

# Global Business Expansion of Wire Rods and Sheets

Takaaki MINAMIDA\*<sup>1</sup>, Kuniyasu ARAGA\*<sup>2</sup>

\*<sup>1</sup> Wire Rod & Bar Products Marketing & Technical Service Department, Iron & Steel Business

\*<sup>2</sup> Sheet Products Marketing & Technical Service Department, Iron & Steel Business

*Japanese automakers and parts manufacturers are expanding their production outside Japan, increasing the need for local procurement. To respond to this need, Kobe Steel's wire rod and sheet business has established production plants for steel and intermediate products outside Japan to enable the supplying of products with quality equivalent to that of products supplied in Japan. This paper describes Kobe Steel's approach to expanding its global business, focusing on special-steel wire rods and high-tensile sheet products.*

## Introduction

Although Japanese automakers have reached a peak of automotive production in Japan, they are steadily increasing production abroad.<sup>1)</sup> (Fig. 1) For a very long time, there have been many Japanese companies expanding outside Japan, and there is a growing need for local procurement of steel and semi-finished products from these companies. In particular, parts for Japanese automakers are required to have high functionality and quality with little variation, and those produced in other countries are required to be of the same quality as the ones made in Japan.

In response to this need, Kobe Steel began business in the U.S. and Thailand in 1990 ahead of other steel companies, following Japanese automakers and parts manufacturers that were expanding outside Japan. The company moved into China in the 2000s and into Mexico in the 2010s and expanded its production capacity at each site to establish a global supply system.

This paper reports on Kobe Steel's global

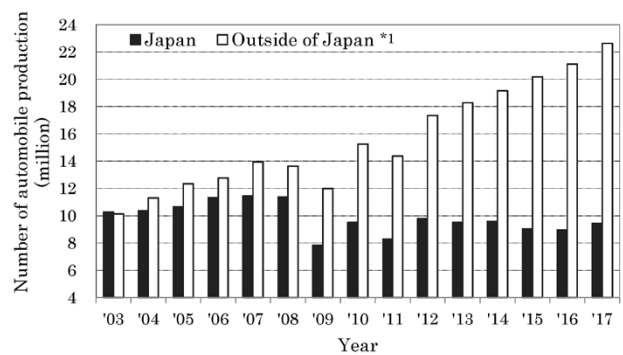


Fig. 1 Trend of automobile production by Japanese automakers (Kobe Steel made this figure on the basis of the database<sup>1)</sup> of Marklines Co., Ltd.)

business development in the field of wire rods and steel sheets.

## 1. Initiative for global supply system

### 1.1 Wire rods

Highly functional steel (special steel) with a small amount of alloying elements is mainly adapted to wire rods and steel bars used as production materials for automotive parts. Wire rods and steel bars are roughly classified according to shape: i.e., wire rods are wound in coils and steel bars are cut into bars of certain lengths. Kobe Steel carries a variety of special-steel wires outside Japan. Before being shaped into final parts, wire rods are subjected to so-called secondary processing to produce metallographic structures and diameters suitable for fabrication.

Kobe Steel has set up secondary processing sites outside Japan since the mid-1990s and has responded to the requests for local procurement. In addition, the company established a rolling plant for producing base material in Thailand in 2016 and began local production of special-steel wire rods.

### 1.2 Steel sheets

Steel sheets are mainly used for outer panels (doors, hoods, etc.) and body frames (pillars, members, etc.), among various other auto parts. Outer panels have stringent surface quality requirements, while body frames must be of extremely high strength to protect passengers. The latter, in particular, frequently adopt high-tensile-strength steel (hereinafter referred to as "Hi-Ten") sheets, and the use of Ultra-Hi-Ten (UHSS) with a tensile strength of 780 MPa or greater is also expanding (Fig. 2).<sup>2-5)</sup> In recent years, hot stamping steel sheets (PHS)<sup>6,7)</sup> are also being used frequently.

Kobe Steel has been focusing on the development of Hi-Ten for a long time<sup>8-10)</sup> and has gained a high reputation, being dubbed "Hi-ten Kobe." With its Kakogawa Works as the mother factory, Kobe Steel established joint ventures with local iron and steel manufacturers in the United States and China. In Europe, the company supplies products with the same quality as those supplied in Japan via local technical cooperation partners.

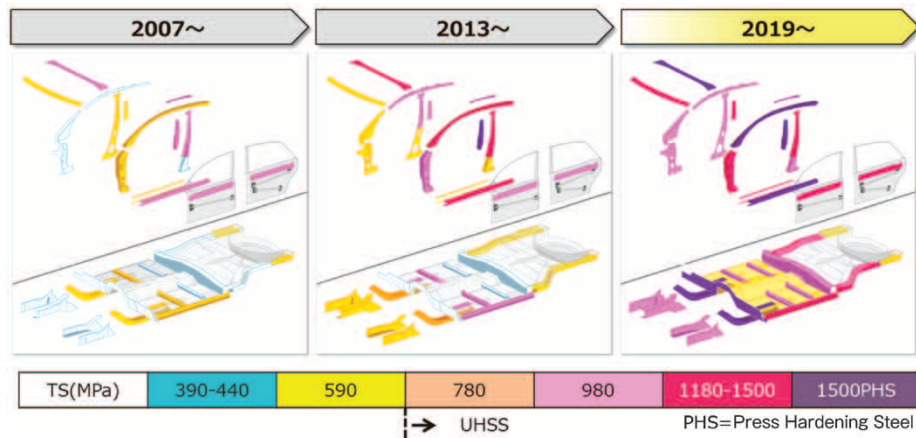


Fig. 2 Application of high tensile strength steel sheet to automotive parts

## 2. Development of manufacturing sites by regions

In the field of wire rods and sheets, Kobe Steel has sites for manufacturing steel and semi-finished products in major areas of the automotive industry, including North America, Latin America, Europe, Thailand and China (Fig. 3, Table 1, Table 2, and Table 3), thus responding to local procurement requests from customers. This section describes the market trend and development status of Kobe Steel in each region.

### 2.1 North America

In order to resolve the Automobile Trade Dispute between the U.S. and Japan, many Japanese automakers began local production in the United States in the 1980s. Accompanying the automakers, parts manufacturers also set up factories there, raising the demand for local procurement of materials.

One of the developments of Kobe Steel's manufacturing sites in the field of wire rod was the establishment of Grand Blanc Processing L.L.C. (hereinafter referred to as "GBP") near Detroit, Michigan, in the U.S. in the mid-1990s. Being a secondary processing site of wire rod, GBP produces cold heading wires (hereinafter referred to as "CH wires") and wires for the rolling bodies of bearings (hereinafter referred to as "bearing wires").

In the field of steel sheets, the PRO-TEC Coating Company was established in Leipsic, Ohio, USA, in 1990, with a 50:50 investment by the United States Steel Corporation, the largest iron and steel manufacturer in North America, and Kobe Steel (Fig. 4). In 1993, a hot-dip galvanizing line (hereinafter referred to as "CGL") began production, and in 1998, the second CGL was put into operation, achieving a production capacity of 1 million short tons per

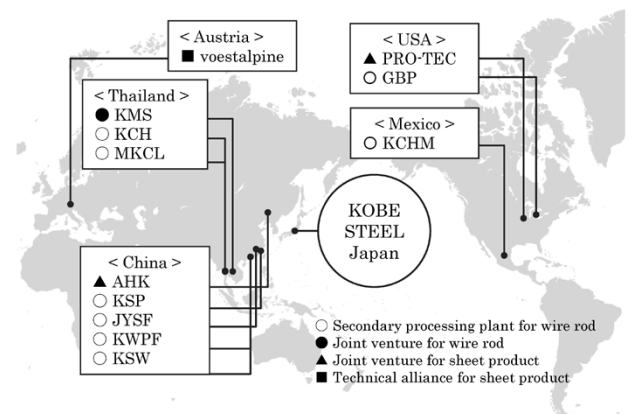


Fig. 3 Locations of steel mills and secondary processing plants for wire rod

Table 1 Steel production mills and their outlines

Company name	Kobelco Millcon Steel Co., Ltd.	Kobelco Angang Auto Steel Co., Ltd.	Pro-Tec Coating Company
Main Product	Wire rod	Cold-rolled High Strength Steel Sheet	Cold-rolled, Galvanized and Galvannealed High Strength Steel Sheet
Place	Rayong, Thailand	Liaoning, China	Leipsic, USA
Tie-up year	2016	2014	1990
Equity participation	50%	49%	50%
Main facilities	Wire rod rolling	CAL	CGL, CAL

year. Over 95% of the production is related to automobiles, and high-value-added products such as outer panels are mainly produced in addition to the Hi-Ten of 590 MPa or higher. In 2013, a continuous annealing line (hereinafter referred to as "CAL") was put into operation to supply cold-rolled Hi-Ten, enabling the supply of both plated and cold-rolled products. Ultra-Hi-Tens, up to 1,500 MPa class for cold-rolled, and up to 980 MPa class for plated, are being mass produced, and the company supplies high quality Ultra-Hi-Ten mainly to Japanese automakers and the Big Three automakers (Detroit 3) in the United States.

In order to meet automaker's demand for Hi-Tens with even higher strength and higher workability,

Table 2 Secondary processing companies for wire rods in USA, Mexico and Thailand

Company name	Grand Blanc Processing L.L.C. GBP	Kobelco CH Wire Mexicana, S.A DE. C.V. KCHM	Kobe CH Wire (Thailand) Co., Ltd. KCH	Mahajak Kyodo Co., Ltd. MKCL
Place	Michigan, USA	Guanajuato, Mexico	Bangkok, Thailand	Bangkok, Thailand
Production	CH & Bearing wire	CH wire	CH wire	Cold drawn bar
Establishment	1995	2014	1997	1996
Equity participation	20%	10%	30%	27.5%

Table 3 Secondary processing companies for wire rods in China

Company name	Kobelco Spring Wire (Foshan) Co., Ltd. KSW	Kobe Special Steel Wire Products (Pinghu) Co., Ltd. KSP	Jiangyin Sugita Fasten Spring Wire Co., Ltd. JYSF	Kobe Wire Products (Foshan) Co., Ltd. KWPF
Place	Foshan, Thailand	Pinghu, Thailand	Jiangyin, China	Jiangyin, China
Production	Valve spring wire	CH & Bearing wire	Suspension spring wire	Cold drawn bar & CH wire
Establishment	2012	2007	2005	2004
Equity participation	50%	47%	60%	60%

in September 2017 the company announced the construction of a third CGL with state-of-the-art heat treatment and cooling functions. Construction is in progress for its inauguration in July 2019. After completion, it will become a steel sheets factory with a total production capacity of 2 million short tons/year.

## 2.2 Latin America

The expansion of Japanese companies has become significant in Mexico, where the automotive industry has formed a major industrial cluster in recent years. In response, Kobe Steel established Kobelco CH Wire Mexicana, S.A. de C.V., a secondary processing site for wire rods, in Guanajuato, located in central Mexico, and has been producing CH wires since 2016.

## 2.3 Europe

Europe is still disseminating a lot of the latest and cutting-edge technologies, mainly from Germany, the country where automobiles originated. Japanese automakers have made a full-scale entry into Europe and have been there since the late 1980s.

In January 2002, Kobe Steel signed a "comprehensive alliance agreement for automotive steel sheets" with an Austrian iron and steel maker, voestalpine Stahl GmbH (hereinafter called "voest"). This agreement has established a global supply system of Hi-Ten materials for Japanese automakers



Fig. 4 PRO-TEC Coating Company



Fig. 5 Kobelco Millcon Steel

through mutual transfer and joint research on technologies and know-how related to Hi-Ten. In September 2008, Kobe Steel formed a comprehensive alliance with voestalpine Krams GmbH, the roll forming division of the voest group, on the roll forming technology of Ultra-Hi-Ten. It responds to a wide range of automakers' needs by offering not only materials but also production technologies for

auto parts.

## 2.4 Thailand

Thailand's automotive industry has continued to develop since the entry of Japanese automakers in the 1960s, building the foundation for the automotive industry in Southeast Asia.

In the field of wire rods, Kobe Steel established, in the late 1990s, Kobe CH Wire (Thailand) Co., Ltd., a production site of CH wires, and Mahajak Kyodo Co., Ltd., which produces various bright bars used in, among other things, hot coiled springs for suspension application, and thus contributed to the expansion of the automotive industry in this country.

In June 2015, Kobe Steel signed an MOU with Thailand's Millcon Steel Public Company Limited on the establishment of a joint venture for rolling and selling wire rods in Thailand. On the basis of this, the two companies worked together to establish Kobelco Millcon Steel Co., Ltd., the ninth wire rod rolling plant of Kobe Steel, in February 2016 (Fig. 5). The newly established company started rolling special-steel wire rods at the end of May 2017 and began supplying these wire rods to Japanese automobile related customers, which are currently the major supply destinations.

## 2.5 China

The automotive production in China was approximately 500,000 units in the 1990s, has expanded rapidly since 2000, and reached a volume close to 30 million units in 2016. From the 1980s to the mid-1990s, it was mainly U.S. and European automakers that entered the market, followed by Japanese automakers, and production has been fully in progress since 2000.

Kobe Steel has established four sites for the secondary processing of wire rods since 2004. Kobe Wire Products (Foshan) Co., Ltd., and Kobelco Spring Wire (Foshan) Co., Ltd., were established in Guangzhou, where there is a major base for Japanese automakers. In addition, Jiangyin Sugita Fasten Spring Wire Co., Ltd., and Kobe Special Steel Wire Products (Pinghu) Co., Ltd., were established near Shanghai, another location with many parts manufacturers. These sites have established a system in China's major automotive production areas for producing and supplying materials to be processed into safety-critical parts, such as CH wires, bearing wires, bright bars for suspension springs, and wires for engine valve springs.

In the field of steel sheets, Kobelco Angang

Auto Steel Co., Ltd., was established in August 2014 as a joint venture with Angang Steel Co., Ltd., a subsidiary of Anshan Iron and Steel Group Co., Ltd., for the purpose of manufacturing and selling cold-rolled Hi-Tens for automobiles. In April 2016, a CAL with an annual production capacity of 600,000 tonnes began operation, enabling the local production of high-value-additive cold-rolled Ultra-Hi-Ten products, and Ultra-Hi-Tens up to 980MPa class are being mass produced. It is planned to produce high-strength, high-workability Ultra-Hi-Ten and expand supply to the U.S., European, and Chinese automakers, as well as to Japanese automakers.

## Conclusions

In order to cope with the need for local procurement of high-grade steel materials associated with the development of Japanese automakers abroad, global development has been promoted sequentially in the fields of both wire rods and steel sheets. Through these efforts, global steel supply systems have been established, involving Japan, the United States, Mexico, Thailand, and China for special steel wire rods, and involving Japan, the United States, Europe, and China for Hi-Ten steel sheets.

It is believed that the need for Japanese quality will grow further in the future not only to expand automotive production, but also to resolve environmental and collision-safety issues. Kobe Steel will strive to maintain its position as the best partner for automakers by continuing to meet these high demands.

## References

- 1) MarkLines Inc. MarkLines Automotive Industry Portal. [https://www.marklines.com/ja/vehicle\\_production/search](https://www.marklines.com/ja/vehicle_production/search), (reference on 2018-10-30)
- 2) Y. Futamura et al. *R&D Kobe Steel Engineering Reports*. 2011, Vol.61, No.2, pp.41-44.
- 3) Y. Utsumi et al. *R&D Kobe Steel Engineering Reports*. 2017, Vol.66, No.2, pp.3-7.
- 4) M. Ikeda et al. *R&D Kobe Steel Engineering Reports*. 2017, Vol.66, No.2, pp.8-11.
- 5) T. Murata et al. *R&D Kobe Steel Engineering Reports*. 2017, Vol.66, No.2, pp.17-20.
- 6) S. Hamamoto et al. *R&D Kobe Steel Engineering Reports*. 2011, Vol.61, No.2, pp.45-48.
- 7) S. Hamamoto et al. *R&D Kobe Steel Engineering Reports*. 2017, Vol.66, No.2, pp.12-16.
- 8) T. Kashima et al. *R&D Kobe Steel Engineering Reports*. 1992, Vol.42, No.1, pp.16-19.
- 9) Y. Tanaka et al. *R&D Kobe Steel Engineering Reports*. 1992, Vol.42, No.1, pp.20-23.
- 10) J. Iwanani et al. *R&D Kobe Steel Engineering Reports*. 1997, Vol.47, No.2, pp.42-45.