

Overseas Deployment of Wire Rod & Bar Manufacturing and Wire Rod Secondary Processing

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The demand for special steel wire rods and bars has been increasing as Japanese auto makers continually expand their overseas operations, increasing the local procurement of automotive parts. Kobe Steel now has a technical tie-up with two special steel mills in Europe and North America so that high quality wire rod and bar can be supplied to auto makers and parts makers. Kobe Steel has also constructed a system to provide for the secondary processing of wire rod products for Japanese parts makers, mainly by establishing secondary processing companies in Asia and North America.

Introduction

The automobile trade dispute between Japan and US caused Japanese automakers to accelerate their local auto production in North America, a major consumption area. This has led Japanese automakers to expand their manufacturing bases in other areas, such as Europe and Asia, where the demand for automobiles has been increasing. Some regions may have significance as operational bases for exporting because of low manufacturing costs. In 2009, the overseas production of Japanese automakers exceeded their domestic production¹⁾ (Fig. 1). Many Japanese parts manufacturers have moved into North America, Southeast Asia and China and are expanding their on-site production against the backdrop of the rising yen.

Without a doubt, Japanese auto parts are supported by customized steel of consistent quality, as well as secondary processing products. For the overseas manufacturing bases, it has thus become

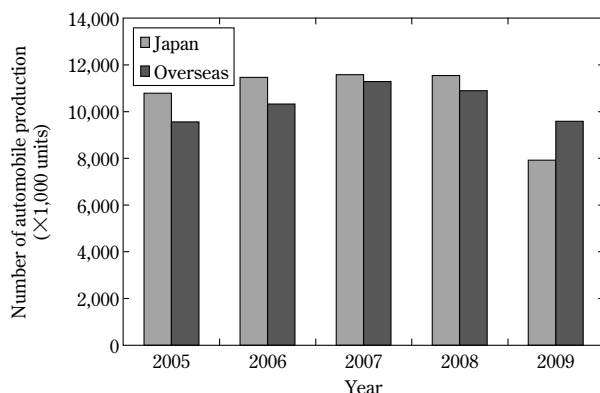


Fig. 1 Domestic and overseas automobile production by Japanese auto makers

increasingly important to ensure a stable supply of materials of the same quality as those delivered in Japan, using a similar delivery system.

This paper reports on Kobe Steel's overseas deployment of sites for fabricating wire rods and bars made of special steel. Also described is the deployment of overseas sites for secondary processing products.

1. Kobe Steel's approach toward establishing overseas production sites

Special steel wire rods and bars have a wide variety of applications. In general, they are used not only for parts such as bearings, springs and gears, which are subject to continuous dynamic load, but also for applications such as structural steel, which are used under static load but are exposed to severe cold work during the manufacturing process. In other words, the wire rods and bars must have high quality surfaces and interiors in response to the performance requirements for end products and manufacturing processes.

As described, many Japanese auto parts employ wire rods and bars made of customized special steels. Thus, the required qualities vary item by item. To meet these quality requirements, detailed and flexible management is needed; and to that end, the overseas production sites must have manufacturing and quality control, production planning and technical services comparable to what has been implemented in Japan. Kobe Steel proceeds with this implementation while keeping the following aspects in mind.

1.1 Business form

Even if made of special steel, steel bars are hot-forged as-is in many cases. In contrast, wire rods are cold-forged plastically into more near-net shapes, requiring a secondary process that gives the wire rods homogeneous structures and sizes suitable for cold forging. This makes the role of secondary processing increasingly important.

Kobe Steel's overseas deployment depends on the type of product. The steel bars are made by local manufacturers of special steel with technical assistance agreements. On the other hand, secondary processing sites are established for wire rods. The

wire rods are either imported from Kobe Steel in Japan, or procured from special steel manufacturers who are located near the secondary processing sites and are under technical assistance agreements.

1.2 Manufacturing & quality control and production management

The impetus behind the need for item-by-item quality control is the downsizing and weight reduction of Japanese automobile parts, which require materials that have high strength and can withstand heavy working. In particular, parts that are subject to heavy cold working call for materials without defects. Thus, the local industry demands steel with no surface defects and no non-metallic inclusions near the surface, which are harmful to the quality. Also in demand is secondary processing that optimizes the microstructure for cold working. To meet these requirements, it is necessary to fully understand what is going on during the production processes and to implement detailed quality control; however, these are technologies supported by accumulated data and experience and are impossible to learn in a short time.

Thus, Kobe Steel focuses on selecting local special steel manufacturers with high technological competence, especially in quality control. Kobe Steel also takes the approach of stationing technical teams at special steel manufacturers equipped with first-class facilities.

Furthermore, Kobe Steel and secondary processing

companies in close relationships with Kobe Steel, have jointly established firms to provide bases for secondary processing. These bases are provided with state-of-the-art facilities, as well as with engineers and managers who are stationed locally to transfer the technologies for production/quality control and to implement management know-how.

1.3 Technical service

It is extremely important to listen to customers' voices to understand how our products are being used and to determine if the customers are satisfied, or if they have any problems. Visual confirmation of the usability of the products is also important.

Determining how our products should be made through such continuous dialogue with customers is the most effective way of strengthening product competitiveness.

Kobe Steel deploys capable human resources to the bases and resident offices in charge of the various regions, where they collect relevant information so as to ensure smooth communication with customers, thus adding value to the products.

2. Deployment of manufacturing bases by regions

Kobe Steel currently has manufacturing bases at important locations in North America, Europe and Asia (Fig. 2) to respond to customers' needs.

The following describes the market trend and status of deployment in each region.

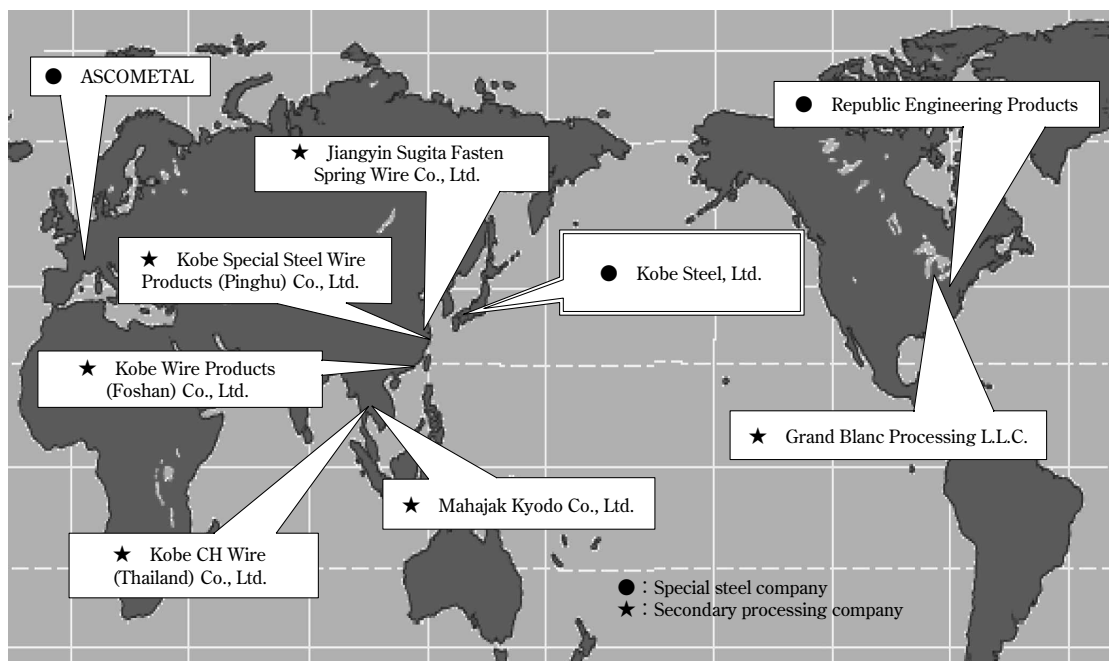


Fig. 2 Location of overseas special steel mill which have a technical tie-up with Kobe Steel and overseas secondary processing companies

2.1 North America

The automobile industry in North America was hit hard by the Lehman Shock in 2008. Two of the Big Three companies filed for protection under federal bankruptcy laws. In this environment, Japanese automakers have increased their market share, thanks to their cars featuring high fuel economy and requiring minimum maintenance¹⁾ (Fig. 3).

Kobe Steel provides technical assistance to

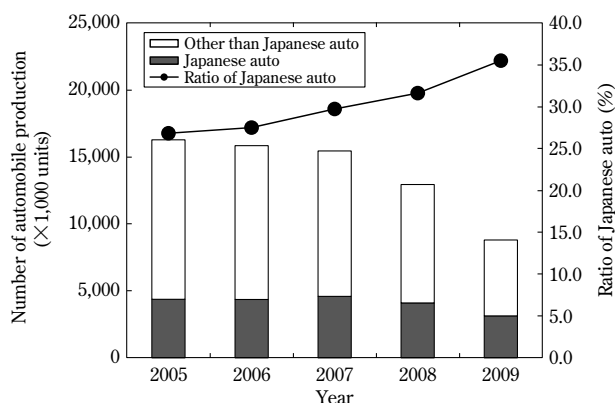


Fig. 3 Automobile production in North America

Republic Engineered Products (REP), Ohio, USA, for its production of special steel wire rods and bars and has licensed it to produce wire rods for suspension springs developed by Kobe Steel. Kobe Steel also has a base at Grand Blanc Processing L.L.C. (GPB), Michigan, USA, to produce steel wire for cold heading and for bearing parts such as balls, rollers and needles. Currently, both the steel products and secondary processing products are supplied not only to Japanese customers, but also to local consumers. The company outlines of REP and GPB are included in Table 1 and 2, respectively.

2.2 Europe

Many steel manufacturers in Europe exceed or even equal Japanese manufacturers in technological competence and management know-how. They are capable of independently producing special steel wire rods and bars with high quality, once they learn the Japanese method of quality control.

Kobe Steel and ASCOMETAL agreed on technical cooperation including a license exchange for producing steels developed by their respective

Table 1 Overseas technical tie-up mills and their outline

Company name	Republic Engineered Products			ASCOMETAL		
Head office	Lorain, OH, USA			Paris, France		
Tie-up year	1999			2002		
Main factory	Lorain	Canton	Lackawanna	Hagondange	Fos sur mer	Le Cheylas
Main facilities	Blast furnace Basic oxygen furnace LF Vacuum degassing Bloom CC Billet CC Billet inspection Bar mill Wire rod mill	Electric furnace LF Vacuum degassing Bloom CC Billet CC	Bar mill Bar inspection	Electric furnace LF Vacuum degassing Bloom CC Bar mill Bar inspection	Electric furnace LF Vacuum degassing Ingot casting Billet inspection Wire rod mill	Electric furnace LF Billet CC Bar mill Bar inspection

Table 2 Overseas wire rod secondary processing companies and their outline

Company Name	Grand Blanc Processing L.L.C. GPB	Mahajak Kyodo Co., Ltd. MKCL	Kobe CH Wire (Thailand) Co., Ltd. KCH	Kobe Wire Products (Foshan) Co., Ltd. KWPF	Jiangyin Sugita Fasten Spring Wire Co., Ltd. JYSF	Kobe Special Steel Wire Products (Pinghu) Co., Ltd. KSP
Place	Michigan, USA	Bangkok, Thailand	Bangkok, Thailand	Guangdong, People's Republic of China	Jiangyin, People's Republic of China	Pinghu, People's Republic of China
Nature of business	Secondary processing of CH & Bearing wire	Secondary processing and sales of cold finishing steel bar	Secondary processing and sales of CH wire	Secondary processing and sales of cold finishing steel bar and CH wire	Secondary processing and sales of oil tempered wire	Secondary processing and sales of CH wire
Establishment	1995 (invested in March 2003)	1996 (invested in February 2002)	1997	2004	2005	2007
Capital	US\$ 16.8 million	THB 143 million	THB 103 million	JP¥ 725 million	JP¥ 760 million	JP¥ 1,200 million
Equity participation	20%	27.5%	30%	60%	60%	50%
Nominal capacity	6,000 t/month	1,800 t/month	3,000 t/month	750 t/month for cold finishing bar 650 t/month for CH wire	600 t/month	2,100 t/month
Main facility	Pickling & coating: 1 unit Continuous furnace: 2 units STC furnace: 1 unit Drawing machine: 5 units Eddy current tester: 1 unit	Combined drawing machine: Type I 1 unit Combined drawing machine: Type II 2 units Eddy current tester: 2 units Straightener: 1 unit Cutting machine: 3 units	Pickling & coating: 2 units Shot-blasting: 1 unit Batch type furnace: 5 units STC furnaces: 4 units Drawing machine: 9 units	Pickling & coating: 1 unit Combined drawing machine with eddy current tester: 2 units Drawing machine: 3 units	Pickling & coating: 1 unit Drawing machine with eddy current tester: 1 unit oil tempered equipment: 1 unit	Pickling & coating: 1 unit STC furnaces: 2 units Drawing machine: 3 units

companies and have implemented joint development activities to produce special steel such as that used in suspension springs. Kobe Steel also provides technical guidance to establish the management know-how required for the supply bases providing special steel to Japanese automakers in Europe. The profile of ASCOMETAL is included in Table 1.

2.3 ASEAN

The annual production of automobiles in Thailand exceeded one million in 2005¹⁾ (Fig. 4). The country, now dubbed the "Detroit of Asia", has become a manufacturing base with a concentration of automakers and parts manufacturers. Worthy of special mention is that Japanese cars occupy more than 90% of the automobiles produced there and the country is positioned as a huge base of operations for exporting automobiles and auto parts to other countries in Southeast Asia, the Middle East and the Southern Hemisphere.

The eco-car project proposed by the Thai government in 2007 was temporarily put on ice in the aftermath of the Lehman Shock; however, with economic recovery, Japanese automakers, in particular, began to announce plans to exploit the program and produce compact cars. Kobe Steel's contribution to the growth of the auto industry in Thailand includes the establishment, in the late 1990s, of Kobe CH Wire (Thailand) Co., Ltd., a production base for wire rods for cold heading, and Mahajak Kyodo Co., Ltd., which produces bright steel bars, a major material for hot-coiled suspension springs. The outlines of these two companies are included in Table 2.

2.4 China

China is one of the few countries to have experienced ever-increasing economic growth, despite a brief stagnation after the Lehman Shock. The country, which has been called "the world's factory,"

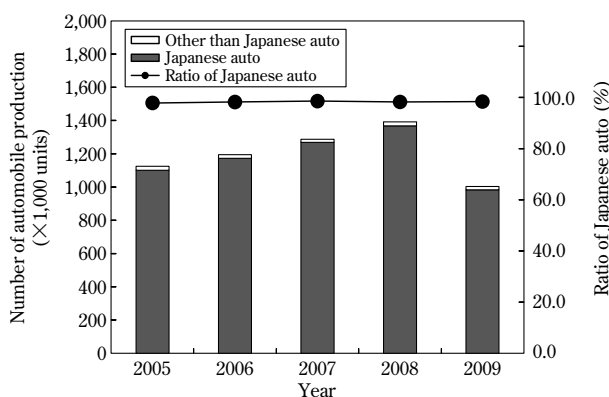


Fig. 4 Automobile production in Thailand

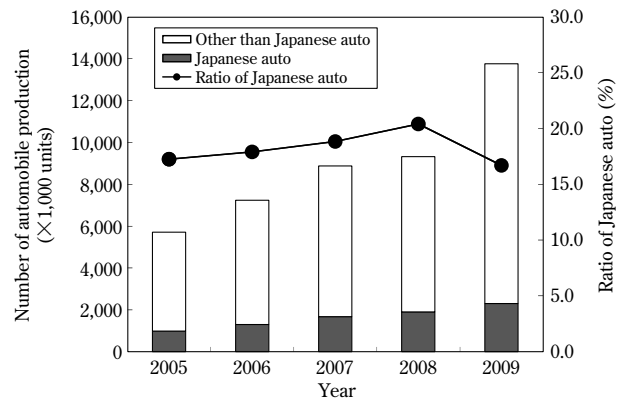


Fig. 5 Automobile production in China

has not only remained, but continued to grow as a big consumer. Now it is fair to say that no industry can get along without China, which has overtaken Japan to become an economic super power that has the second largest GDP in the world.

China overtook the US as the world's largest auto-making country in 2009¹⁾ (Fig. 5). Major automakers of the world have established manufacturing bases there, with some manufacturers producing more in China than they do in their own countries. New local manufacturers are growing rapidly. Japanese and European component manufacturers are moving in one after another, increasing the demand for wire rods and bars made of special steel.

With this background, Kobe Steel has established three bases for wire rod fabrication since 2004 and has built a structure for producing and supplying wires for cold heading, bright steel bars for hot-coiled suspension springs and oil-tempered wires for cold-coiled suspension springs. Kobe Wire Products (Foshan) Co., Ltd. was established in Guangzhou, a major production center for Japanese automakers. Jiangyin Sugita Fasten Spring Wire Co., Ltd. and Kobe Special Steel Wire Products (Pinghu) Co., Ltd. were established in the suburbs of Shanghai, where there is a concentration of many component manufacturers. Kobe Steel thus has built a system for the widespread supplying of secondary processing products of wire rods to major auto production sites in China. The outlines of these three companies are included in Table 2.

Conclusions

In response to the demand for customized steel with consistent quality and secondary processing products from Japanese automakers overseas, Kobe Steel has established manufacturing bases in North America, Europe, Thailand and China. These secondary processing bases for wire rods will continue to be used, despite the trend toward

reexamining standard steel with a view to cost reduction. Kobe Steel will expand its capacity to meet demands in a timely manner and strive to build a system to satisfy customers by working with its partners to improve the management skills of local staffs in production and quality control.

References

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