacturing sites
9. Development of 1-Piece DIP (Door Impact Panel) forming technology applying next-generation automotive 1.5GPa-class ultra-high-strength steel and high-precision cold press forming methods for aluminum materials
10. Development of a machine learning-based solution for ultra-hard steel processing using ultra-hard/PCBN cutting tools and customized cutting processing solutions for users
11. Development of an automated face milling system for heavy insert steel to respond to changes in the demand for next-generation automotive body structures
12. Development of a digital standardization and automotive manufacturing system for Shim plates to improve productivity and transition to high-efficiency processes



SHINHWAST R&D Activities

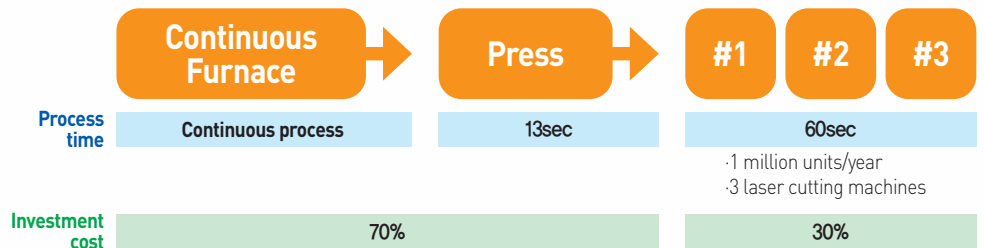
- Hot Stamping
- Smart Factory of Test Operation Line
- Hot-Piercing Complex Die System

Smart Factory of Hot Stamping Line for Test Operation

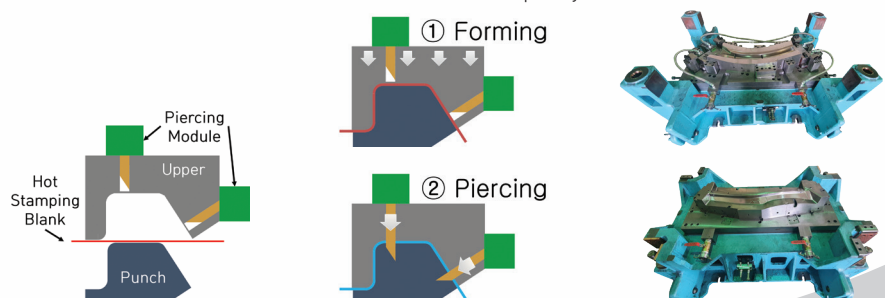


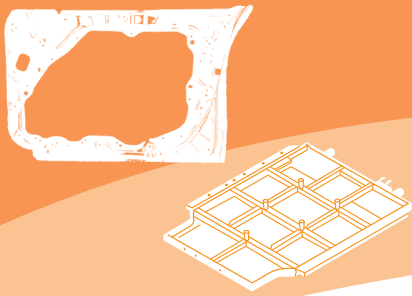
High-precision Hot -Piercing Module Complex Die System

- ▶ **Existing Process** · Decrease in productivity and increase in cost
· Increase in equipment investment costs



- ▶ **Development Process** · Demand for increased productivity and cost reduction
· Increased demand and quality of materials



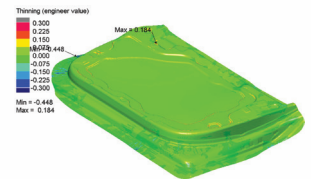
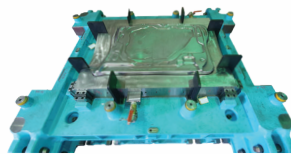


SHINHWA ST R&D Activities

- Aluminum High-precision Technology
 - Hybrid-Warm Drawing
 - Extrusion Part Forming & Tooling

Aluminum High-precision Hybrid-Warm Drawing

Material Properties	Traditional Technology (Cold Forming)	Developed Technology (Hybrid-Warm Drawing)
Characteristics	<ul style="list-style-type: none"> ·Cold Forming ·Poor formability of aluminum at room temperature, suitable for simple shapes 	<ul style="list-style-type: none"> ·Forming of aluminum sheets after over-heating to the appropriate temperature ·Capable of difficult forming and drawing
Advantages	<ul style="list-style-type: none"> ·No investment in facilities ·Simple Die Structure 	<ul style="list-style-type: none"> ·Able to form complex shapes ·High shape-holdability
Disadvantages	<ul style="list-style-type: none"> ·Unable to form complex shapes ·Difficult to control spring-back 	<ul style="list-style-type: none"> ·Requires additional equipment ·Complex Die structure
Process Diagram		



Aluminum Extrusion Part High-precision Forming & Tooling

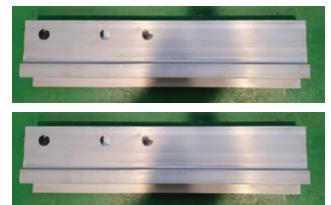
► Piercing & Trimming



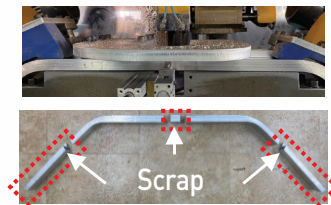
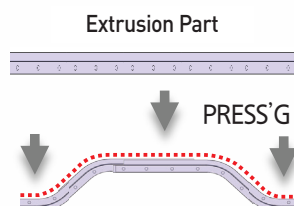
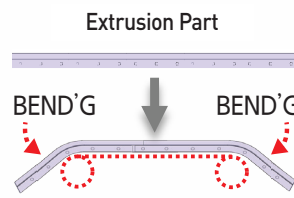
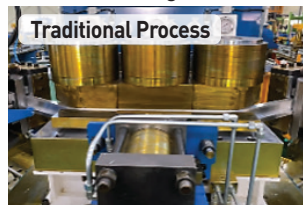
·CNC Machining
·Decrease in Productivity and Increase in Cost



·Development of Single-Sided Simultaneous Piercing and Trimming Process Technology via Press Process



► Draw Forming

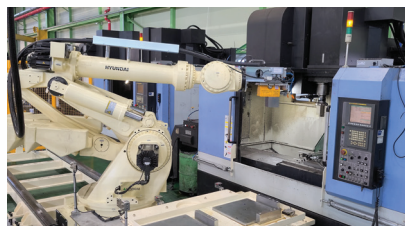




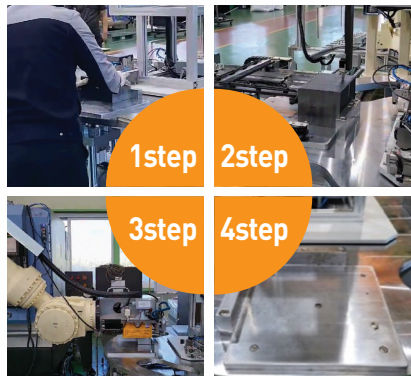
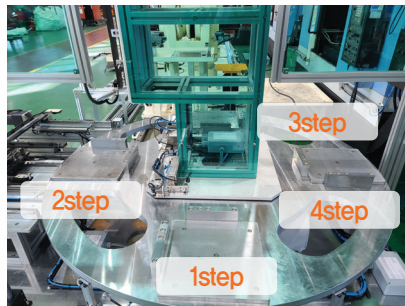
SHINHWA ST R&D Activities

Automated Face-milling System

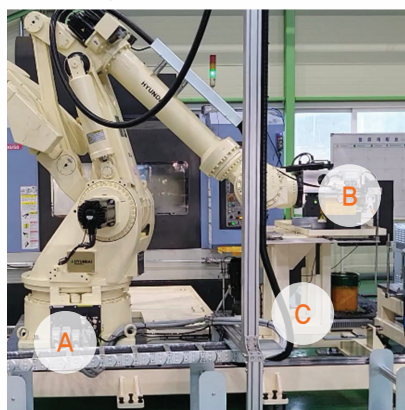
Automated Face-milling System



▶ Index System



▶ Robot System



A. Shuttle -type Transfer

· Transfer for In/Out Insert Steel

B. Grip Handling

· Development of Heavy-weight Insert Steel Grip Handle

C. Plate

· Insert Steel Standby Transfer Plate for In/Out

▶ Auto Jig System



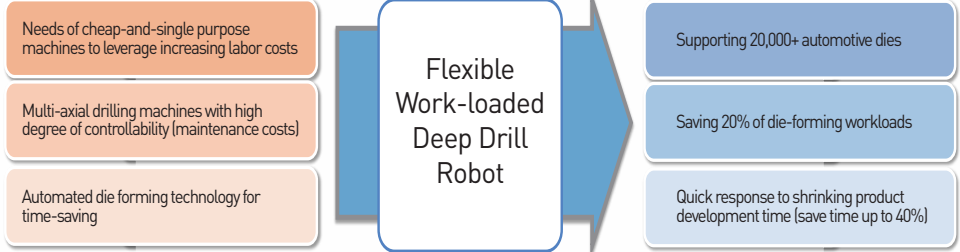
· Before Face Milling, X, Y, Z Axis Clamping System for Insert Steel Processing



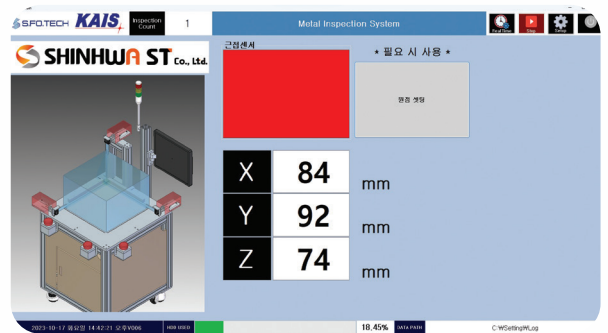
SHINHWA ST R&D Activities

— Multi-D.O.F. Deep Hole Drilling & Inventory Management System

Multi - D.O.F. Side & Upper Drill Equipment for Deep Hole Drilling



Inventory Management System



Main App

- Warehouse code management
- Management of warehouses by remnants
- Incoming and outgoing remnants and inventory status

Process App

- Registration of incoming remnants
- Inquiry of incoming remnants
- PLC environment settings

DB Server

- Basic information DB
- Incoming and outgoing DB
- Remnants inventory DB

PDA

Application system

- PDA remnants information inquiry
- PDA remnants discharge registration



Major Patents



Forming Apparatus And Forming Method Of Pipe



Jig Module And Face Milling Automation System Having The Same



Mold For Hot Forming



Injection Molding Apparatus



Polishing Apparatus For Bottom Surface Of Heat Treated Insert Steel



Polishing Method For Bottom Surface Of Insert Steel



Method For Inspecting Flatness Of Bottom Surface Of Assembly Block For Press Mold



Hot Stamping Forming Method For Easy Laser Trimming Process



Hot stamping Hot trimming method using Hybrid mold system



6-axis hole drilling apparatus

NO.	Equipment	Standard	Manufacturer
1	Machine Press	1200ton	SIMPAC
2		1000ton	VERSON
3	Hydraulic Press	500ton	WOJIN
4		1200ton	HBE
5	Hydraulic D/Spotting Machine	200ton	HBE
6		200ton	AMINO PDF200D
7	Vertical Machining Center	No.30	OKUMA MCR-B3
8		No.25	OKUMA MCR-A
9			OKUMA MCR-A5C
10			OKUMA MCR-B2
11		No.20	OKUMA MCV-A2
12		No.8.5	HWACHEON SIRIUS-850
13	Horizontal Machining Center	VX950M(No.9.6)	WIA
14		VX960M(No.9.5)	WIA
15	2-D Laser Cutting Machine	KH80G	WIA
16		KH1000	WIA
17	3-D Laser Cutting Machine	2000x3000	NTC
18		2000x6000	DNE LASER
19	Multi-Heating furnace	2100x2500x400	SINSUNG YOUL YEON Co., Ltd
20	Robot (6 Axis)	210kg	NACHI
21		160kg	LOFA Co., Ltd
21	3D SCANNER	MetraSCAN3D	CREAFORM
22	CAE Program	CATIA, Auto-form, Pam-stamp, Power Mill, Flow-vision	



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Hot Stamping Die Factory

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Tool Steel & Die Parts Factory

434, Gukgasandanse-ro, Guji-myeon, Dalseong-gun, Daegu, 43011, Republic of Korea

R&D Center

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