

OUTLINE OF THE JAPANESE ALUMINUM INDUSTRY

Japan Aluminium Association

1. Position of the Aluminum Industry in Japan

* Japan's total value of shipments

All manufacturing industries	¥ 269.4 trillion
of which	
Basic materials industry	¥ 90.6 trillion
(Metal products industry	¥ 13.7 trillion)
(Non-ferrous metal industry	¥ 5.7 trillion)
Assembly industry	¥ 123.1 trillion
Livelihood related industry	¥ 55.7 trillion

* Position of materials industry and non-ferrous metals industry in value of shipments shown in percentage, as of 2002:

Basic materials industry.....	33.6% (Including aluminum)
Assembly industry.....	45.7%
Livelihood related industry.....	20.7%
<u>Total industry.....</u>	<u>100.0%</u>
Chemical industry.....	25.1%
Steel industry.....	12.1%
Metal products industry.....	15.2%
Plastic products industry.....	10.6%
Ceramics industry.....	8.5%
Non-ferrous metals industry.....	6.3% (Including aluminum)
Others.....	22.2%
<u>Basic materials industry.....</u>	<u>100.0%</u>

2. Structure of the aluminum industry

The Japanese aluminum industry mainly consists of rollers, extruders, foil rollers, etc. who import most of the primary aluminum ingots for making a variety of end products in such market segments as construction and transportation. Japan has also sizable secondary aluminum industry.

3. The number of aluminum rolling mills, plants and employees (as of December 2004)

Companies: 56
Plants: 78
Employees: 12,739
(Data by Japan Aluminium Association)

4. Demand forecast for fiscal 2005

(1) Aluminum products

Reflecting strong growth in demand from industries such as transportation and packaging, total demand for overall aluminum products in Japan for fiscal 2005 is forecast to grow by 1.5% from a year ago to 4,336,000 metric tons (based on the research conducted by the Aluminum Research Council, details of which are shown in the following table.

Demand Forecast for Aluminum Products in Fiscal 2005 (April 2005 - March 2006)

March 25, 2005

Aluminum Research Council

Unit:1,000 MT

Products	FY2003 Actual	FY2004 Estimated	FY2005 Forecast	04/03 (%)	05/04 (%)
Rolled products (For auto)	1,139 (134)	1,186 (146)	1,181 (154)	4.2 (8.3)	- 0.5 (6.1)
Extruded products (For auto)	1,010 (139)	1,024 (143)	1,040 (147)	1.4 (3.1)	1.5 (2.9)
Semis – Total (For auto)	2,149 (273)	2,210 (289)	2,221 (302)	2.9 (5.6)	0.5 (4.5)
Castings (For auto) (For others)	395 (364) (31)	397 (365) (32)	420 (388) (32)	0.5 (0.3) (2.9)	5.9 (6.4) (0.0)
Die-Castings (For auto) (For others)	881 (719) (162)	944 (773) (171)	983 (812) (171)	7.2 (7.5) (5.5)	4.1 (5.0) (0.0)
C/DC Total	1,276	1,341	1,403	5.1	4.6
Forgings (For auto)	40 (27)	42 (28)	44 (29)	5.4 (3.4)	4.8 (3.6)
Steel Making	138	142	142	2.6	0.0
Powder	14	14	14	0.0	0.0
Others	74	74	72	- 0.6	- 2.7
Imports	183	184	185	0.8	0.5
Domestic Demand	3,874	4,007	4,081	3.4	1.8
Exports	285	263	255	- 7.9	- 2.8
Total Demand	4,159	4,270	4,336	2.7	1.5
Total Automotive Aluminum Shipped	1,384	1,455	1,531	5.2	5.2

Note : Detail may not add due to independent rounding

(2) Semi-fabricated aluminum products

Demand for all semi-fabricated aluminum products in fiscal 2005 is forecast to maintain steady growth heavily supported by demand from the transportation market, automotive applications in particular. However, demand for can stock is anticipated to decline slightly due to an expected fall in consumption of beer and low-malt beer, sales of which grew substantially in the preceding year owing to extremely hot summer weather.

Consequently, total aluminum sheet/plate shipments in fiscal 2005 are forecast to drop slightly from the previous year's all time high.

The main outlet for aluminum extrusions is the building and construction market, which accounts for approximately 16% of the total aluminum demand in Japan.

New housing starts in fiscal 2005 are expected to decline 0.8% to 1.18 million units. However, aluminum demand from such markets as the automotive, general machinery, precision machinery, and fabricated metals industries is expected to remain favorable.

Therefore, total demand for extrusions in 2005 is anticipated to gain 0.1% from the previous year.

Demand for overall semi-fabricated aluminum, combining rolled and extruded products, is forecast to increase modestly by 0.1% to 2,442,000 tons in fiscal 2005.

Demand forecast for semi-fabricated products (1,000 mt)

	2003	2004	2005	04/03	05/04
	Act.	Est.	Fcst.	%	%
Rolled products	1,380	1,400	1,387	+1.5	-1.0
Extruded products	1,023	1,039	1,055	+ 1.5	+1.6
Total	2,403	2,439	2,442	+1.5	+0.1

5. Demand structure and trends

(1) Shipments by products

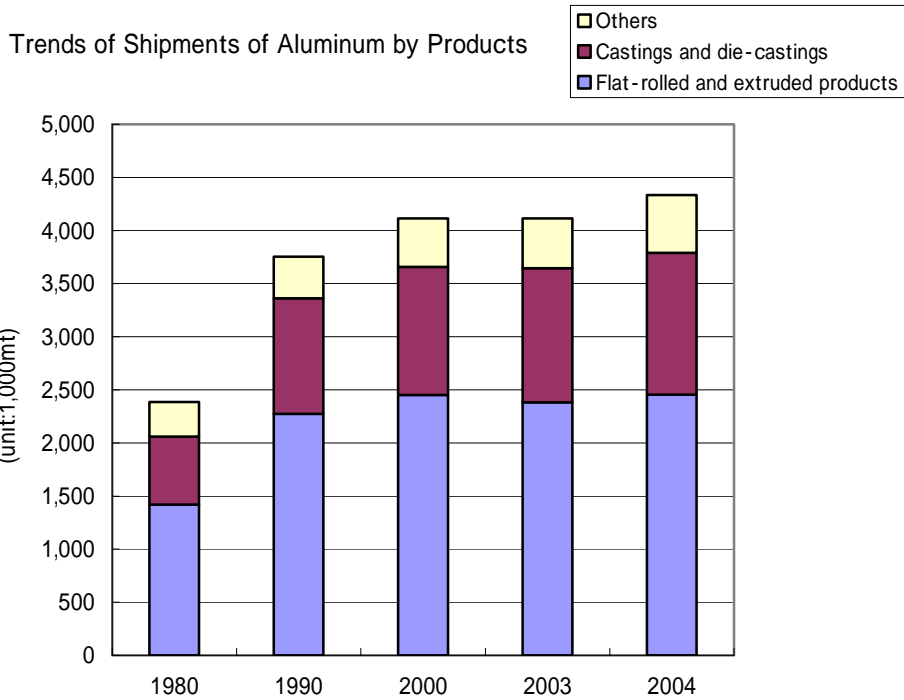
* Total shipments of aluminum products in 2004: 4.33 million tons (100%)

Shipments by product:

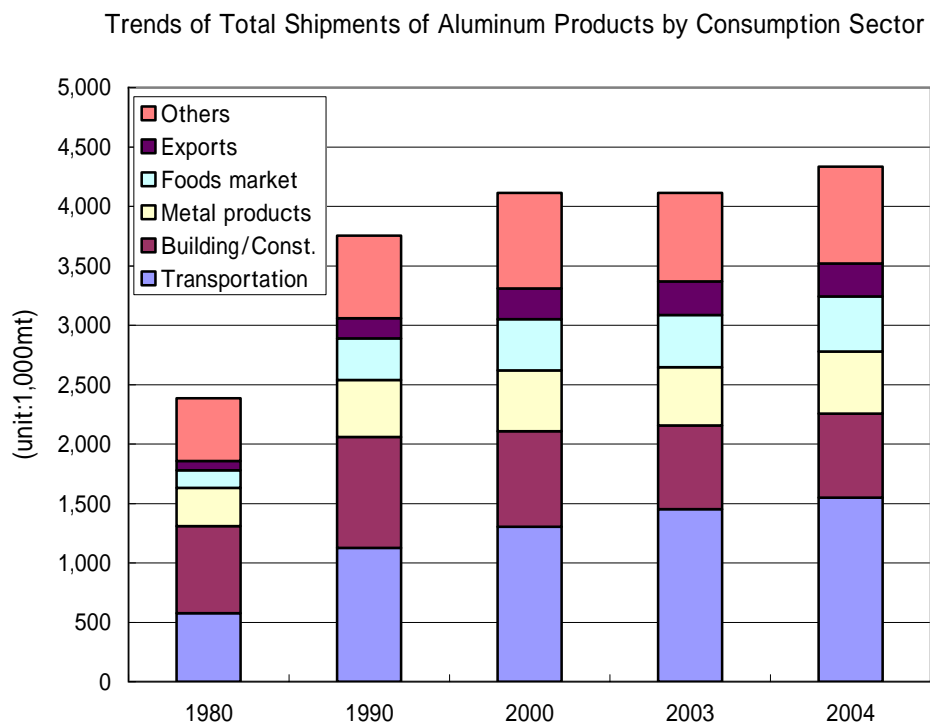
Flat-rolled and extruded products.....2.45 million tons (56.6%)

Castings and die-castings.....1.33 million tons (30.7%)

Others.....0.55 million tons (12.7%)



* Total shipments of all aluminum products (2004): 4.33 million metric tons
 By consumption sector:
 Transportation: 1.55 million tons (For automotive use 1.45 million tons)
 Building/const.: 0.70 million tons (Door and window sashes 0.48 million tons)
 Metal products: 0.52 million tons (Litho plate, daily goods, etc.)
 Foods market: 0.46 million tons (For beverage cans 0.44 million tons)
 Exports: 0.28 million tons
 Others 0.82 million tons



(2) Shipments of semi-fabricated aluminum

* Shipments of semi-fab. aluminum products (2004): 2.45 million tons comprising:

Flat rolled products: 1.41 million tons (Foil 0.15 million tons)

Extruded products: 1.04 million tons

6. External trade

(1) Procurement of raw materials

* Japan imports almost all of its primary aluminum requirements.

Domestic production of primary aluminum..... 6,000 tons (2004)

Imports of primary aluminum..... 2.43 million tons (2004)

• Trends of Primary Aluminum Imports by Country (2000 ~ 2004) (unit : ton)

Country	2000	2001	2002	2003	2004
Australia	623,574	652,978	577,518	592,951	553,539
Russia	465,471	429,385	413,219	451,236	442,940
New Zealand	211,011	207,940	197,343	213,506	225,131
Brazil	256,578	186,258	190,514	274,857	215,786
South Africa	129,068	98,603	171,325	197,757	204,770
China	13,369	26,285	51,406	144,812	199,505
Canada	139,841	131,476	97,203	138,240	161,517
Indonesia	116,375	130,544	114,908	109,193	136,251
Venezuela	123,059	109,833	31,253	85,644	98,621
UAE	100,511	98,329	80,064	90,302	94,482
Others	164,140	114,837	108,067	104,356	100,121
Total	2,342,997	2,186,468	2,032,820	2,402,854	2,432,663

Note : Number in circle stands for ranking in 2004

(2) Exports of semi fabricated aluminum

Japan exports aluminum sheet and plates including can stock, fin stock, litho plate, etc. mainly to China and South East Asian countries.

• Trends of Semi-fabricated Aluminum Exports by Country (2000 ~ 2004) (unit : ton)

Country	2000	2001	2002	2003	2004
China	53,644	49,971	65,807	63,634	63,064
Thailand	18,280	17,941	16,344	24,412	26,737
Taiwan	26,695	26,565	29,668	31,025	22,042
Malaysia	13,738	15,888	17,478	19,014	19,185
South Korea	14,577	12,882	15,946	16,664	15,072
Others	82,895	62,514	60,657	66,414	57,072
Total flat rolled products	209,829	185,761	205,900	221,163	203,172
Malaysia	5,900	3,170	4,885	4,972	6,828
China	2,344	1,797	2,882	5,642	6,276
South Korea	7,141	5,462	6,024	5,222	4,574
USA	1,561	1,752	2,292	3,475	4,295
Thailand	2,053	1,500	1,764	3,083	2,813
Others	8,386	7,040	6,808	7,401	6,992
Total extruded products	27,385	20,721	24,655	29,795	31,778
China	16,900	16,758	17,456	20,181	20,772
Taiwan	15,900	13,934	19,195	18,225	14,369
Thailand	6,881	8,103	8,646	11,828	12,976
South Korea	6,398	4,414	5,235	3,891	4,180
USA	6,062	4,225	3,617	3,791	4,168
Others	21,463	18,328	18,550	19,234	16,779
Total foil products	73,604	65,762	72,699	77,150	73,264
Total	310,818	272,244	303,254	328,108	308,214

Note : Number in circle stands for ranking in 2004

(3) Imports of semi-fabricated aluminum

* Japan imports semi-fabricated aluminum from various countries in Asia, North America, Europe, and elsewhere.

• Trends of Semi-fabricated Aluminum Imports by Country (2000 ~ 2004) (unit : ton)

Country	2000	2001	2002	2003	2004
South Korea	17,805	16,414	12,146	13,849	27,072
Germany	6,836	6,438	6,446	4,559	6,150
France	6,092	4,430	3,120	5,008	5,108
USA	8,085	7,094	4,411	3,533	4,347
Russia	47	100	185	621	3,986
Others	7,447	7,989	8,854	11,642	14,763
Total flat rolled products	46,312	42,465	35,162	39,212	61,426
USA	3,050	3,768	3,272	3,079	3,973
South Korea	1,809	1,699	1,382	1,891	2,628
China	175	564	256	911	1,752
England	1,431	1,292	1,354	1,512	1,411
Germany	1,655	1,252	1,212	1,054	1,341
Others	1,819	1,288	1,831	2,923	2,749
Total extruded products	9,939	9,863	9,307	11,370	13,854
China	1,236	1,198	1,641	1,756	3,782
South Korea	2,582	2,177	1,083	1,210	1,932
Taiwan	1,506	1,097	1,119	1,260	1,610
USA	1,324	1,298	1,399	1,443	1,456
Malaysia	204	231	111	103	279
Others	1,517	1,345	1,391	935	552
Total foil	8,369	7,346	6,744	6,707	9,611
Total	64,620	59,674	51,213	57,289	84,891

Note : Number in circle stands for ranking in 2004

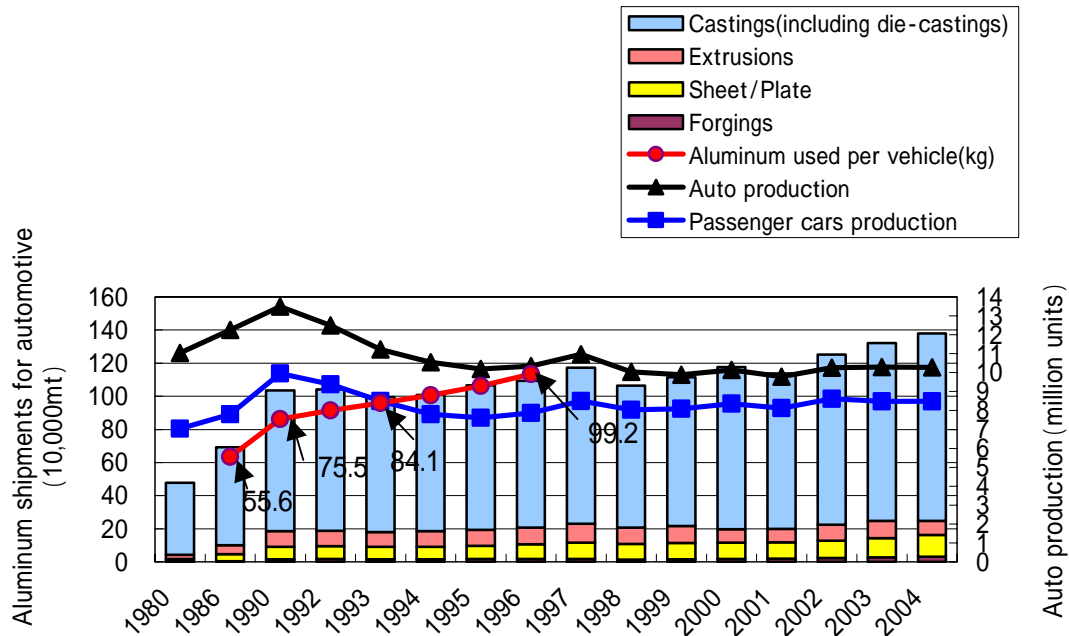
7. Recent trends on demand for aluminum by market

(1) Transportation

(a) Automobile

- * Japan's domestic production of passenger cars increased 2.9% year-on-year to 8,720,385 units in 2004, though truck production declined 0.9% to 1,730,691 units, while bus output fell 1.0% to 60,422 units. As a result, total automobile production rose 2.2% to 10,511,518 units in 2004.
- * Demand for all aluminum products totaled 4.33 million tons in 2004, of which demand from auto industry accounted for 33% or 1.45 million tons.
- * In view of concerns about global warming, automakers are substituting aluminum for heavier materials in their auto parts, centering on engines, radiators, suspensions, etc. Aluminum use per vehicle is now over 100 kilograms on average as compared with 55 kilograms in 1986.
- * For automotive aluminum, castings and die-castings were first applied and in recent years, use of aluminum sheet/ plates and extrusions has been largely increased.
- * Light-weighting through aluminum can result in improved fuel efficiency, and thus , reduced greenhouse gas emissions. A 10% reduction in vehicle weight translates to a 4% increase in fuel economy.

Auto Production and Automotive Aluminum Shipments(10,000mt)



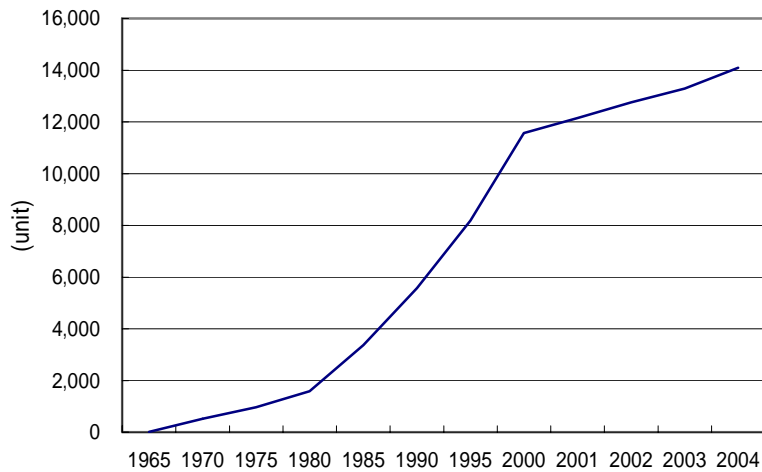
Trend of Research and Development

- * Research and Development on weight reduction and recycling of end-of-life (ELV) automobiles. The Japan Aluminium Association has been cooperating with the Japan Research and Development Center for Metals (JRCM) in undertaking projects aimed at reducing vehicle weight.
- * Research and Development of aluminum cylinders for hydrogen gas. Under a contract with the New Energy and Industrial Technology Development Organization (NEDO), Japan Aluminium Association has been involved in the basic study on developing aluminum cylinders for hydrogen gas to be used by fuel battery vehicles.

(b) Railway vehicles

- * In order to reduce the weight of railway vehicles, Shinkansen trains as well as subway cars are now aluminum intensive. As of the end of 2004, the total number of aluminum railway vehicles produced domestically reached 14,000 units.
- * For railway vehicles, aluminum is used not only for the body frame structures, but also used in applications such as window-frames, seats and bogies. Approximately 100 tons of aluminum is used for one train (consisting of 16 coaches) of the Shinkansen 300 series.

Trends of Total Number of Aluminum Railway Vehicles



(c) Fishing boats and passenger ships

- * With improvement in welding technologies, aluminum vessels are gaining popularity. Fishing boats, patrol boats, passenger vessels using aluminum are now popular and being built in greater numbers.

In the past, many fishing boats were made of FRP (Fiber Reinforced Plastics). However, FRP boats are difficult to dispose of. Thus, highly recyclable aluminum boats are now replacing these FRP boats to a large extent.

(d) LNG Ships

- * An LNG ship carries liquefied natural gas in specially designed aluminum tanks. As much as 2,500-3,000 tons of aluminum is used for each of this type of vessel.
- * Currently, 154 LNG ships are in service worldwide, about half of which are equipped with the aluminum tanks.

(2) Construction

- * In the past few years, new housing starts have been sluggish due to Japan's economic slowdown and drop in personal spending, etc, although starts are expected to regain the level of 1,189 million units in 2004.
- * Among the aluminum building materials such as sashes, doors, interiors, and exteriors, sashes are the mainstay and demand amounts to 480,000 tons per annum, accounting for about 60% of the total aluminum demand from the building and construction market.
- * In 2002, the Japanese Government approved the use of aluminum for housing structural elements including pillars, walls and beams, for which steel, concrete and timbers are usually applied.

* In order to further develop and refine technologies for using aluminum in home building and to strengthen the technical basis, the Japan Aluminium Association built a demonstration aluminum house (ECO House) in 1999 under a contract with NEDO (New Energy and Industrial Technology Development Organization), an agency of METI (Ministry of Economy, Trade and Industry).

(3) Beverage containers

* The total amount of beverages (beer and soft drinks) produced in Japan amounted to approximately 22.6 million kiloliters in 2003, of which beer and soft drinks accounted for 28% and 72% respectively.

* As for packaging in 2003, aluminum canned beer accounted for 63.4% of the total beer production, the far largest share, while for soft drinks PET bottles held the largest share of over 50%. Aluminum canned soft drinks accounted for about 10% of the market.

* Of the beverage containers produced in fiscal 2003, over 57% or 17.7 billion cans were of aluminum. During the year, 14.6 billion aluminum cans were recycled, registering a recycling rate of 81.8%.

* Aluminum can has higher scrap value relative to other beverage containers, thus, its distribution systems have been highly developed.

* Used aluminum beverage can has higher scrap value compared with other containers, resulting in the lowest recycling costs. This helps reduce costs born by the self-governing bodies for their segregating, collecting, and disposing operations.