6. Machine Element Sector

6.1. Dies

6.1.1 Supply and demand trend

(1) Outline

The domestic production of dies in 2008 amounted to ¥448.30 billion or a decrease of 6.7% from 2007. Specifically, the amount of production fell for all types of products, including dies for presses and dies for plastics. It should also pointed out that even in the recession the trend of decreasing numbers of production and increasing average weight and average unit price of dies continued in general.

The export of dies in 2008 was ¥343.13 billion or a decrease of 3.87% from 2007. The top three export counterparts were the same as in 2007: China + Hong Kong, the U.S. and Thailand. Export to these three countries accounted for about 55% of the total dies export from Japan. The import of dies totaled to ¥87.05 billion or a fall of 4.48% from 2007.

(2) Production

Let's look at the trend of production of the dies industry in Japan. Figure 6.1.1. shows the trend of output of dies in Japan (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 2008 dropped by about ¥32.0 billion from the previous year to ¥448.30 billion (down 6.7% year on year). This was a decline for two consecutive years and tells the fact that the global recession caused by the Lehman shock directly 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 2008, all types of dies experienced a smaller amount of output: dies for presses (down 10.2% year on year), dies for plastics (down 5.0%), die-casting dies (down 1.9%), forging dies (down 0.8%), dies for rubber (down 7.6%), casting dies (down 5.0%), powder-metallurgy dies (down 2.7%) and dies for glass (down 9.2%).

In 2008, the amount of production of dies for presses and dies for plastics combined accounted for about 80% of the total dies output: 39.0% and 37.9%, respectively. Thus, this section discusses the situation of production of the dies industry in Japan focusing on dies for presses and dies for plastics.

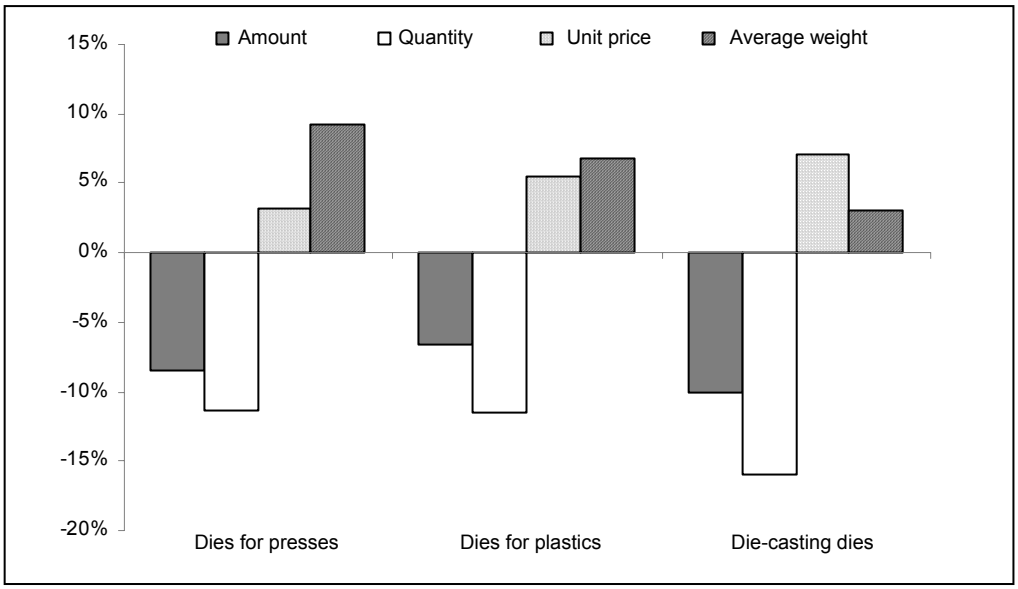
Fig. 6.1.1 Trend of production of dies (at manufacturers having 20 or more employees)

(Calendar years, Unit: ¥100 million)

	2004	2005	2006	2007	2008	Year-on-year ratio (2008)	Ratio (2008)
Dies, total	4,122.6	4,392.7	4,879.6	4,804.2	4,483.0	-6.7%	100%
Dies for presses	1,710.5	1,748.4	1,909.5	1,945.0	1,747.0	-10.2%	39.0%
Dies for plastics	1,594.7	1,680.9	1,821.0	1,790.9	1,700.8	-5.0%	37.9%
Die-casting dies	297.2	384.7	527.2	483.4	474.3	-1.9%	10.6%
Forging dies	157.8	176.7	211.1	205.5	203.8	-0.8%	4.5%
Dies for rubber	113.1	127.3	125.8	119.9	110.8	-7.6%	2.5%
Casting dies	108.6	135.8	151.0	136.3	129.4	-5.0%	2.9%
Powder-metallurgy dies	73.8	78.7	79.4	77.9	75.8	-2.7%	1.7%
Dies for glass	66.9	60.4	54.6	45.3	41.1	-9.2%	0.9%

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

Fig. 6.1.2 Changes in the average weight and average unit price of dies (2006 vs. 2008)



Source: Same as that for Fig. 6.1.1.

◆Average unit price and average weight

Let's look at changes in dies produced in Japan from three viewpoints: quantity of production, average weight and average unit price. The quantity of dies made in Japan has been decreasing in recent years. The quantity of output of all types of dies has continued falling recently. Behind the falling quantity of dies production is the situation where the dies produced in Japan are being concentrated in high value-added dies as called "super complex," "super precision" and "super large." This is the same even under the worldwide recession. To examine this situation, let's look at the trend of the amount and quantity of production, average weight and average unit price of dies for presses, dies for plastics and die-casting dies in 2006 and 2008 (Fig. 6.1.2).

From Figure 6.1.2, it is evident that while the amount and quantity of production dropped

sharply, the average unit price and average weight of dies for presses, dies for plastics and die-casting dies increased. Structural changes in production at the dies industry in Japan steadily continued even during the global recession.

(3) Export and import

Now let's look at the trend of export and import of the dies industry in Japan. In 2008, the total amount of export of dies declined by about ¥14.0 billion to ¥343.153 billion (down 3.87% year on year). As shown in Figure 6.1.3, the amount of dies export dropped for two years running. 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 2008 amounted to ¥87.05 billion, which was a fall of about ¥4.0 billion or 4.48% from 2007. The export of dies for presses and dies for plastics also decreased year on year, although the size of decrease was small. In 2008, the export of dies for presses amounted to ¥131.74 billion (down 1.77%) and that of dies for plastics, ¥132.28 billion (down 3.00%).

Figure 6.1.3 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.

Finally, let's look at the trend of the trade partners of the dies industry in Japan from Figs. 6.1.4 and 6.1.5. The top three export counterparts were China + Hong Kong, the U.S. and Thailand, while the three largest import trading partners were South Korea, China + Hong Kong and Thailand. This ranking has not changed greatly since 2005.

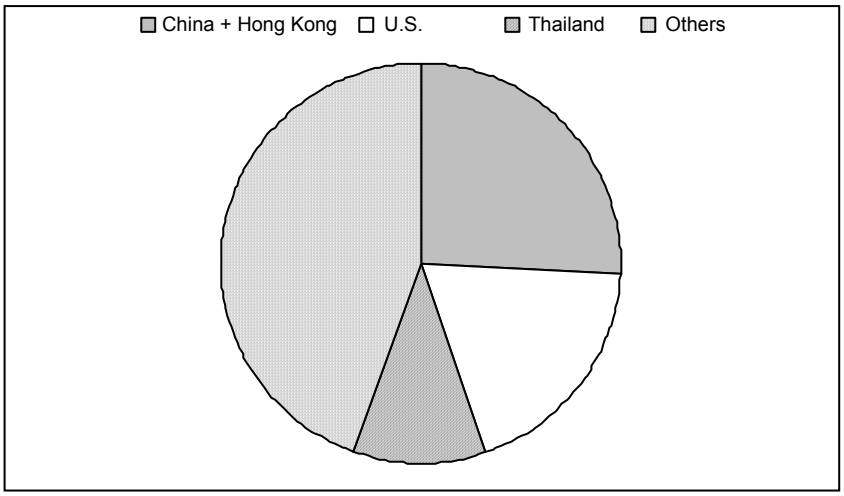
Fig. 6.1.3 Trend of export and import of dies[1]

	2004	2005	2006	2007	2008	Growth rate in 2007-2008
Dies, total						
Export	3,719.1	3,488.5	3,816.0	3,569.5	3,431.3	-3.87%
Import	607.7	780.6	861.5	911.3	870.5	-4.48%
Trade balance	3,111.4	2,708.0	2,954.5	2,658.2	2,560.8	-3.66%
Coefficient of specialization	0.719	0.634	0.632	0.593	0.595	-
Dies for presses						
Export	1,461.2	1,309.9	1,484.4	1,341.1	1,317.4	-1.77%
Dies for plastics						
Export	1,466.6	1,354.1	1,451.4	1,363.8	1322.8	-3.00%

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

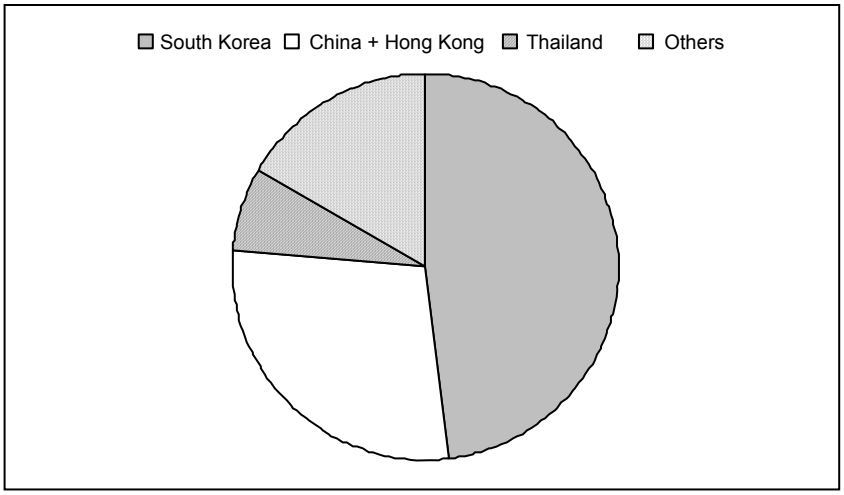
[1] Note that because the source adopts the classification "dies for molding rubber or plastics" the figures for the export and import of dies for plastics include those for the export and import of dies for rubber, too. Coefficient of specialization: One of the indicators of international competitiveness. 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. 6.1.4 Export amount of dies by country



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

Fig. 6.1.5 Import amount of dies by country



Source: Same as that for Fig. 6.1.4.

Let's look at the situation of the import trading partners of dies to Japan, too. At present, about a half of dies imported to Japan comes from South Korea, and Japan has a trade deficit in its dies trade with South Korea. Moreover, it can be said that China + Hong Kong is increasing their presence as dies exporters to Japan.

Also noteworthy is the fact that adopting a motto, "Detroit in Asia," Thailand, which has many Japanese automobile-related subsidiaries, ranks third in both dies export to and import from Japan. Considering the tendency of dies production abroad, including South Korea, China, Thailand and ASEAN nations, the trends mentioned above, that is, "super precision," "super complex" and "super large," will become more remarkable in the dies manufacture in Japan.

6.1.2 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 listed on the stock exchange and present their financial statements to the outside. Figure 6.1.6 utilizes these materials and summarizes the dies-related sales and operating profit in 2007 and 2008 of the main dies manufacturers in Japan involved in the production of dies for plastics, dies for presses, forging dies and dies parts.

As shown in Figure 6.1.6, most dies businesses recorded an operating profit in 2008 but had a substantial drop in sales and operating profit as compared with those in 2007. The very sluggish trend of management of main Japanese dies manufacturers in 2008 was just because of the worldwide recession and resultant decline in capital investment. What special attention should be paid to is the fact that the dies manufacturers suffered a sharp fall in operating profit.

Fig. 6.1.6 Consolidated settlement of accounts of main dies businesses (the most recent announcement)

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

	FY2007		FY2008		Growth rate vs. 2008	
	Sales	Operating profit	Sales	Operating profit	Sales	Operating profit
Dies for plastics	38,332,400	679,200	29,742,200	438,700	-22.4%	-35.4%
ARRK Corp.						
Sekisui Machinery Co. Dies division	666,800	38,700	720,208	43,272	8.0%	11.8%
Dies for presses						
Fuji Technica Inc. Dies for presses for automobiles division	1,197,201	-39,539	1,076,711	-170,465	-10.1%	-531.1%
Kuroda Precision Industries System equipment division	690,078	103,874	507,230	18,703	-26.5%	-82.0%
Dies for presses	351,800	-	284,200	-	-19.2%	-
Hoden Seimitsu Kako Kenkyusho Die division	352,777	58,645	342,927	55,340	-2.8%	-194.4%
Marujun Co. Dies business division	287,500	49,500	511,800	76,100	78.0%	53.7%
Mitsui Hi-Tech Dies for presses division	712,600	122,600	699,400	96,200	-1.9%	-21.5%
Forging dies						
Nichidai Corp. Net-Shape division	754,806	68,244	623,228	11,737	-17.4%	-82.8%
Dies parts						
Futaba Corp. Manufacturing equipment division	4,030,300	200,400	3,407,900	-1,149	-15.4%	-100.6%

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.

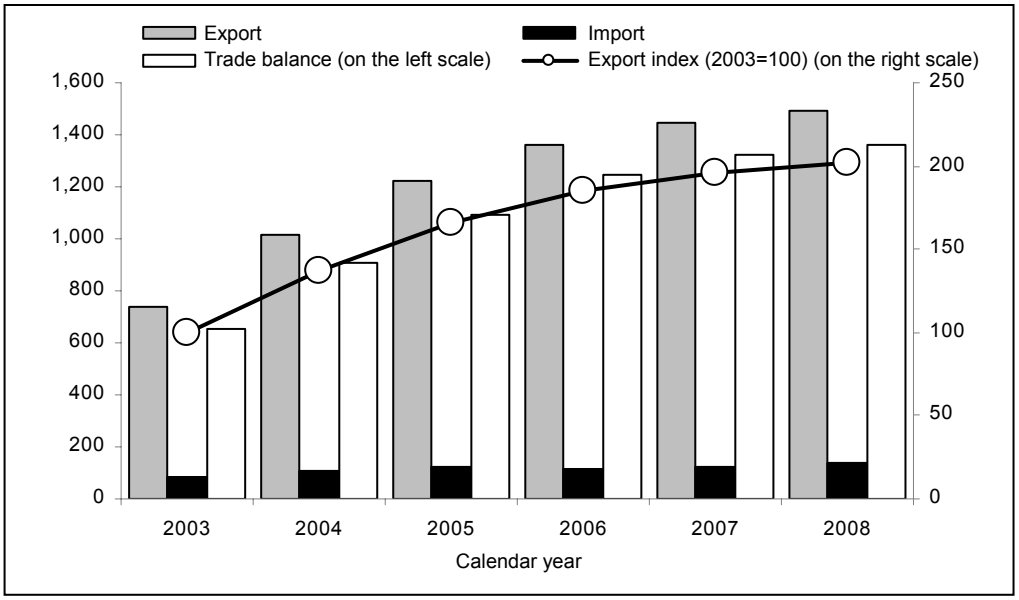
(3) Future prospects and problems

In this section, the present and future direction of dies industries in South Korea will be outlined briefly so as to give some suggestions to Japanese dies manufacturers. South Korean dies industries have achieved a rapid growth in technical levels and in a wide range of transactions, including those overseas, by cooperating with universities and public organizations. The population of South Korea is less than 40% of that of Japan; as evident from this fact, the scale of machine industry, the user of dies, in the country is smaller than that in Japan. The natural result is that South Korean dies manufacturers turn their eyes to overseas markets. In fact, the export amount of dies from South Korea in 2008 was over twice that in 2003, recording a big trade surplus.

Aram Metal Industry, a manufacturer of dies for presses (20 employees) based in Kwangju, South Korea, for example, generates 70% of sales from export, and 90% of the export is to Japan and the U.S. The company's website is written not only in Korean but also in English, Chinese and French. In 2002, it acquired an ISO9001 certification. Woosung Precision, a manufacturer of dies for plastics (60 employees) based also in Kwangju, succeeded in receiving orders for dies from a Swedish automaker by joining hands (in the R&D of laminated dies) with public organizations and universities in the city. This company got an ISO9001 certification in 2002 and an ISO14001 certification in 2004.

As described above, South Korean dies industries have positively opened overseas markets on the basis of the fact that the owner once worked for the purchase department of a big business and so has plenty of contacts, the acquisition of an ISO certification, the securing and training of people proficient in foreign languages, such as English and Japanese, or cooperation with universities and public organizations. Japanese dies manufacturers will face falling domestic demand in the years ahead due to population decrease and expanding overseas business by large companies. In such a circumstance, they will have much to learn from the efforts of their South Korean rivals to find new overseas demand.

Fig. 6.1.7 Trend of South Korean export and import of dies (US$ million)



Source: Prepared by the authors based on the Global Trade Atlas.