# 5. Precision Machine Sector

## 5.1. Bearings

### 5.1.1 Supply and demand trend

#### (1) Outline

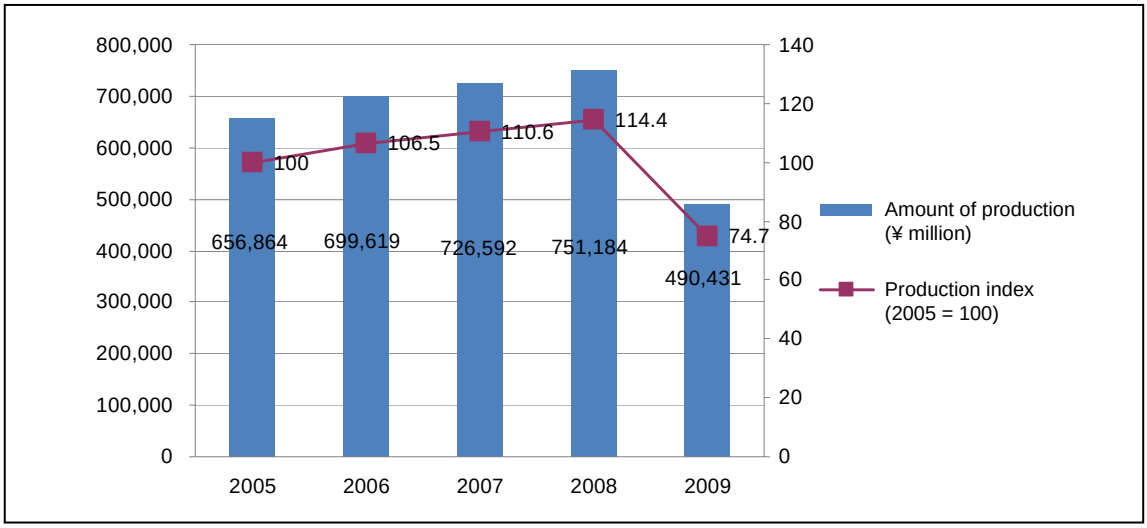
The production of all types of finished bearing products in 2009 was about ¥490.4 billion (down 34.7% year on year), which was a sharp decrease contrary to the steady trend until 2008. The sales of all finished bearing products showed a big fall, too, amounting to about ¥504.4 billion (down 33.8%). The export of finished bearing products and bearing parts declined considerably to about ¥273.4 billion (down 33.8%). The import of finished bearing products and bearing parts suffered a bigger drop than in the previous year with about ¥42.1 billion (down 42.2%).

As noted above, both the output and sales of bearings in 2009 experienced a marked decrease and so did their export. The import had already turned into a negative growth in 2008, but the size of the drop in 2009 was greater than in 2008. It looks as if the uncertainty about demand for bearings in Japan pointed out in the 2009 edition of this report were realized. It is supposed that the main cause of these poor results was the impact of a huge drop and stagnancy in domestic production due to the Lehman shock rather than a sudden change in domestic demand. The scale of decline in import was greater than that in production and export, indicating that uncertain factors behind demand, including the shift of automobile production to overseas, have not been removed yet.

#### (2) Production

The production of bearings (finished bearing products) in 2009 amounted to ¥490.431 billion, and the production index when the figure for 2005 is supposed to be 100 was 74.7 points, a sharp decrease, suddenly changing from the upward trend until 2008 (See Fig. 5.1.1).

**Fig. 5.1.1 Production of bearings (finished bearing products)**

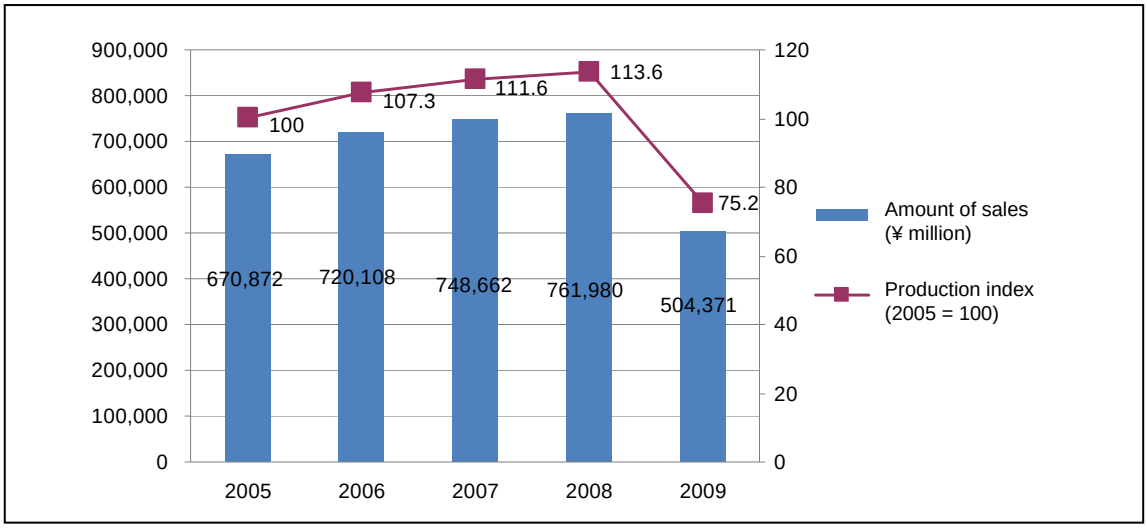



Source: Based on the Ministry of Economy, Trade and Industry, “Annual Report of Machinery Statistics.”

### (3) Sales

The sales of bearings (finished bearing products) totaled to ¥504.371 billion, and the sales index when the figure for 2005 is supposed to be 100 was 75.2 points. Just as in the case of production, sales had continued to grow in 2005 and after but suffered a rapid fall in 2009 (See Fig. 5.1.2).

**Fig. 5.1.2 Sales of bearings (finished bearing products)**



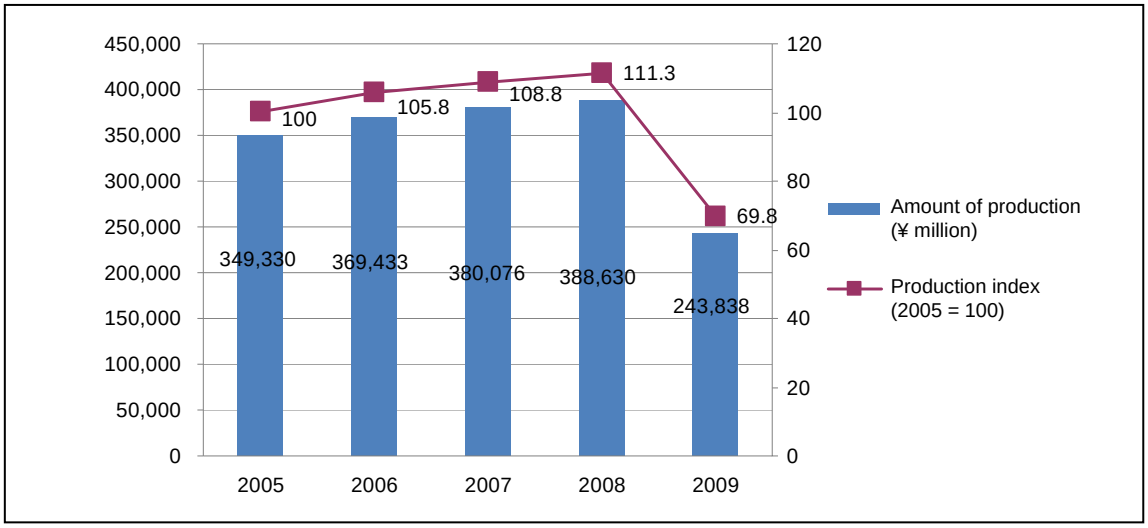

Source: Based on the Ministry of Economy, Trade and Industry, "Annual Report of Machinery Statistics."

### (4) Production by the type of product

The production of ball bearings (excluding bearing units) in 2009 showed a steep decline of 37.3% year on year to ¥243.838 billion, and the increasing trend that had started in 2005 had a turning point. The production index when the figure for 2005 is supposed to be 100 was 69.8 points, which means that the output in 2009 was only 70% of that in 2005 (See Fig. 5.1.3). Similarly, the output of roller bearings suffered a big fall of 31.9% year on year to ¥232.970 billion, although the size of decrease was not so great as that for ball bearings. The production index stood at 81.3 points, suggesting that the upward trend seen at least for six years up to 2008 turned into a sharp drop (Fig. 5.1.4).

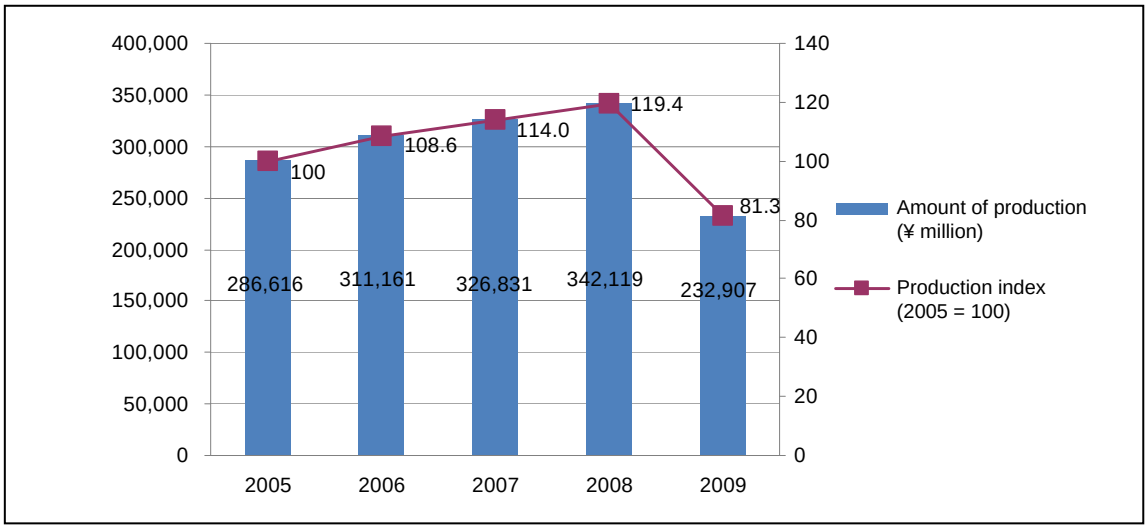
As outlined above, the production of ball and roller bearings both shifted from a growing trend to a big decrease tendency. In both cases, it can be supposed that restricted capital investment and stagnant demand from the automobile industry and other users, the factors already mentioned in the 2009 edition of this report, seriously affected demand for bearings, causing it to drop greatly. This situation indicates that the recyclable energy sector, such as wind power generation, and the aircraft sector represented by B787 and MRJ, which had run in the favor of bearing industries, remained to be factors for greater demand by the export of bearings but were unable to prevent falling demand due to the business cycle of the global recession triggered by the Lehman shock.

**Fig. 5.1.3 Production of ball bearings**




Source: Based on the Ministry of Economy, Trade and Industry, "Annual Report of Machinery Statistics."

**Fig. 5.1.4 Production of roller bearings**

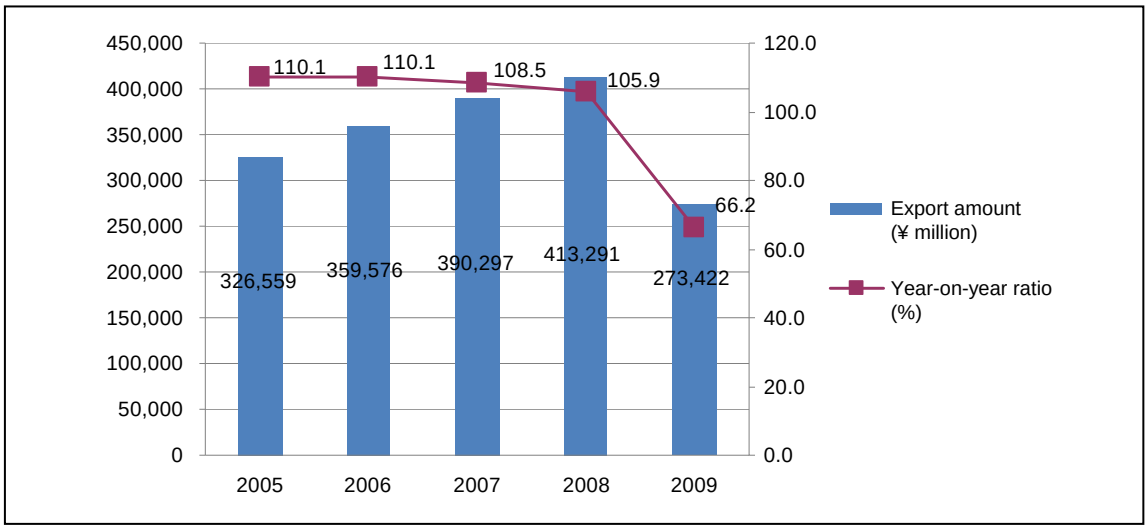



Source: Based on the Ministry of Economy, Trade and Industry, "Annual Report of Machinery Statistics."

### (5) Export

The export of bearings (finished bearing products and bearing parts) in 2009 amounted to about ¥273.422 billion (down 33.8% year on year). The export had gradually reduced the scale of growth in 2006 and after and suddenly showed a big fall in 2009. While this outcome was largely affected by the global-scale recession, there are some factors likely to help recovery, such as growing demand for automobile parts mainly in BRICs and demand related to the development of high-speed railway infrastructure.

**Fig. 5.1.5 Export of bearings (finished bearing products and bearing parts)**

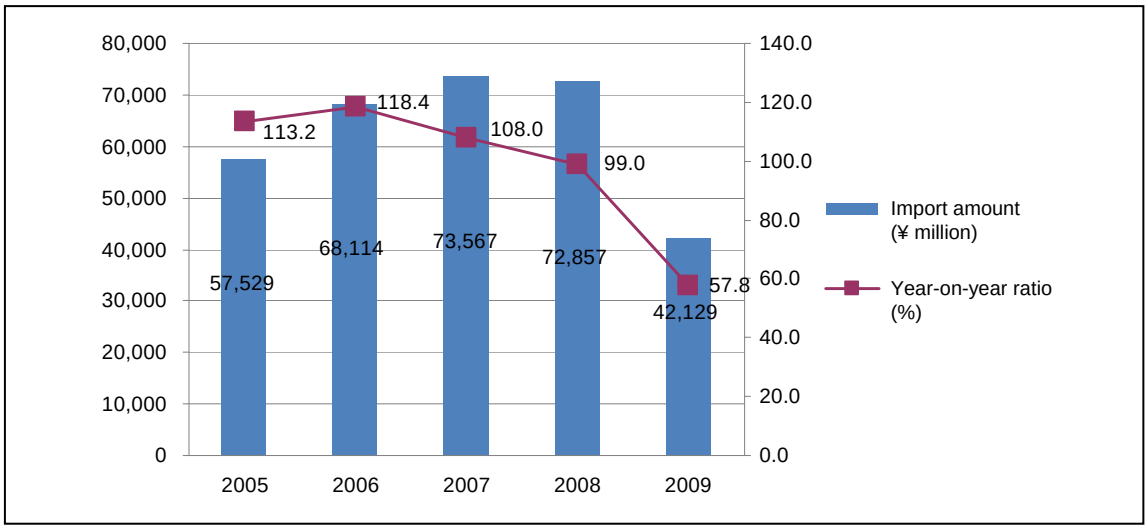



Source: Based on the Ministry of Finance, "Trade Statistics of Japan" and data of the Japan Bearing Industrial Association.

### (6) Import

The import of bearings (finished bearing products and bearing parts) in 2009 declined as in 2008 to about ¥42.129 billion (year on year). The scale of drop was far greater than that in 2008, and it is supposed that this performance was affected by the fact that the aftermath of the Lehman shock was actualized and orders from Japanese automakers and related machine industries, the main users, decreased greatly.

**Fig. 5.1.6 Import of bearings (finished bearing products and bearing parts)**




Source: Based on the Ministry of Finance, "Trade Statistics of Japan" and data of the Japan Bearing Industrial Association.

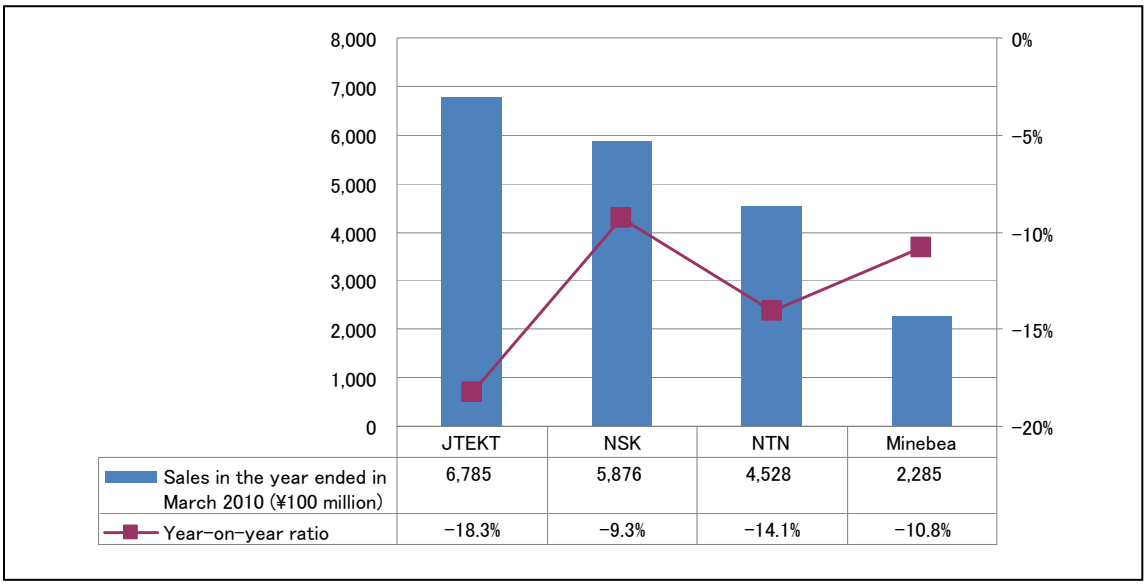
### 5.1.2 Results of operations and the trend of the bearing industry

#### (1) Trend of management

According to the data of the four major bearing manufacturers, the sales for the year ended March 2010 and year-on-year ratios are as shown in Fig. 5.1.7. As a result of the global recession caused by the Lehman shock in the fall of 2008, the production of automobile parts, etc. was curtailed and capital investment was controlled at home and abroad, and foreign exchange rates continued to be in favor of yen. In such a situation, the three of the big four, excluding NSK Ltd., experienced a drop of over 10% in sales, and NSK's sales decreased by 9.3%. These figures mean that the business environment in fiscal 2009 was more unfavorable than ever, but considering that the size of the fall in sales for the bearing industry was no so large as that for all industries and that a similar decline in sales occurred at the end of March 2009, too, it can also be considered that the bearing producers managed to prevent any too lower sales owing to the reviving demand at the end of the fiscal year and their own management efforts.

In the circumstance stated above, JTEKT Corp. defined the energy segment, such as wind power generation, iron and steel and railway vehicles as the main areas for their activities for increasing sales. NSK worked to cut down procurement from the outside and review the manufacturing system in addition to cost reduction efforts and strove to increase the sales of bearing products. NTN Corp. suffered lower sales as a whole because of the effects of foreign exchange rates and less demand in Japan for bearings for automobiles in spite of greater sales of bearings for railway vehicles and aircraft. NTN says that it will reinforce sales promotion activities for industrial machines and efforts to reduce costs. Minebea Co. has focused on activities for higher profitability, that is, cost reduction, the development of high value-added products and new technology and sales promotion.

**Fig. 5.1.7 Import of bearings (finished bearing products and bearing parts)**




| | JTEKT | NSK | NTN | Minebea |
|---|---|---|---|---|
| Sales in the year ended in March 2010 (¥100 million) | 6,785 | 5,876 | 4,528 | 2,285 |
| Year-on-year ratio | −18.3% | −9.3% | −14.1% | −10.8% |

Note: The figures for JTEKT are those of the company's machine tool and parts segment.
Source: Based on the quick report on the settlement of accounts of each company.

#### (2) Trend of the bearing industry

In July 2009, JTEKT agreed with the Timken Co. in the U.S. to acquire Timken's needle bearing division in an effort to become the top company in automobile bearing business in the world, and expects synergy effects from the integration of supply chains. NSK has accelerated the global reorganization of ball screw production and plans to integrate NSK Precision (Maebashi, Gunma Prefecture) into NSK Kyushu and start the local production of ball screws at NSK Shenyang, China, in 2011. In October 2009, NTN founded and started the operation of NTN Houdatsushimizu Factory in Hakui-gun, Ishikawa Prefecture in anticipation of a future rise in demand for super-large bearings for general industrial machines, including wind power generation devices. This was NTN's prior investment aiming at dealing with growing demand in the future by transferring manufacturing functions from the existing Kuwana Factory to the new one. Minebea says that as a result of a recovering world economy, the output of ball bearings reached an all-time high level in March 2010. Thus the company decided to temporarily postpone the predetermined plan to expand its ball bearing business in the low-priced product market, that is, the Chinese market.

### 5.1.3 Future prospects and problems

There are some promising markets for the bearing industry, and the aircraft industry is one of them. In the aircraft industry, the mass production of new models was started in 2008 and the manufacture of domestic passenger planes (MRJ) was begun in 2009, too. Bearings are used for airplanes, and JTEKT and Minebea have already entered the aircraft industry market positively. Because aircraft parts require high-grade quality control, it will be very difficult to manufacture them in low-cost countries. Therefore, Japan will have comparative advantage in the production of these parts. The bearings that need a similar level of quality control to one for aircraft parts are those for high-speed railway vehicles. High-speed railway vehicles require safety while running at a high speed, and thus the manufacture of these bearings in Japan will have international competitiveness, too. The production of railway vehicles is likely to increase considerably in the years ahead considering a rush of high-speed railway construction projects in Asia and the starting of high-speed railways in Europe. What strategies should be mapped out and pursued in this situation will be an important subject for Japanese bearing manufacturers.

## 5.2. Dies

### 5.2.1 Supply and demand trend

#### (1) Outline

The domestic production of dies in 2009 amounted to ¥315.92 billion or a decrease of 29.5% from 2008. The output of all types of dies, including dies for press and dies for plastics, dropped. In addition, although no detailed data is shown here, it should be pointed out that the tendency of declining numbers of dies manufactured and rising average weight and average unit price of dies

generally continued even in the situation of recession.

The export of dies in 2009 was ¥232.96 billion or a decrease of 32.1% from 2008. Similarly, the trade balance also fell by 31.2% year on year to ¥176.29 billion. The import of dies totaled to ¥56.67 billion or a big fall of 34.9% from 2008.

### (2) Production

Let's look at the trend of production of the dies industry in Japan. Figure 5.2.1 shows the trend of output of dies in Japan (at the manufacturers having 20 or more employees) based on the Ministry of Economy, Trade and Industry, "Annual Report of Machinery Statistics." According to the figure, the production of dies in 2009 dropped by over ¥130.0 billion from the previous year to ¥315.92 billion (down 29.5% year on year). This was a decline for three consecutive years and tells the fact that the recession in the Japanese and overseas markets and the deterioration of business sentiment of automakers and other users hard hit the dies industry in Japan, an equipment-based industry.

Then let's look at the trend of production by the type of product. In 2009, all types of dies experienced a steep drop in output: dies for presses (down 21.0% year on year), dies for plastics (down 30.3%), die-casting dies (down 47.8%), forging dies (down 39.6%), dies for rubber (down 40.9%), casting dies (down 42.4%), powder-metallurgy dies (down 39.9%) and dies for glass (down 9.0%).

In 2009, the amount of production of dies for presses and dies for plastics combined accounted for more than 80% of the total dies output: 43.7% and 37.5, respectively. Thus, this section discusses the situation of production of the dies industry in Japan focusing on dies for presses and dies for plastics.

**Fig. 5.2.1 Trend of production of dies (at manufacturers having 20 or more employees)**

(Calendar years, Unit: ¥100 million)

| | 2005 | 2006 | 2007 | 2008 | 2009 | Growth rate in 2008-2009 | Ratio (2009) |
|---|---|---|---|---|---|---|---|
| Dies, total | 4,392.7 | 4,879.6 | 4,804.2 | 4,483.0 | 3,159.2 | -29.5% | 100% |
| Dies for presses | 1,748.4 | 1,909.5 | 1,945.0 | 1,747.0 | 1,379.9 | -21.0% | 43.7% |
| Dies for plastics | 1,680.9 | 1,821.0 | 1,790.9 | 1,700.8 | 1,185.5 | -30.3% | 37.5% |
| Die-casting dies | 384.7 | 527.2 | 483.4 | 474.3 | 247.6 | -47.8% | 7.8% |
| Forging dies | 176.7 | 211.1 | 205.5 | 203.8 | 123.2 | -39.6% | 3.9% |
| Dies for rubber | 127.3 | 125.8 | 119.9 | 110.8 | 65.5 | -40.9% | 2.1% |
| Casting dies | 135.8 | 151.0 | 136.3 | 129.4 | 74.5 | -42.4% | 2.4% |
| Powder-metallurgy dies | 78.7 | 79.4 | 77.9 | 75.8 | 45.6 | -39.9% | 1.4% |
| Dies for glass | 60.4 | 54.6 | 45.3 | 41.1 | 37.4 | -9.0% | 1.2% |

Source: Based on the Ministry of Economy, Trade and Industry, "Annual Report of Machinery Statistics."

### (3) Export and import

Now let's look at the trend of export and import of the dies industry in Japan. In 2009, the total amount of export of dies declined by about ¥110.0 billion to ¥232.96 billion (down 32.1% year on

year). As shown in Figure 5.2.2, the amount of dies export dropped for three years running. The export of dies in 2009 was only about 60% of that in 2008. On the other hand, the amount of dies import stopped an upward trend and began to decline recently. As a result, the import of dies in 2009 amounted to ¥56.67 billion, which was a fall of about ¥30.0 billion or 34.9% from 2008. The export of dies for presses and dies for plastics also decreased markedly in 2009 year on year: the export of dies for presses amounted to ¥92.77 billion (down 29.6%) and that of dies for plastics, ¥87.27 billion (down 34.0%).

Figure 5.2.2 shows the international competitiveness of the whole dies industry in Japan using the indicator known as "coefficient of specialization." This indicator tells us that the international competitive power of Japanese dies manufacturers has lowered since 2004.

**Fig. 5.2.2 Trend of export and import of dies[1]**

(Calendar years, Unit: ¥100 million)

| | 2005 | 2006 | 2007 | 2008 | 2009 | Growth rate in 2008-2009 |
|---|---|---|---|---|---|---|
| Dies, total | | | | | | |
| Export | 3,488.5 | 3,816.0 | 3,569.5 | 3,431.3 | 2,329.6 | -32.1% |
| Import | 780.6 | 861.5 | 911.3 | 870.5 | 566.7 | -34.9% |
| Trade balance | 2,708.0 | 2,954.5 | 2,658.2 | 2,560.8 | 1,762.9 | -31.2% |
| Coefficient of specialization | 0.634 | 0.632 | 0.593 | 0.595 | 0.609 | - |
| Dies for presses | | | | | | |
| Export | 1,309.9 | 1,484.4 | 1,341.1 | 1,317.8 | 927.7 | -29.6% |
| Dies for plastics | | | | | | |
| Export | 1,354.1 | 1,451.4 | 1,363.8 | 1322.8 | 872.7 | -34.0% |

Source: Ministry of Finance, "Trade Statistics of Japan."

## 5.2.2 Results of operations and the trend of the dies industry

### (1) Trend of management

The dies industry is characterized by a very high percentage of small manufacturers. This makes it difficult to study the trend of management of individual manufacturers. But some Japanese dies businesses have been listed on the stock exchange and present their financial statements to the outside. Figure 5.2.3 utilizes these materials and summarizes the dies-related sales and operating profit in 2008 and 2009 of the main dies manufacturers in Japan involved in the production of dies for plastics, dies for presses, forging dies and dies parts.

[1] Note that because the source adopts the classification "dies for molding rubber or plastics," the figures for the export and import of dies for plastics include those for the export and import of dies for rubber, too. Coefficient of specialization: One of the indicators of international competitiveness; calculated by the equation: (export amount - import amount)/ (export amount + import amount). It is considered that the closer the coefficient is to 1, the higher the international competitiveness (export competitiveness) is, and the closer the coefficient is to 0, the lower the international competitive power is.

**Fig. 5.2.3 Consolidated settlement of accounts of main dies businesses (the most recent announcement)**

**(Consolidated; ¥10,000; rounded off to the ¥10,000)**

| | FY2008 | | FY2009 | | Growth rate in 2008-2009 | |
|---|---|---|---|---|---|---|
| | Sales | Operating profit | Sales | Operating profit | Sales | Operating profit |
| Dies for plastics | | | | | | |
| ARRK Corp. - | 29,742,200 | 438,700 | 12,218,600 | -500,400 | -58.9% | Fell into the red |
| Sekisui Machinery Co. Dies division | 720,208 | 43,272 | 420,060 | -28,775 | -41.7% | Fell into the red |
| Dies for presses | | | | | | |
| Fuji Technica Inc. Dies for presses for automobiles division | 1,076,711 | -170,465 | 1,244,231 | 38,221 | 15.6% | Went into the black |
| Kuroda Precision Industries System equipment division | 507,230 | 18,703 | 289,349 | -2,883 | -43.0% | Fell into the red |
| Dies for presses | 284,200 | - | 209,800 | - | -26.2% | - |
| Hoden Seimitsu Kako Kenkyusho Die division | 342,927 | 55,340 | 285,203 | 39,050 | -16.8% | -90.5% |
| Marujun Co. Dies business division | 511,800 | 76,100 | 148,400 | 18,600 | -71.0% | -75.6% |
| Mitsui Hi-Tech Dies for presses division | 699,400 | 96,200 | 502,500 | 20,900 | -28.2% | -78.3% |
| Forging dies | | | | | | |
| Nichidai Corp. Net-Shape division | 623,228 | 11,737 | 410,300 | -32,700 | -34.2% | Fell into the red |
| Dies parts | | | | | | |
| Futaba Corp. Manufacturing equipment division | 3,407,900 | -114,900 | 2,596,400 | -218,300 | -23.8% | In the red |

Note: 1. The description following the company name is the name of the segment to which the product's business belongs.
2. Sales figures include those of sales between different segments.
3. Figures for ARRK Corporation are those of the company's total sales and operating profit (Sekisui Machinery is ARRK's subsidiary).
4. Kuroda Precision Industries announces figures of sales of dies for presses in the data for the system equipment division.

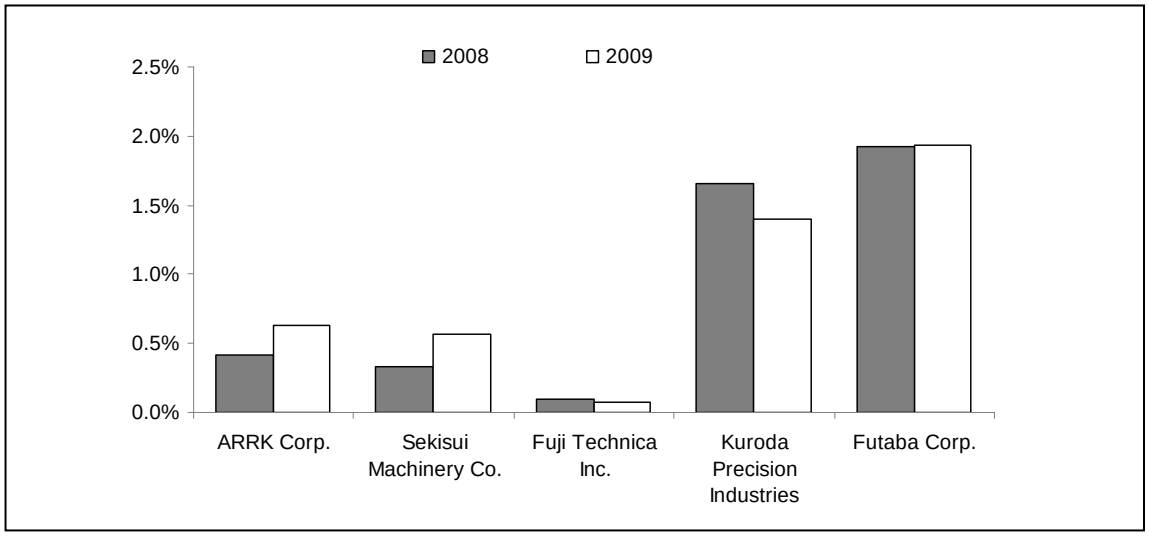
Source: Based on the financial statements of the companies.

As shown in Figure 5.2.3, most dies businesses recorded an operating loss or a sharp decrease year on year in 2009. Kuroda Precision Industries, Nichidai Corp. and Futaba Corp. suffered an operating loss, while Hoden Seimitsu Kako Kenkyusho, Marujun Co. and Mitsui High-Tech registered an operating profit but had a big fall in profit.

### (2) Technological innovation and the business environment

Fig. 5.2.4 shows the R&D expenditure to sales ratio of major bearing manufacturers in Japan. All of these companies focus on R&D on the forming of parts involving dies and on CAD/CAM and other peripheral systems instead of on dies themselves. It can be said that as they have suffered poorer sales and a smaller profit, these manufacturers have managed to continue having incentives for R&D, which will help them raise productivity and obtain new technology.

**Fig. 5.2.4 R&D expenditure to sales ratio of main dies manufacturers**




Source: Same as that for Fig. 5.2.3.

### (3) Future prospects and problems

On September 17, 2010, Fuji Technica Inc., main manufacturer of dies for presses for automobiles in Japan, agreed with Miyazu Seisakusho Co., on business merger. This was an event that occurred in the circumstance where Japanese bearing-related businesses experienced a severe slump in business due to intensified global competition and changes in industrial structure. The poor performance and business merger of the two companies can be called an example that plainly shows the situation in which bearing manufacturers in Japan have been. According to the opinion of the authors, the most important problem of Japanese bearing industries is the fact that they have not shaken themselves free from the conventional management system based on the “full-set” industrial structure where industries own all levels of functions ranging from low to high ones. Because they have long been satisfied with the traditional full-set industrial structure, bearing manufacturers in Japan have no function of positively making proposals and doing sales activities. Because of this, they lack networks with foreign companies and know-how to get orders from abroad. As a result, they are unable to take advantage of overseas demand and are faced with poor business results although business activities are expanding in Asian countries and regions. In the circumstance stated above, it can be said that Japanese bearing companies should develop and increase management capacity helpful for making good use of demand abroad as soon as possible.