KOBELCO
KOBE STEEL GROUP

–Business Segment Briefing–
Initiatives for Automotive Weight Reduction Strategy

May 26, 2017

Position in the Medium-Term Management Plan

Growth strategies for the three core business areas

Materials

- **I. Initiatives for weight reduction in transportation** — Today's subject
- II. Strengthening profitability in the steel business

Machinery

- I. Initiatives in the fields of energy and infrastructure
- II. Strengthening profitability in the construction machinery business ← Briefing in Feb. 2017

Electric power

- Initiatives aimed at stable profitability in the electric power supply business ← Briefing in Jan. 2017

Strengthening the business base

Common strategies

I. Strengthening corporate governance
II. Securing and developing human resources
III. Strengthening technology development and *monozukuri* (manufacturing) capabilities

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Our Basic Policy for Automotive Weight Reduction

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➢ We are the world's only company supplying both steel and aluminum. Providing these materials with joining and other application technologies, we are working to contribute to weight savings in automobiles.

Contribute to weight reduction as the only company supplying steel and aluminum

Cutting-edge steel materials

- **Ultra high-strength steel sheets**
- Special steel wire
- Steel powder

Cutting-edge aluminum alloys

- **Aluminum sheets**
- **Aluminum forged products**
- **Aluminum extruded products**

Application technologies

- Forming technologies
- Evaluation technologies and structure proposals
- Joining technologies for dissimilar materials to promote multi-material application

Contents

Strategy for Automotive Weight Reduction: Status of Implementation of Strategic Investments

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- Under our Medium-term Management Plan, we are allocating about 100 billion yen for investments pertaining to automotive weight reduction. To date, we have decided on strategic investments in aluminum amounting to approximately 68 billion yen.

Investments for the automotive weight reduction strategy under the Medium-term Management Plan

Strengthening domestic mother plants, the source of our competitive edge

Capture growth in overseas markets

Strategic investments on a scale of 100 billion yen under consideration

■ Status of implementation of strategic investments

No.	Decision-making date	Products	Descriptions	Amount of investments
1	May 2016	**Aluminum** extruded and fabricated products	Established a new extrusion plant in the U.S.	US$46.7 million
2	April 2017	**Aluminum** forged products	Decided on facility expansion at U.S.-based KAAP (Phase 7)	Approx. US$53 million
3	May 2017	**Aluminum** panel materials (cold rolled materials)	Decided to establish a joint venture with Novelis in South Korea	US$315 million*1
4	May 2017	**Aluminum** panel materials	Decided on facility expansion at Moka Plant	Approx. 20 billion yen
			*1: Amount for share acquisition **Total**	**Approx. 68 billion yen**

[Aluminum] Strategic Investments to Contribute to Profits in Aluminum & Copper Business

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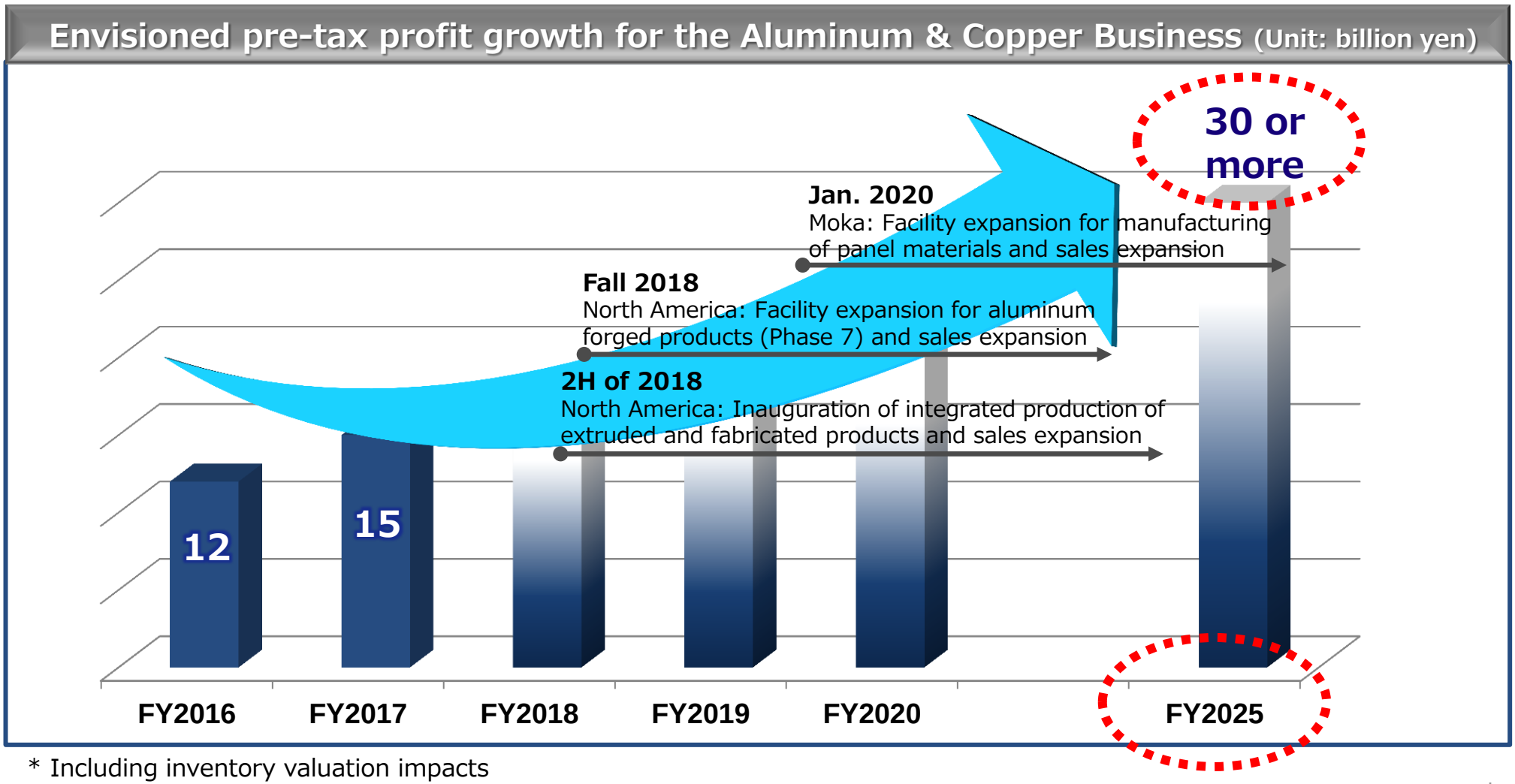
- Strategic investments are anticipated to contribute to profits in the Aluminum & Copper Business. In addition to earnings from existing areas, we expect profits of at least 30 billion yen in FY2025, which is double the level forecast for FY2017.

Envisioned pre-tax profit growth for the Aluminum & Copper Business (Unit: billion yen)



* Including inventory valuation impacts

[Aluminum]
Our Aluminum Products Used in Automobiles

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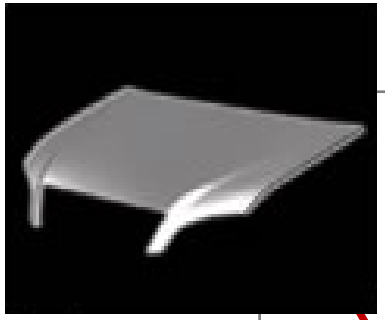
- Our aluminum products are used in various parts, including panels, suspensions and bumpers.

■ Aluminum panel material



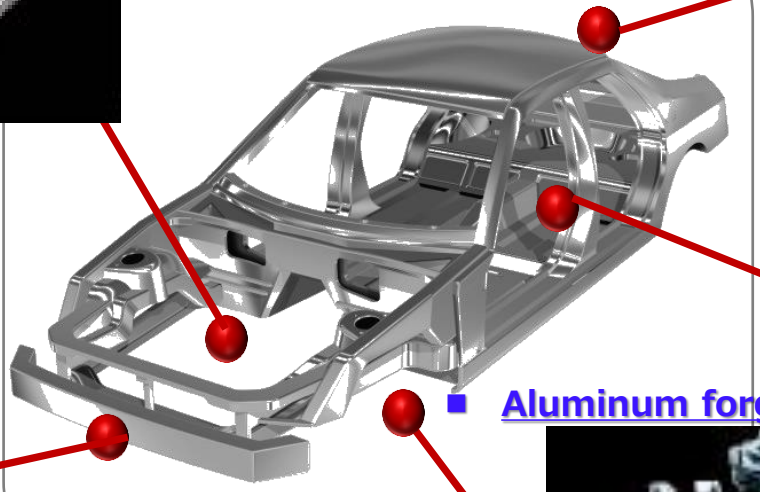
Hood

■ Aluminum panel material

Trunk lid

■ Aluminum extruded product

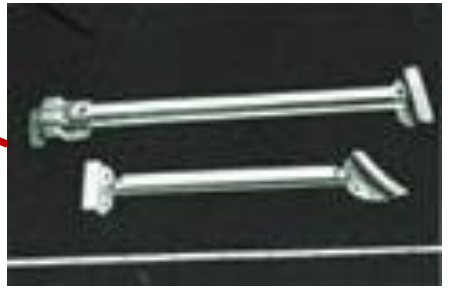
Bumpers



■ Aluminum forged product

Suspension

■ Aluminum extruded product



Door beams (with brackets)

[Aluminum] Advantages of our Aluminum Panel Materials & Demand Forecast

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- We are Japan's top supplier on the basis of our technological advantages and technical support.
- In light of growing need for weight reduction, the demand forecast for 2025 will be six or seven times the current level in Japanese and Chinese markets. We need to establish a supply system to capture future demand.

Our technological advantages and market share

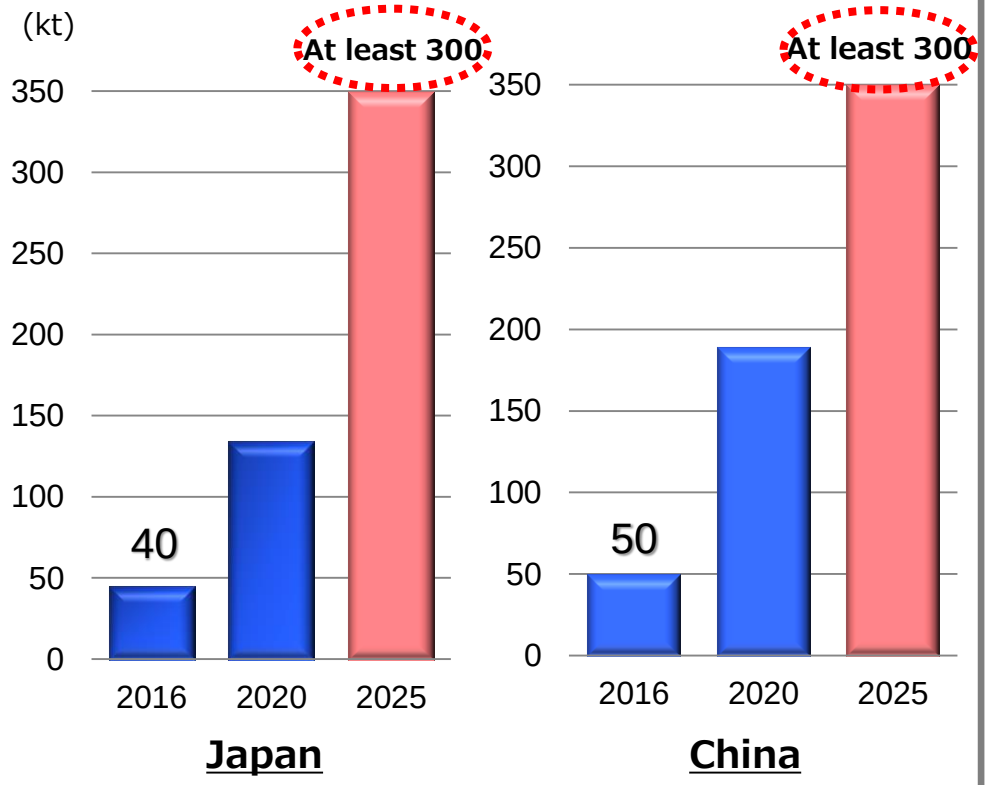
<Points of differentiation in aluminum panel materials>

- **Technological advantages**
- **Material control technologies**
  * New heat treatment technology
- **Surface control technologies**
- **Technical support**

We gained high marks from Japanese OEM customers and were chosen as a "technical development partner."

Domestic market share of aluminum panel materials supplied to Japanese OEM firms: 50%

Demand forecast for automotive aluminum panel materials in Japan and China



* Our forecast for Japan includes Asia, but excludes China.

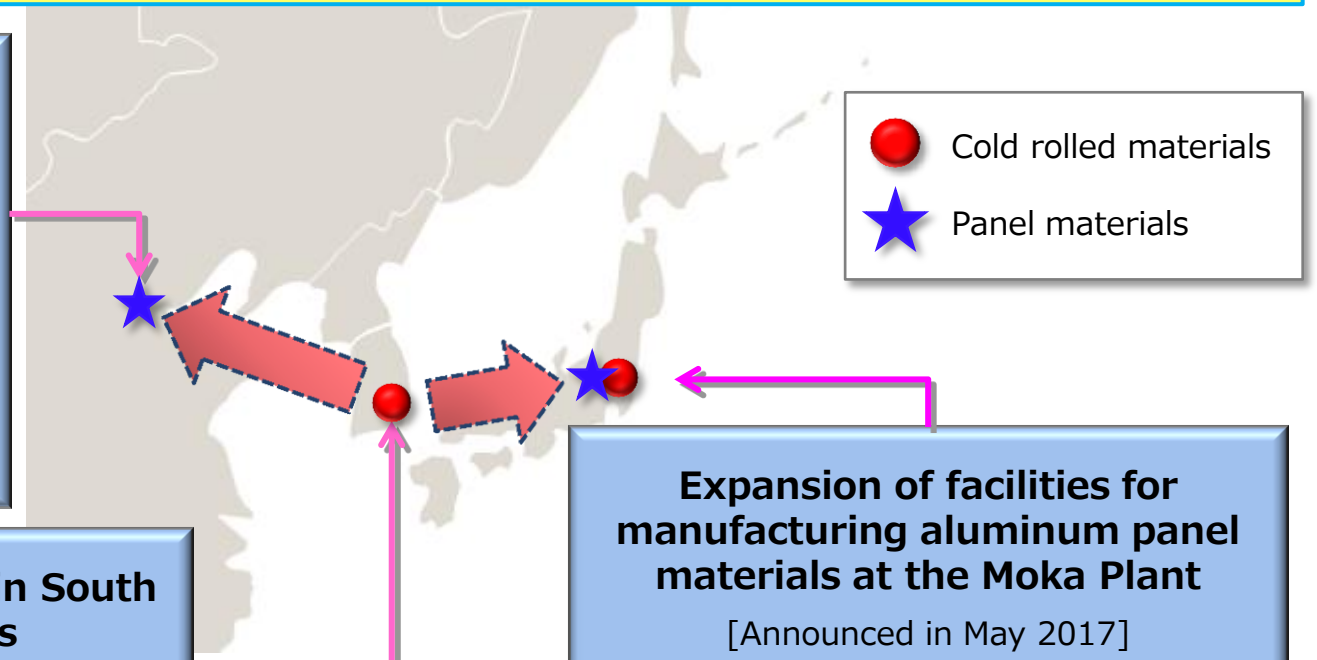
[Aluminum] Response to Rising Demand for Aluminum Panel Materials

- To respond to the growing demand for aluminum panel materials in Japan and the rest of Asia, including China, we are boosting production capacity in upstream and downstream processes.
- The North American market remains under continued consideration.

Establishment of Kobelco Automotive Aluminum Rolled Products (China) Co., Ltd.

[Announced in Sept. 2013]

- Total investment: Approx. 19 billion yen
- Date of inauguration: 2016
- Production capacity: 100,000 tons/year



Setup of a joint venture in South Korea with Novelis

[Announced in May 2017]

- Share acquisition value: US$315 million
- Ownership ratio:
  Kobe Steel 50%, Novelis Korea 50%
- Production capacity: 300,000 tons/year
  (We have offtake rights to receive up to 50% of the production capacity.)

Expansion of facilities for manufacturing aluminum panel materials at the Moka Plant

[Announced in May 2017]

- Investment: Approx. 20 billion yen
- Target facilities:
  Heat treatment equipment and surface treatment equipment
- Date of inauguration: January 2020
- Production capacity: Increased by 100,000 tons/year

[Aluminum] Advantages of our Aluminum Forged Suspension Products & Demand Forecast

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- We already hold the largest market share worldwide, out-performing the competition with the advantages of our technologies and equipment.
- In North America, where aluminum suspensions are increasingly being used, aluminum suspension use will rise to 25% in 2025. We urgently need to expand capacity to capture the growing demand.

Our technological advantages and market share

<Points of differentiation in aluminum forged suspensions>

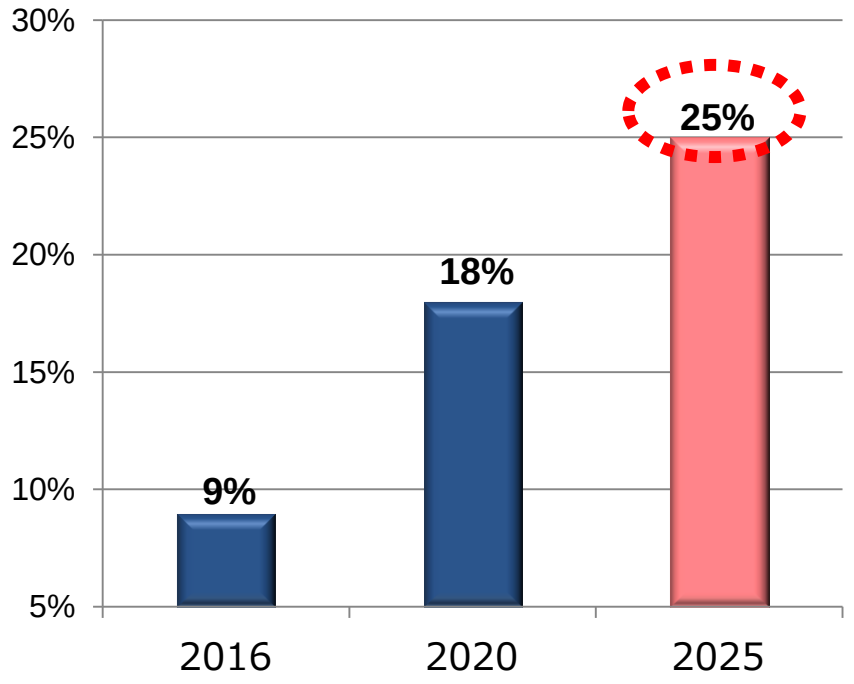
Technological advantages

- Competitiveness based on integrated production until forging
- Alloy technologies and heat treatment technologies

Large-sized 6,300 ton forging presses

Holding the largest global market share
for medium- and large-sized aluminum suspension products

Share of aluminum forged suspensions in North America



* Medium- and large-sized (L-shaped/knuckle) suspensions

* Based on our forecast

[Aluminum] Response to Rising Demand for Aluminum Forged Suspension Products

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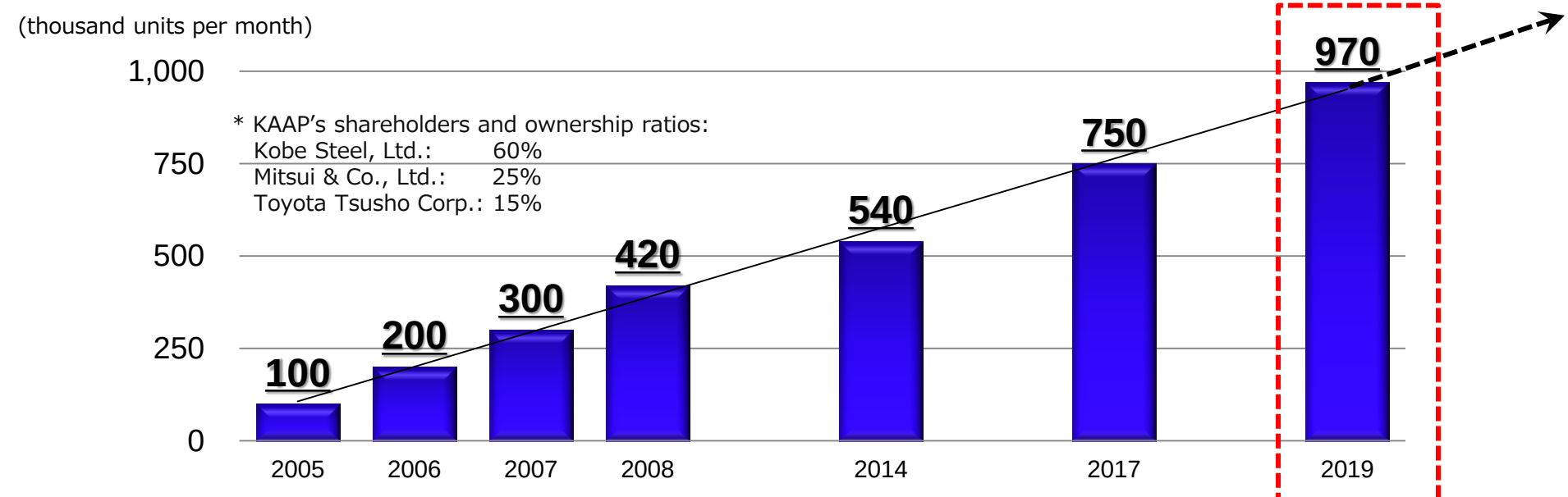
- Based in the U.S., Kobe Aluminum Automotive Products, LLC (KAAP) is successively expanding its production facilities in a bid to respond to growing demand in North America.
- Response to further demand growth in 2025 remains to be addressed.

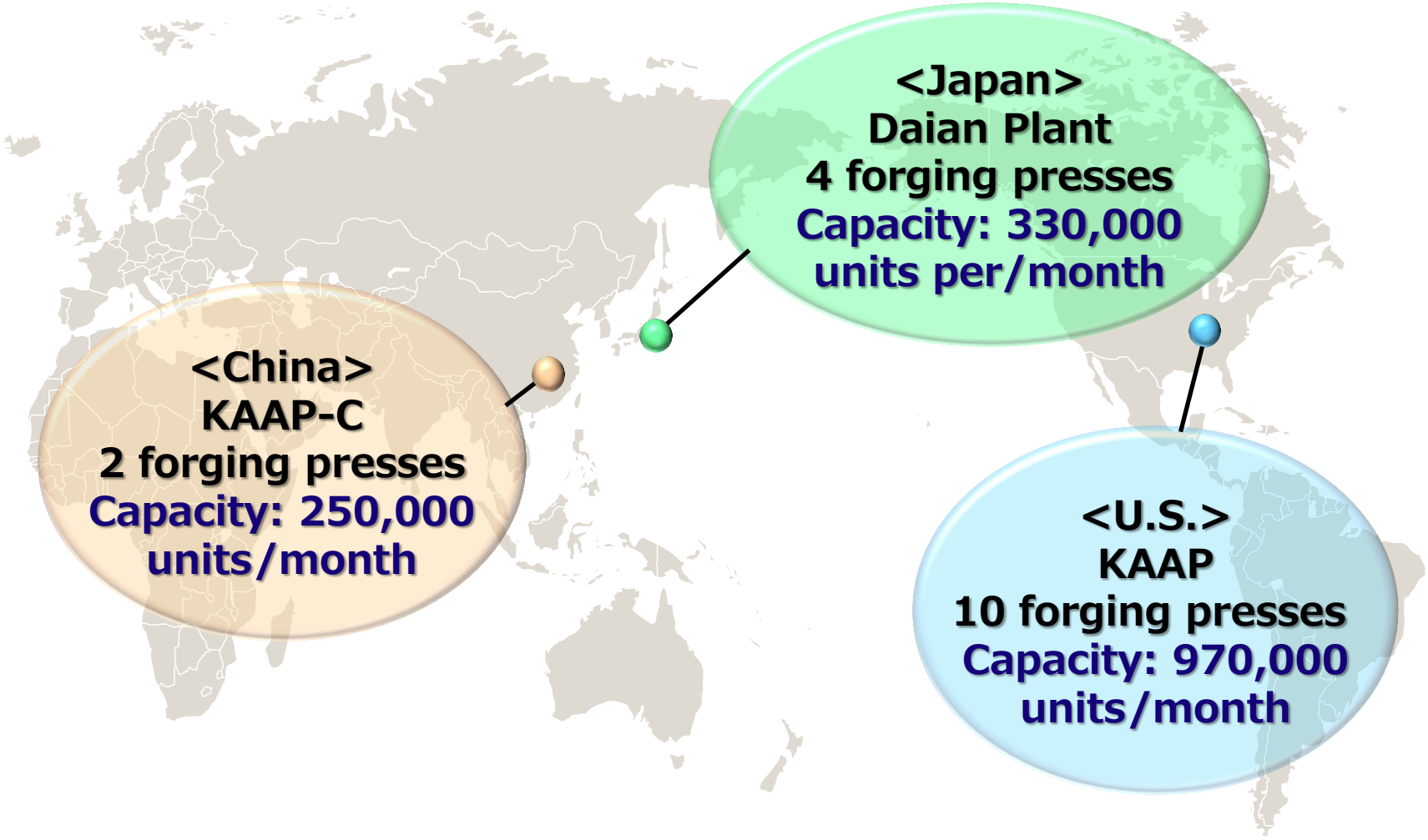
Production capacity trends of U.S.-based KAAP



	Phase 1 investment	Phase 2 investment	Phase 3 investment	Phase 4 investment	Phase 5 investment	Phase 6 investment Determined in Nov. 2015	Phase 7 investment Determined in Apr. 2017
No. of melting and casting lines	1				2	3	4
No. of forging presses	1	2	3	4	6	8	10

[Aluminum]
Global Expansion of Aluminum Forged Suspension Products

- After completion of the Phase 7 expansion at KAAP, our production capacity for aluminum forged suspension products will be 1.55 million units per month in total for the plants in Japan, the U.S. and China.
- We will remain in the leading position in market share in the global medium- and large-sized aluminum forged suspension market.



[Aluminum] Advantages of our Aluminum Bumpers, Demand Forecast & Response

- Our technological advantages are based on the 7000 Series alloy we developed ahead of the competition.
- In North America, aluminum bumpers are steadily on the increase. The share of aluminum bumpers is expected to reach around 30% in 2020.
- The new extrusion plant set up in the U.S. is scheduled to begin mass production of our original 7000 Series aluminum alloy.

Our technological advantages (features of the 7000 Series alloy 7K55)

Stress corrosion crack resistance (SCC resistance)

Achieving both

High strength (proof stress: 400 N/mm²)

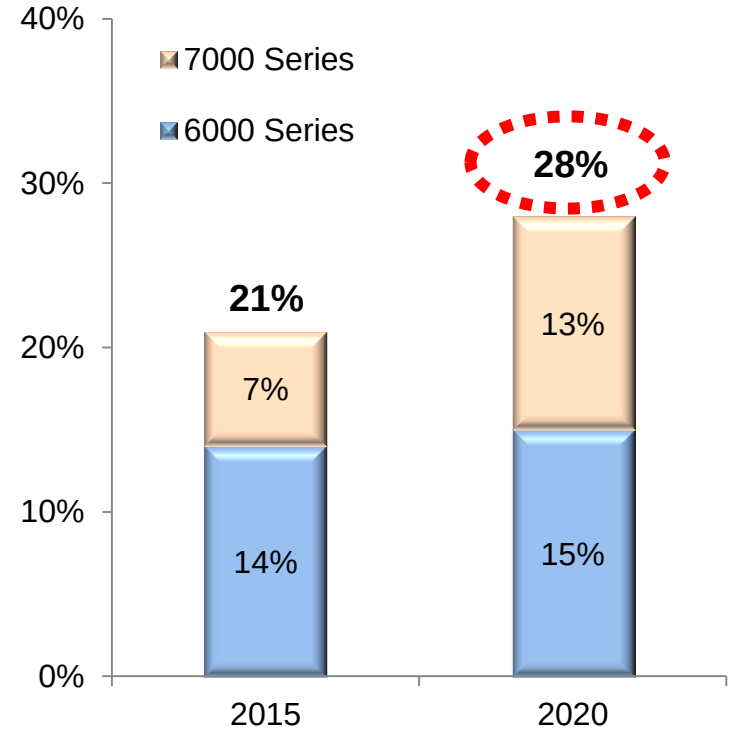
Bumpers made of the 7000 Series alloy 7K55 weigh **around 30% less** than those made of the 6000 Series.

Establishment of a new extrusion plant in the U.S. (Kobelco Aluminum Products & Extrusions)

[Announced in May 2016]

- Total investment: US$46.7 million
- Dates of inauguration: In the second half of 2017 for downstream processes and in the second half of 2018 for upstream processes
- Production capacity: 6,000 tons/year

Share of aluminum bumpers in North America



* Based on our forecast

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[High-Strength Steel]
Weight Reduction through the Use of Steel

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➢ To achieve both crashworthiness and weight reduction, UHSS/HSS and/or PHS will be the main material for the body structure.
(UHSS: Ultra high-strength steel with tensile strength of 780 MPa or higher.)

Body

Panels & closures	▸ **Design properties (e.g. shape)** ▸ **Stiffness**	▸ Constraints to sheet thickness due to limitations to stiffness/rigidity. Use of **aluminum** and **plastic** will increase.
Body structure	▸ **Crashworthiness (Strength, EA, etc.)** ▸ **Comfort (stiffness, NVH, etc.)**	▸ **UHSS/HSS**, which provides higher strength and weight reduction, will be the main material for the body structure.

■ Body structure

[High-Strength Steel] Our Initiatives in AHSS

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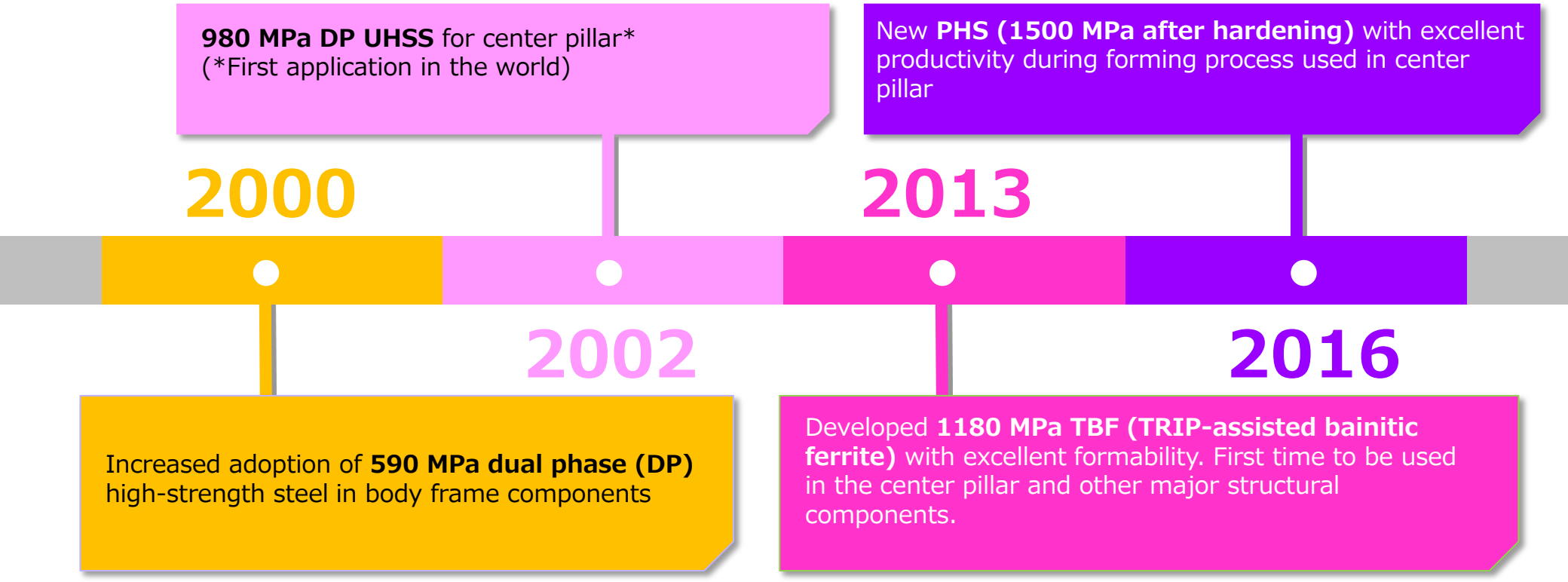
- We make full use of our annealing facility specializing in manufacturing UHSS to develop and produce outstanding AHSS of ultra high-strength and with excellent formability.
- Our 980MPa and 1180MPa steels were the first in the world to be used in major body structural parts. We are a leader* in ultra high-strength steel.
  (*We supply 30% to 40% of the ultra high-strength steel to some Japanese OEMs.)



[High-Strength Steel]
Our Global Supply Structure for AHSS

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- Local supply systems were established in the U.S. and China by transferring ultra high-strength steel manufacturing technology from Kakogawa Works, as the mother facility in Japan, to overseas bases.
- The objective was to respond to requests from Japanese OEMs for the local procurement of high-strength steel and to capture increasing demand for AHSS in North America and China market.

*1【United States】Joint venture with United States Steel Corporation. Leading supplier of high-strength steel in North America. U.S. Steel was the first to supply GA980 MPa in North America. It currently produces martensitic steel up to 1500 Mpa. Kobe transferred HSS technology to PRO-TEC.
*2【China】Joint venture with Angang Steel. Kobe transferred HSS technology to the JV. Mass production began in 2016.

Kobelco Angang Auto Steel Co., Ltd.

Joint venture with Angang Steel Company Limited
- Production Capacity: 600,000 tons/year
- Date of Establishment: Aug. 2014
- Start of Production: 2016
  (continuous annealing line)

PRO-TEC Coating Company

- Joint venture with United States Steel Corporation
- Production Capacity: 1.5 million short tons/ year
- Date of Establishment: 1990
- Start of Production:
  May 1993: First hot dip galvanizing line (CGL1)
  Nov. 1998: Second hot dip galvanizing line (CGL2)
  May 2013: Continuous annealing line

[High-Strength Steel]
Application Trend of High-Strength Steel in Body Structure

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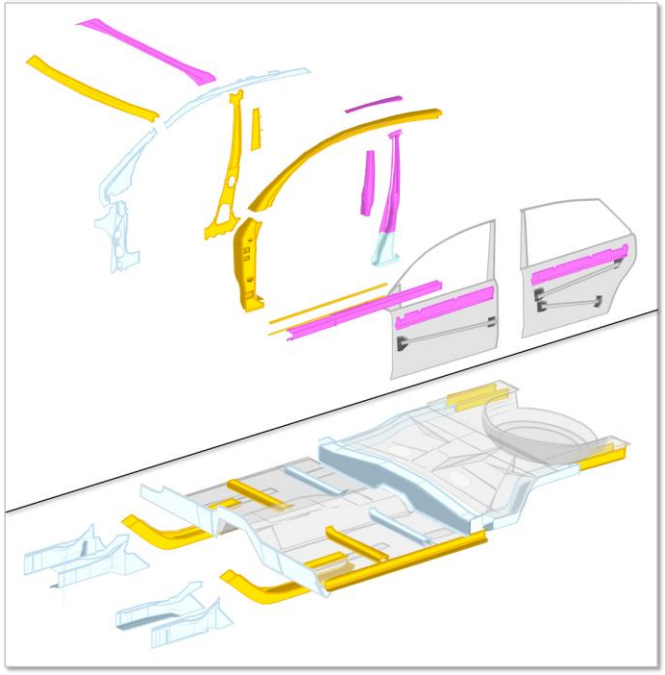
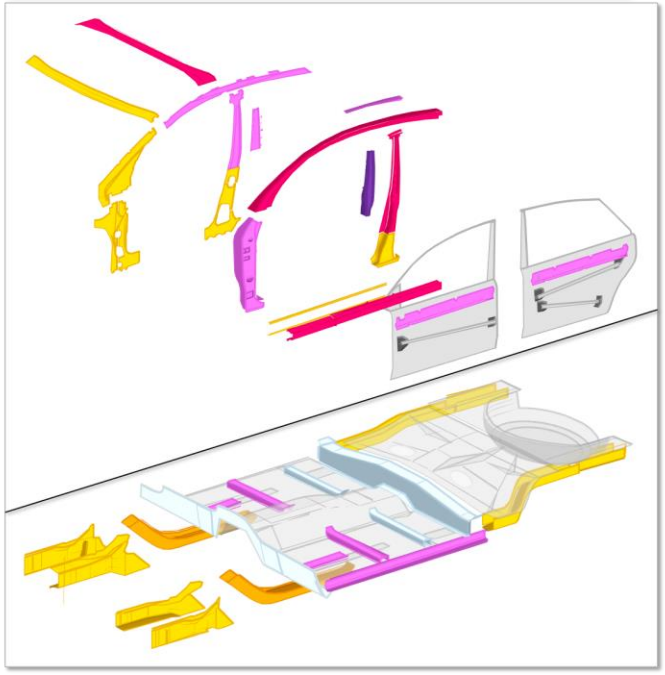
- As the number of parts using UHSS and PHS increase, demand for UHSS and PHS is forecast to grow.
- To expand UHSS application, ultra high-strength steel of higher strength and better formability will be needed.

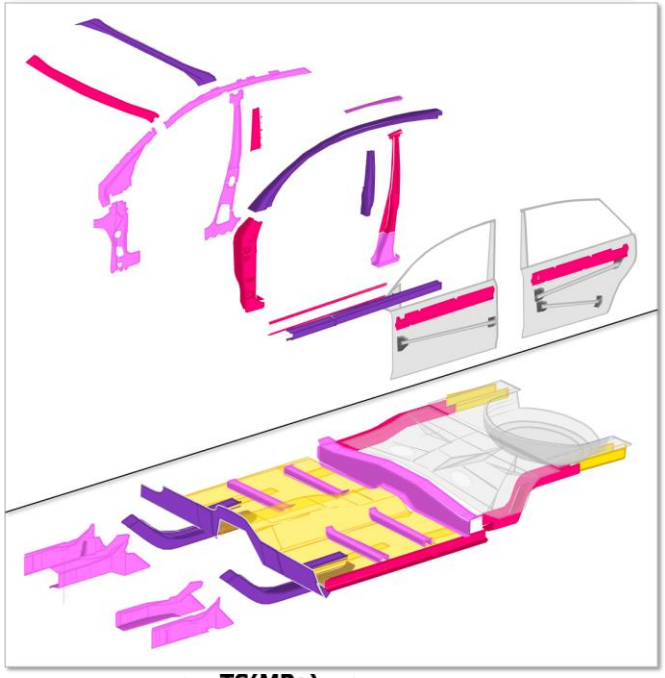
2007-

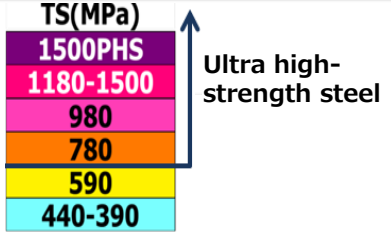


2013-



2019-





[High-Strength Steel]
Our Strategy for High-Strength Steel

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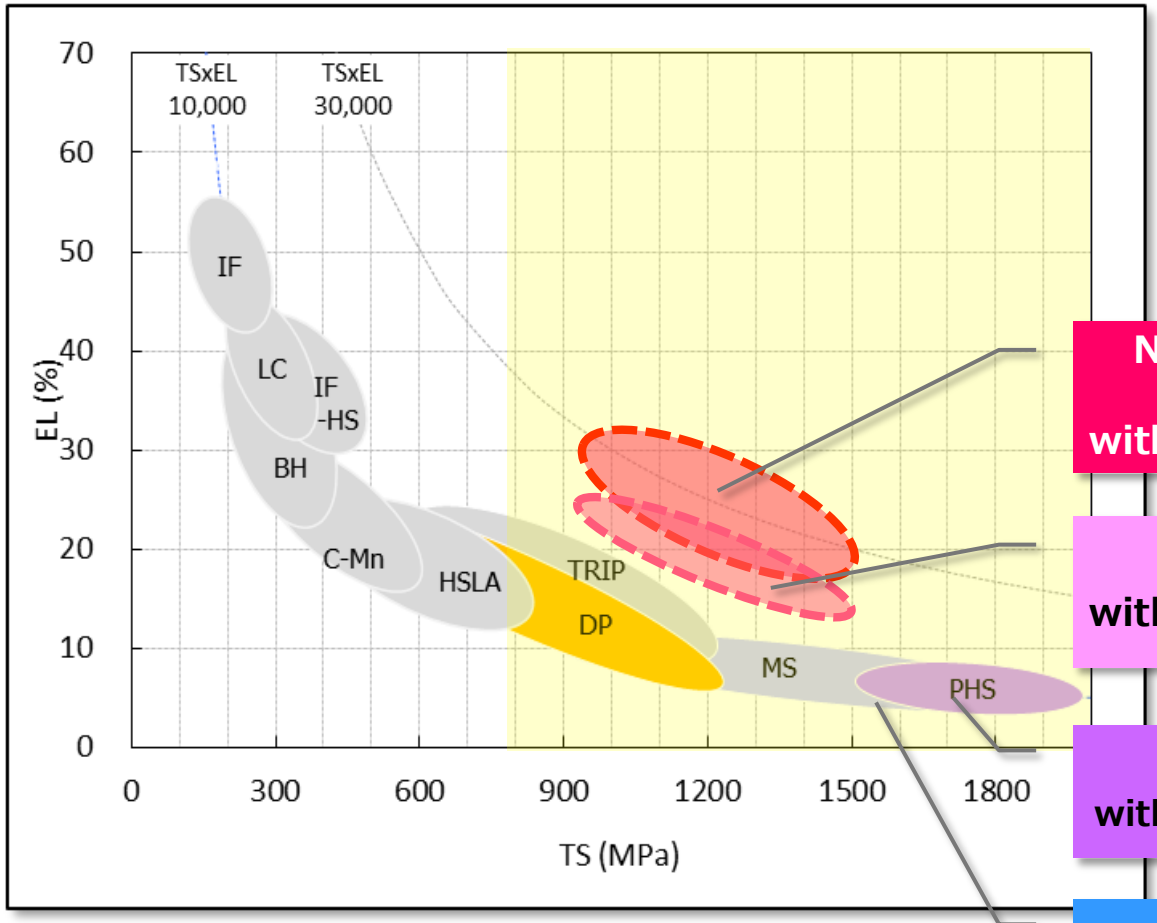
- Move forward with new development and sales expansion of UHSS, PHS and other products for automotive weight reduction.
- Shift more of the product portfolio to ultra high-strength steel. Promote transfer to overseas plants.



TS: tensile strength
EL: total elongation (workability)

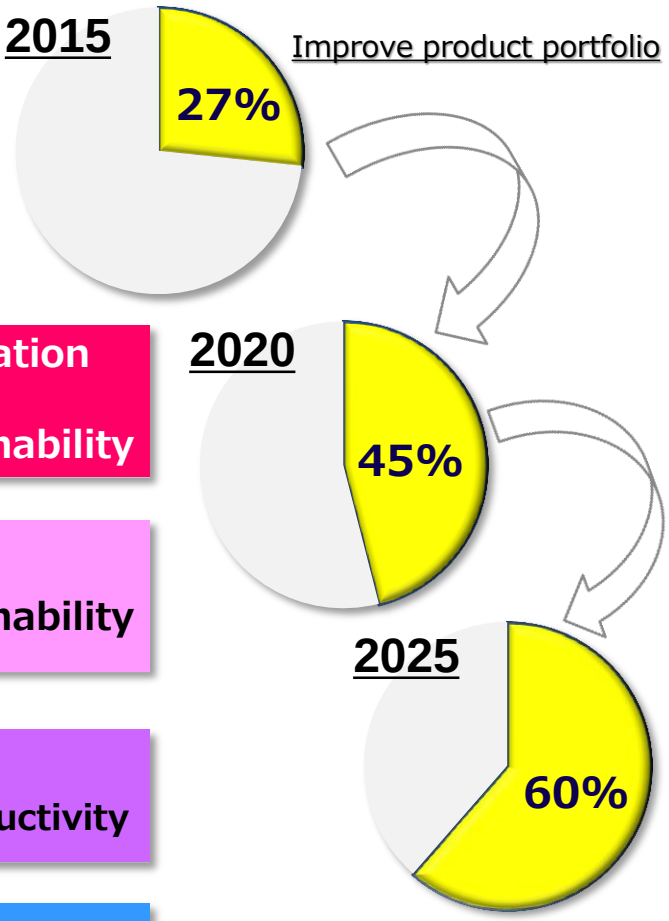
Next-generation UHSS with high formability

UHSS with high formability

PHS with high productivity

Martensitic steel

Improve product portfolio



Breakdown of production volume of automotive steel sheets for domestic market
- Ultra high-strength steel and hot stamping steel sheets
- Other steel sheets

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[Application Technologies] Proposals for Comprehensive Weight Reduction

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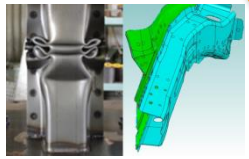
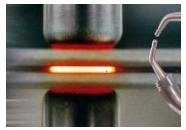
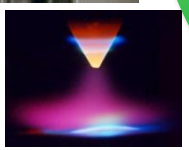
- Leverage strengths in ultra high-strength steel, aluminum and welding materials to develop and provide application technologies to customers.
- Combine cutting-edge materials with application technologies to contribute to automotive weight reduction.

Application technologies

Forming technologies and optimal structures
to make full use of distinctive materials







Joining technologies
UHSS - UHSS, Steel - Aluminum

UHSS/PHS, aluminum
Cutting-edge materials helping to reduce automotive weight

Automotive weight reduction

[Application Technologies] Initiatives for Joining Technologies

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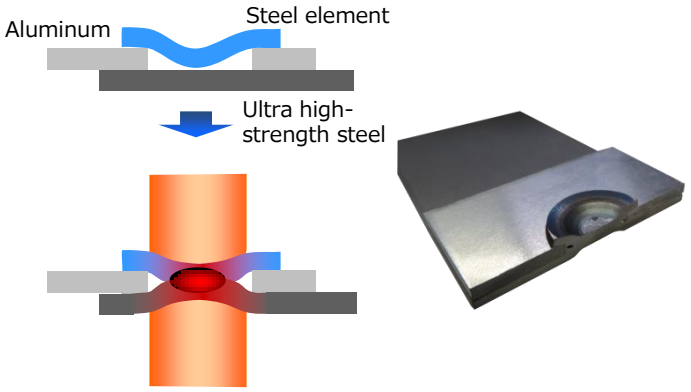
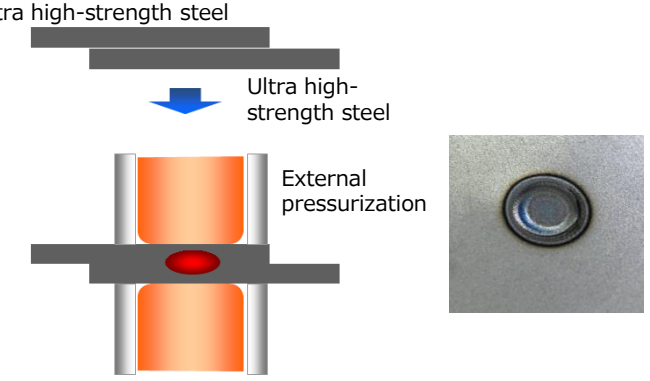
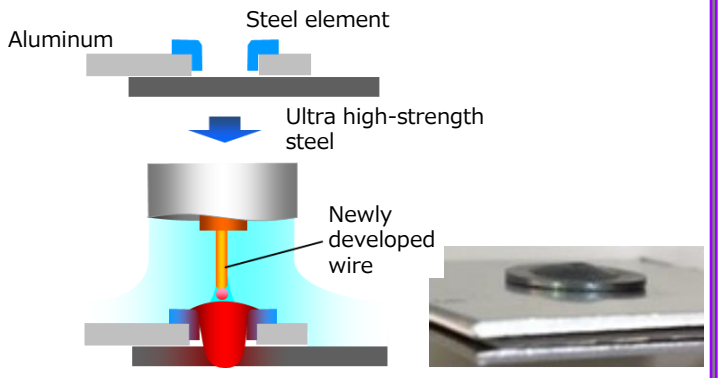
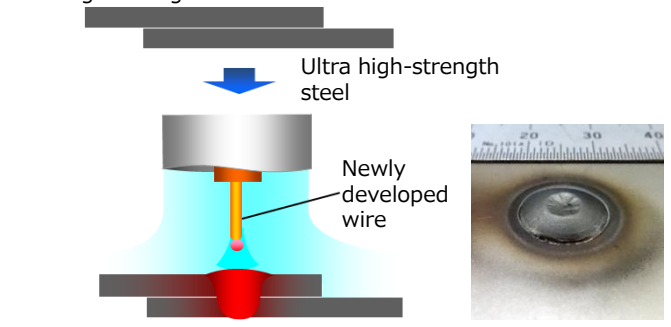
- Joining ultra high-strength steel to each other and with aluminum alloy is an emerging issue.
- We can propose suitable joining applications taking into account customers' existing equipment.

	Ultra high-strength steel with aluminum	Joining ultra high-strength steel
Resistance spot welding		
Arc spot welding	 **Element Arc Spot Welding (EASW)**	

[Application Technologies] Initiatives for Joining Dissimilar Metals

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➢ A new dissimilar metal joining process, Element Arc Spot Welding (EASW), was developed by utilizing our strengths in ultra high-strength steels, aluminum alloys and welding materials.

Dissimilar Metals Joining Process "Element Arc Spot welding"

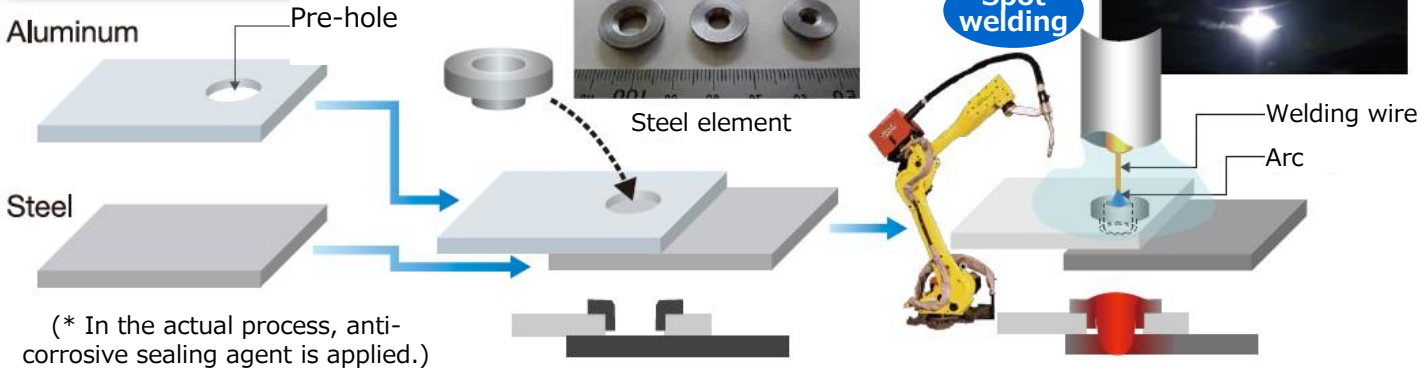
Effect

- Ultra high-strength steel and aluminum can be joined together using inexpensive arc welding.
- Applicable to closed section parts through one-side access.

Progress

1. Development underway 2. Development finished 3. Commercialized

Steps for joining



[Application Technologies]
Initiatives for Joining Dissimilar Metals

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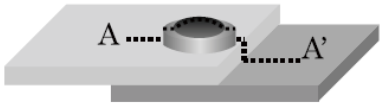
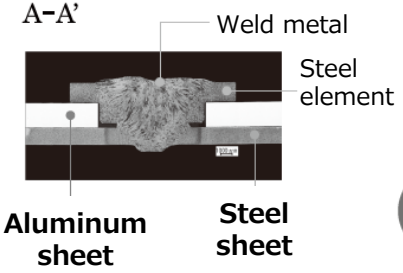
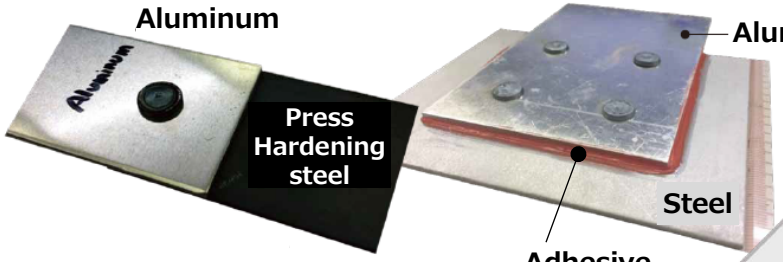
- Element Arc Spot Welding (EASW) is suitable for joining ultra high-strength steel to aluminum alloy.
  - ➔ Contributes to weight reduction by promoting the use of multi-materials.

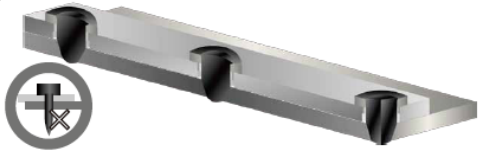
Examples of joining



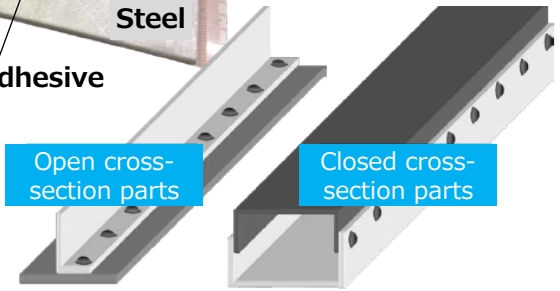




Example of aluminum alloy and 1470MPa PHS joint.

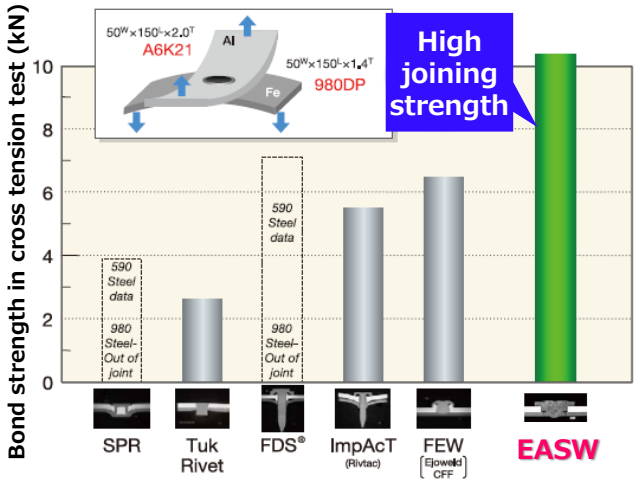


Combined joining with welding materials to counter electrolytic corrosion



Features & advantages

- High joining strength
- Flat backside unlike nail or screw type mechanical joining
- No LME (Liquid metal embrittlement) crack generation when joining high strength hot-dip galvanized steel and aluminum
- Hydrogen crack problem can be reduced by combining the use of special welding wire with ultra high-strength steel.
- Spatter generation can be reduced with the use of the latest low-spatter arc welding technology (i.e. power source and wire feeding control).
- Ideal for repairing dissimilar metals at repair shop



[Application Technologies]
Our Proposal for Weight Reduction

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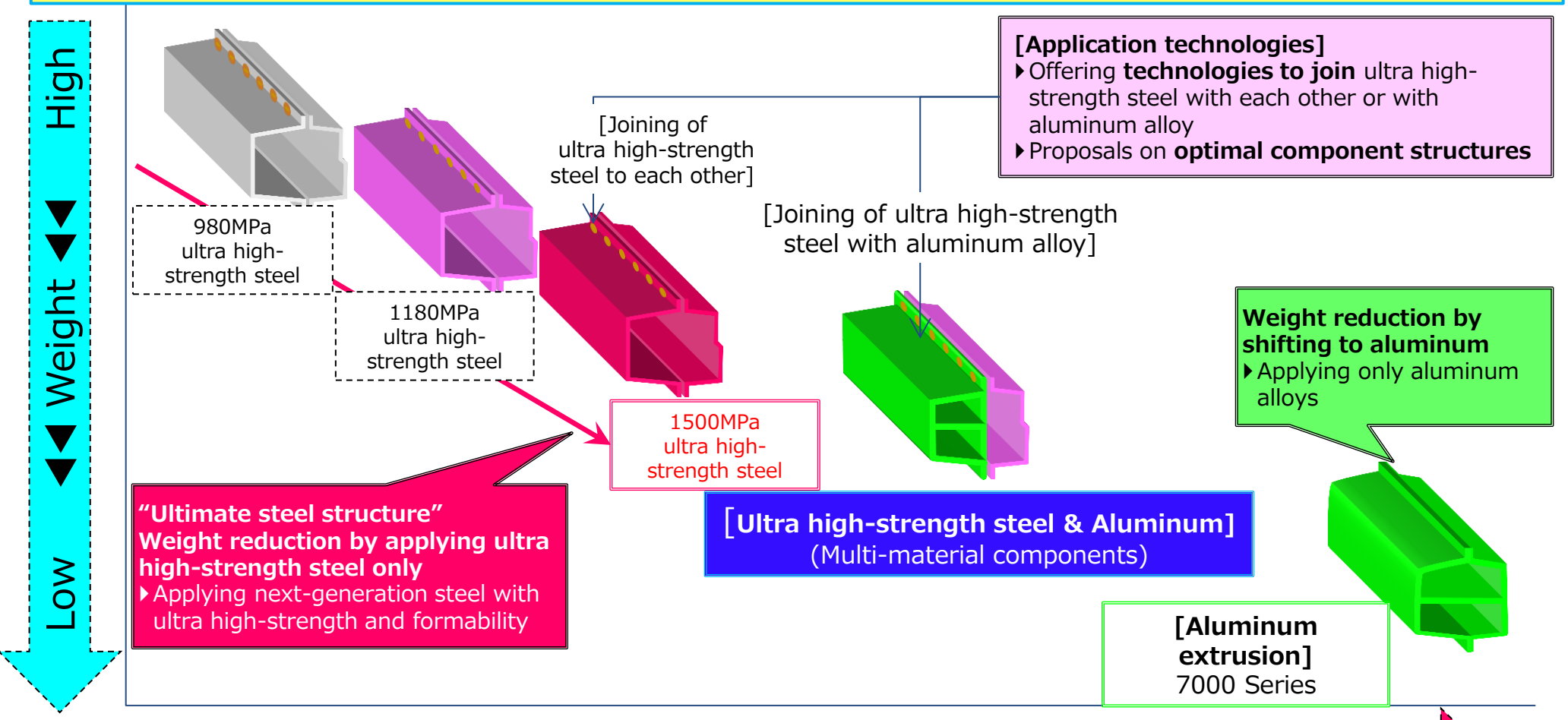
➢ We can provide various weight reduction options by combining ultra high-strength steel, aluminum alloy and application technologies. That's difficult for other companies.



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1. Initiatives for Weight Reduction in Automobiles

- Basic policy
- Aluminum strategy (Aluminum & Copper Business)
- High-strength steel strategy (Iron & Steel Business)
- Application technologies

2. Initiatives for Medium- to Long-Term growth

- Establishment of a new organization
- Financial strategy

Stepped Up Efforts to Reduce Automotive Weight: Launch of New organizations

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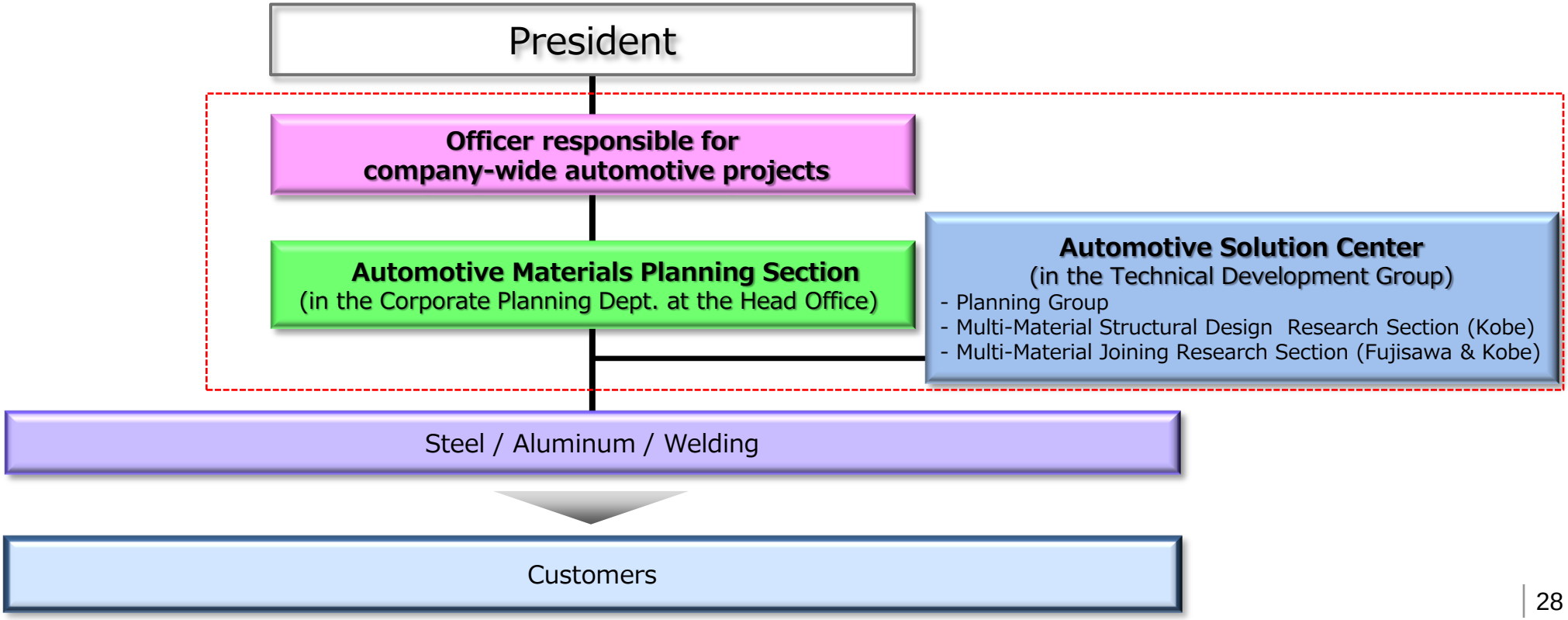
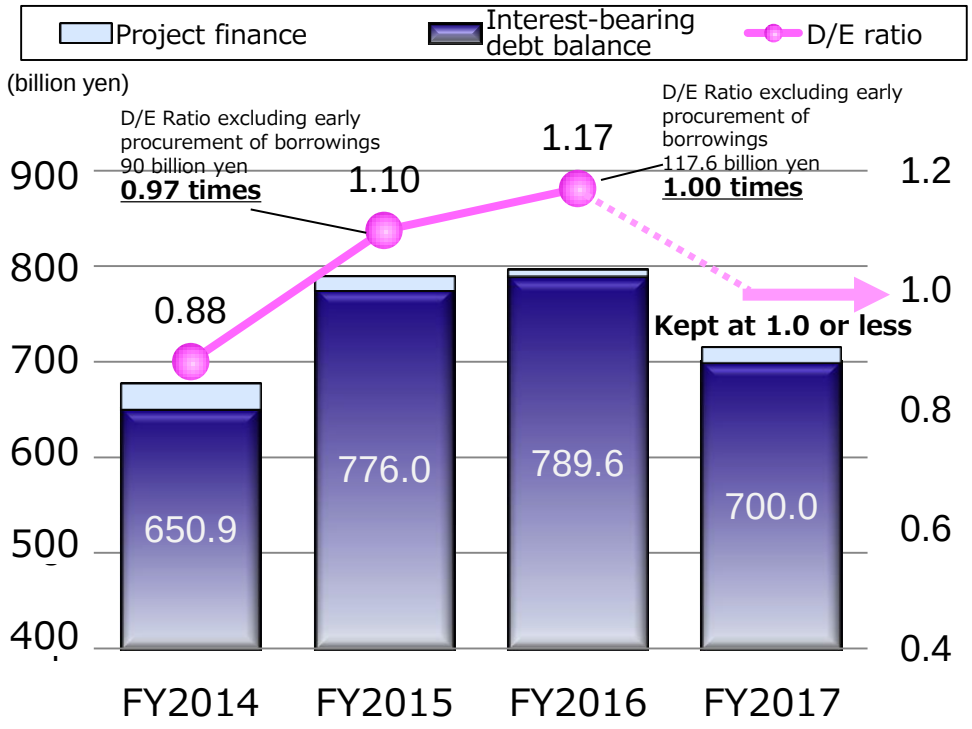
- **Automotive Solution Center** launched in the Technical Development Group at the head office
  ➔ Bolstering ability to make solution proposals utilizing strengths in steel, aluminum and welding
- **Automotive Materials Planning Section** launched in the Corporate Planning Dept. at the Head Office
  ➔ Strengthening marketing capabilities and proposals for weight reduction across business segments
- **Post an officer responsible for company-wide automotive projects**
  ➔ For quicker decision-making and company-wide implementation of strategy



Financial Strategy

- Under the Medium-Term Management Plan, “in principle, the basic policy is to finance large strategic investments and regular investments that support the business base by business cash flows” and the D/E ratio target is set at 1.0 or less. These will be retained while ensuring financial health, achieving profitability improvement.
- To steadily invest in growth while maintaining financial discipline, cash generation measures* of around 100 billion yen will be considered and implemented.
  (* Including asset sales, improvements in working capital, careful selection of investment destinations)

Interest-bearing debt balance and D/E ratio



Cash generation measures

The cash generation measures specified below were taken in or after FY2016.

Item	Effect	Descriptions
Improvements in working capital	19 billion yen	Improvement in efficiency of capital in SE Asia and China
Asset sales	8 billion yen	Sales of operations, etc.
Total	27 billion yen	

Reference Information

Behind the Need for Vehicle Weight Reduction: Performance Sought from Automobiles

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- Amid toughening fuel efficiency regulations and improvement in safety performance, environmentally friendly vehicles, collision avoidance systems and self-driving technologies will increase. Meanwhile, it is vital to reduce automotive weight to further enhance the advantages of these technologies.

Expected performance from vehicles

Fuel efficiency and environmental performance		Driving performance	Safety performance	
ICEV HEV PHEV	EV FCV	Improve drivability	Passive safety	Active safety
Challenge: Improve fuel efficiency	Challenge: Prolong driving distance			

Automotive weight reduction

■ **ICEV:** **I**nternal **C**ombustion **E**ngine Vehicle, ■ **HEV:** **H**ybrid **E**lectric **V**ehicle,
■ **PHEV:** **P**lug-in **H**ybrid **E**lectric **V**ehicle, ■ **EV:** **E**lectric **V**ehicle, ■ **FCV:** **F**uel **C**ell **V**ehicle

Behind the Need for Vehicle Weight Reduction: Trends in CO_2 Emission Regulations

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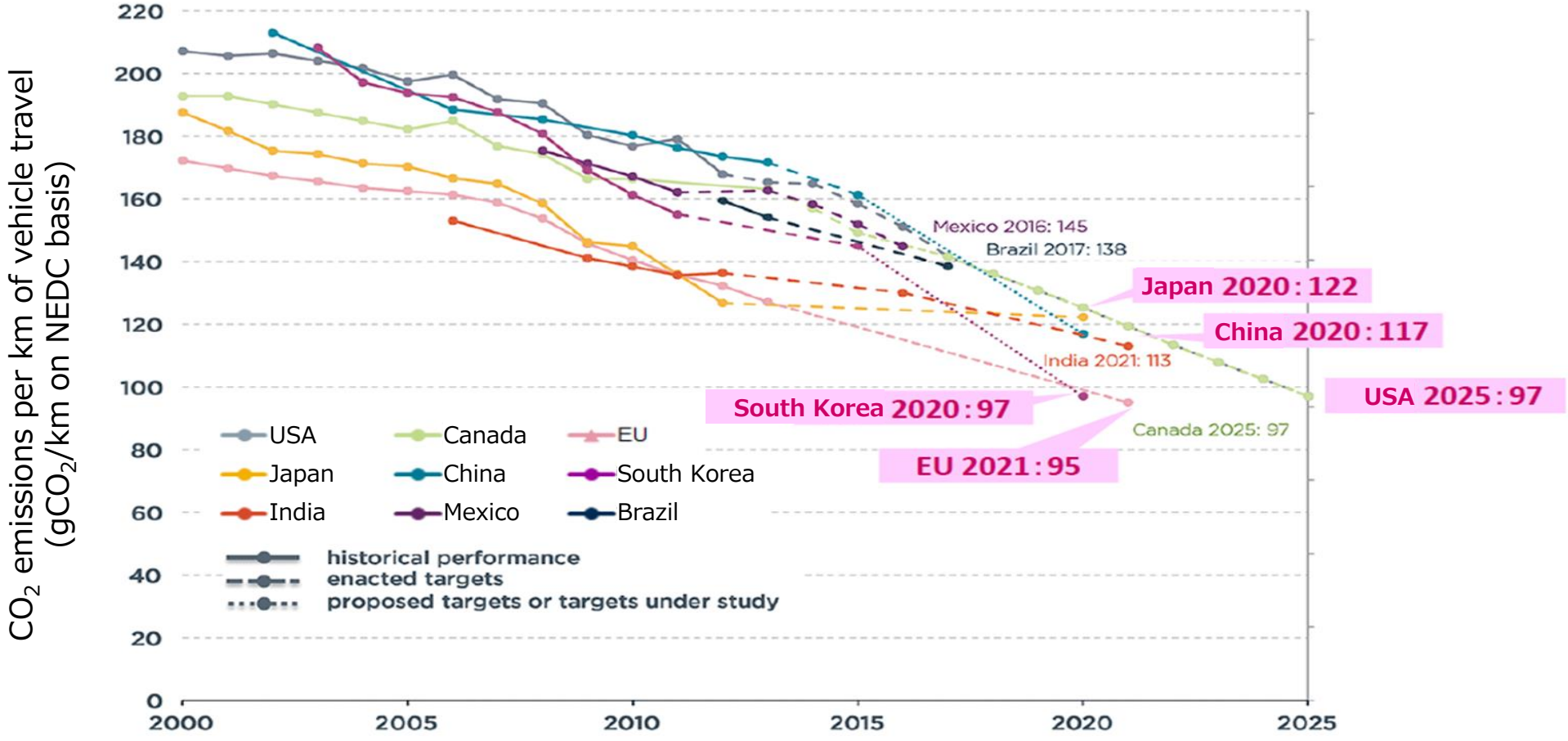
- So far, EU and Japanese regulations are tougher than those in other countries. In 2020 and beyond, regulations will be considerably stricter in the United States and in China.



* Reference: The values represent the target values converted by ICCT into the CO_2 equivalent on a NEDC test cycle basis:
Japan: 20.3 km/L in 2020, China: 6.9 L/100 km in 2015, 5 L/100 km in 2020 (under consideration), USA: 143 gCO_2/mi

Source: The Ministry of the Environment: *Greening of Motor Vehicle Taxation in Foreign Countries*, Dec. 22, 2016

Behind the Need for Vehicle Weight Reduction: Toughening of Collision Safety Regulations

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		Frontal collision			Side collision		Roof strength
							
		Full-wrap (100% wrap)	Offset (40% wrap)	Offset (minor wrap)	MDB barrier	Pole	-
USA	Regulations	○	○		○	○	○
	UN NCAP	○	○*3		○*4	○*4	○
	IIHS		○	○	○		○
Europe	Regulations	○	○		○	○	
	Euro NCAP	○	○	○*5	○*6	○	
China	Regulations	○	○		○		○
	C NCAP	○	○		○		
Japan	Regulations	○*1	○*1		○	○*2	
	J NCAP	○	○		○*1		

○: Stipulated
*1: Revised in 2018
*2: Newly added in 2018
*3: Oblique collision test added in 2019
*4: Revised in 2019
*5: Small overlap test or oblique test additionally required from 2020 onwards
*6: Fair side collision test to be required from 2020 onwards

Material Application Trends in Automotive Bodies

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- Different steel and aluminum materials are used depending on the size of the vehicle body and parts.

Material Application Trends in Automotive Bodies

- For automotive weight reduction, materials used are determined by balancing between their cost and characteristics.
- For large vehicles in which weight reduction is more challenging, aluminum is commonly used. For small and medium-sized vehicles, ultra high-strength steel is widely used.
  → Both ultra high-strength steel and aluminum will be used in more diverse applications.

Part		Small and medium-sized vehicles	Large vehicles
Body	Frame		**Ultra high-strength steel** / **Extruded aluminum**
	Panels & covers	Steel sheets	**Aluminum sheets**
	Bumpers	**Ultra high-strength steel**	**Extruded aluminum**
Interior	Seat materials	**Ultra high-strength steel** / **Extruded aluminum**	
Chassis	Suspensions	**Forged aluminum**	
Power train	Engine	**Special steel**	

Ultra high-strength: Tensile strength of at least 780 Mpa
High strength: Tensile strength of at least 340 MPa

Parts where multi-material components will be increasingly used

Core Values of KOBELCO

1. We provide technologies, products and services that win the trust and confidence of our customers we serve and the society in which we live.
2. We value each employee and support his and her growth on an individual basis, while creating a cooperative and harmonious environment.
3. Through continuous and innovative changes, we create new values for the society of which we are a member.

Under these commitments, we endeavor to increase the corporate value of our entire Group.

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- Certain statements in this presentation contain forward-looking statements concerning forecasts, assertions, prospects, intentions and strategies. The decisions and assumptions leading to these statements were based on information currently available to Kobe Steel. Due to possible changes in decisions and assumptions, future business operation, and internal and external conditions, actual results may differ materially from the projected forward-looking statements. Kobe Steel is not obligated to revise the forward-looking contents of this presentation.

- Uncertain and variable factors include, but are not limited to:
  - Changes in economic outlook, demand and market conditions
  - Political situation and trade and other regulations
  - Changes in currency exchange rates
  - Availability and market conditions of raw materials
  - Products and services of competing companies, pricing policy, alliances, and business development including M&As
  - Strategy changes of alliance partners