A STUDY ON INDUSTRIAL SUB-SECTOR DEVELOPMENT IN THE REPUBLIC OF INDONESIA

Part III
Aluminium Downstream Products Industry

SECOND YEAR FINAL REPORT

DECEMBER 1991

JAPAN INTERNATIONAL COOPERATION AGENCY

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SUMMARY

1. Viewpoint of Industrial Promotion

The domestic consumption of aluminium in Indonesia is estimated to be approximately 70,000 tons (1990). This is one-fifth that of the Republic ofs Korea and positions the country between Thailand and Malaysia. Alumina, aluminium pigment and powder and forged products are not produced domestically, among the items from the raw material bauxite to the final product. Demand for aluminium is strongly correlated with the stage of economic growth. The future trends in demand for aluminium in Indonesia may be said to depend on its economic growth. If an average annual 4.9 percent growth is continued, the consumption of aluminium in the year 2000 will be over 119,000 tons and if 6.5 percent will be over 152,000 tons, it is estimated.

The numbers of companies making main aluminium products are estimated as one company for ingots, 12 for extrusions, 10 for plate, two for foil, one for slabs, 10 for impact tubes, 22 for utensils, and nine for roofing plate. Die castings are mainly made in-house by large companies making home electrical appliances and motorcycles. There are believed to be two companies specializing in die castings. Low pressure casting is performed by two companies and mold casting by three. Extrusions and plate require large initial investment into machinery and equipment and therefore many of the companies are large in size.

Exports have been increasing since 1987. More structures and utensils are exported than imported. Products which are beginning to be exported but on which Indonesia still has a high import dependence are plate and foil. Indonesia relies completely on imports for powder, stranded wire, and storage tanks. Aluminium window frames and other structures are starting to be exported through foreign investment enterprises while utensils are starting to be exported through OEM production. The main destination for exports of structures and utensils is Japan.

The current state of the aluminium product industry and the problems in production technology as revealed by the field survey are as follows:

(1) Extrusions

There are problems with extrusions in terms of the [1] soaking treatment of the billets, [2] dies, [3] extrusion, and [4] surface treatment of the products.

If billets are not subjected to a soaking treatment as in [1], the predetermined characteristics cannot be obtained in the extrusion material and the quality of the final product is affected. The precision of the dies is poor, as in [2], so the dimensions of the finished products are inaccurate. Also, the surface treatment of the dies is insufficient, so the lifetime is short. As mentioned in [3], the extrusion machines are ageing and the precision of work is poor. As to [4], in the surface treatment, the anodizing film is thin and there are no testing machines for measuring the film thickness. Further, composite films cannot be formed due to the limitations in equipment and technology.

(2) Plate

The problems in plate are [1] the melting, [2] the rolling, and [3] the preshipment inspection.

When melting slabs as in [1], the chemical composition of the melt are analyzed not by testing machines, but by intuitions. Regarding [2], the material is rolled manually

and so the plate surface is easily scratched. Regarding [3], the preshipment inspection is performed visually and considerable damage is overlooked.

(3) Plate Products (Utensils, Foil, Roofing Plate, Etc.)

The biggest problem in plate products is the quality of the raw material, i.e., the plate.

Domestically produced plate is inferior in quality compared with imports, but a high tariff is assessed on the high quality imported plate, so use of the same is difficult. Looking at foil, the purity and precision of the aluminium coil are insufficient, so pinholes are formed when the foil is rolled. Looking at utensils, the quality of the aluminium plate and coil is poor and the handling of the same is rough. Therefore, good surface treatment cannot be performed. In plate roofing, the precision of the raw material, i.e., the embossed aluminium coil, is insufficient. In impact tubes and cans, the purity of the slabs is low and the control over the component is unsuitable, which have a deleterious effect on the final product.

(4) Die Castings

The problems in die castings are [1] the dies and [2] the alloys.

In [1] dies, Indonesia is immature when it comes to the design technology and lacks sufficient knowhow, so cannot design or produce complicated dies. Heat treatment and surface treatment also cannot be performed, so there are problems such as a short lifetime of the dies. Regarding [2], locally made alloys are shipped out without sufficient inspection, so their composition is unclear and their reliability is poor. The supply is also small.

(5) Low Pressure Castings and Mold Castings

Low pressure casting is performed in technical tieups with foreign companies. High quality aluminium wheels are produced and the export ratio is also high.

Factors affecting quality of products are classified into 5M, that is, Man, Machine, Measurement, Method and Material.

The above problems can be organized by 5M Fishbone Chart shown in Fig.2. Among them, the following is the most important problems.

[1] Production by antiquated manufacturing facilities.
[2] Insufficient quality control in every process from melting and dies to shipment.

Most of the companies manufacturing aluminium products sell mainly to the domestic market. The domestic market is oriented toward lower price rather than quality. It accepts even the low quality products manufactured using antiquated facilities and with insufficient quality control and is profitable. Therefore, increased exports of aluminium products would require strengthening quality, marketing, and other aspects of nonprice competitiveness while maintaining the superiority of current prices.

2. Issues and Measures

The issues and measures in the aluminium product industry of Indonesian may be arranged into the following three groups of manufacturing processes: (1) rolling, extrusion, and platework, (2) die casting and other casting, and (3) aluminium

manufacture as a whole.

These measures should primarily be taken by private companies. When private companies would find it difficult to sufficiently handle them due to funds, facilities, or manpower, support will become necessary. Consideration may be given to support from public organizations, technical transfers from foreign companies, and cooperation of overseas economic cooperation organizations.

The recommended goals of the improvement of the business environment for the aluminium industry are [1] the reduction of the high import tariffs on plate and [2] the introduction of tax incentives for capital investment, as mentioned in the "Policy Recommendations".

(1) Rolling, Extrusion, and Platework

1) Modernization of rolling facilities

The pull-over system for rolling, a system which has already disappeared from the advanced countries is still in use. The coil rolling systems used are also antiquated. Exports would require that the international level of competitiveness be reached in terms of quality. It would be desirable if the antiquated facilities could be replaced.

2) Improvement of surface treatment

Treatment for providing composite films and control over film thickness

3) Improvement of quality of billets

Modernization of melting, casting, and soaking facilities for producing high quality billets

(2) Die Casting and Other Casting

1) Die casting machines

[1] Automation of manufacturing processes
[2] Establishment of system of control over maintenance.
[3] Improvement of layout of manufacturing facilities

2) Dies

[1] Learning design technology
[2] Measures for increasing lifetime of dies
Modernization of the heat treatment and surface treatment facilities is necessary.
[3] Maintenance of dies

Preventive measures and periodic inspections

3) Quality control of alloys

[1] Improvement of quality of dies and establishment of inspection system for same
Strengthening of quality control system, introduction of inspection equipment, or testing and inspection by public organizations
[2] Improvement of methods of storage of alloys

(3) Aluminium Manufacture as a Whole

1) Understanding and practical application of quality control
   [1] Differentiation between good products and defective products
   [2] Improvement of inspection methods and establishment of system for same
   [3] Improvement of handling of products
   [4] QC activities and development of human resources for the same

2) R&D and development of human resources

3) Establishment and dissemination of standards, augmentation of testing and inspection organizations, and support to private companies
   [1] Establishment of industrial standards
   [2] Strengthening and augmentation of testing and inspection organizations

4) Acquisition of information and provision to companies

   [1] Acquisition and provision of technical and product development information
   [2] Acquisition and provision of marketing information

5) Development of human resources through systematic education and training

3. Recommendations on Programs

All of the measures for promotion of the aluminium industry are important and implementation of all of them would be desirable. Due to limitations in resources, manpower, etc., however, the realistic approach would be to start with the programs of the highest priorities. Therefore, recommendation is made of the following five programs for which there are existing implementing organizations, which would be easy to implement, which are high in urgency, and which it is believed there would be a great effect on industry.

(1) Program 1: Augmentation and Strengthening of Research and Development Institutes of Ministry of Industry

There are two research institutes which provide technical support for the aluminium product industry: the Institute for Development of the Metal and Engineering Industries (IDMMI) and the Institute for R&D for Material and Technical Products (IRDMTP). At the present time, these institutes do not have almost any facilities relating to the aluminium industry with the exception of some simple casting and heat treatment facilities and also lack staffs. They are not so sufficient in manpower or facilities as to provide support to the aluminium manufacturing industry.

Therefore, it is recommended that support be given to the industry as a whole by [1] improving facilities by strengthening and augmenting testing and inspection functions, [2] establishing a system of accreditation for engineers, [3] promoting exchanges with overseas research institutes and companies, [4] developing human resources both inside and outside of the institutes by strengthening the engineer training functions, and [5] strengthening the technical support system.

(2) Program 2: Technical Support from Experts to Private Companies

Regarding the determining factors of the level of technology, i.e., the "materials, machinery, methods, and manpower for controlling the same", experts will visit individual companies and make diagnoses and provide guidance so as to solve problems.

This program would be comprised of a short term program for providing roving guidance to medium sized companies and medium and long term programs aimed at promoting superior companies into business leaders.

(3) Program 3: Export Promotion Program

It is proposed that an export promotion program be formulated with consideration given to the features of the products, the technical level of companies, the export markets, that the increase of exports be promoted through overseas market research, enquiries services, provision of information, guidance in technology and design, and participation in exhibitions and seminars.

(4) Program 4: Promotion of Foreign Investment and Technical Tieups

Investment by export oriented foreign companies would both increase exports of the products and promote the transfer of technology. Technical tieups with foreign companies would also be a way of effectively transferring technology and realizing exports. It is recommended that foreign investment and technical tieups be promoted focusing on the aluminium product industry.

(5) Program 5: Development of New Products

New product development requires production facilities and a technical level able to handle manufacture of new products, technical research, and manpower able to handle development and marketing. There are limits to what can be done in this regard in the Indonesian aluminium product companies, and support from outside the companies is required. It is recommended that the above-mentioned programs (1) to (4) be organically linked for promotion of development of new products.

Fig. 1: Problems in Aluminium Product Industry

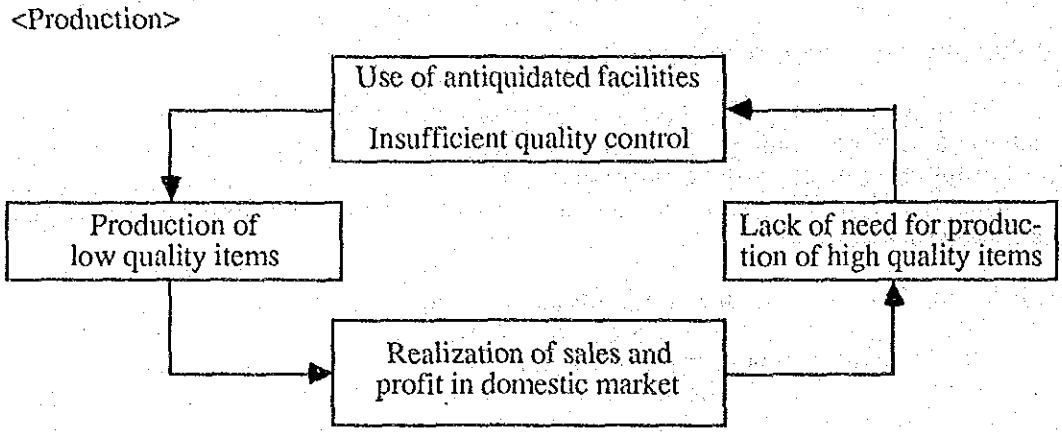


Fig. 2: Main Causes of Low Quality Aluminium Products

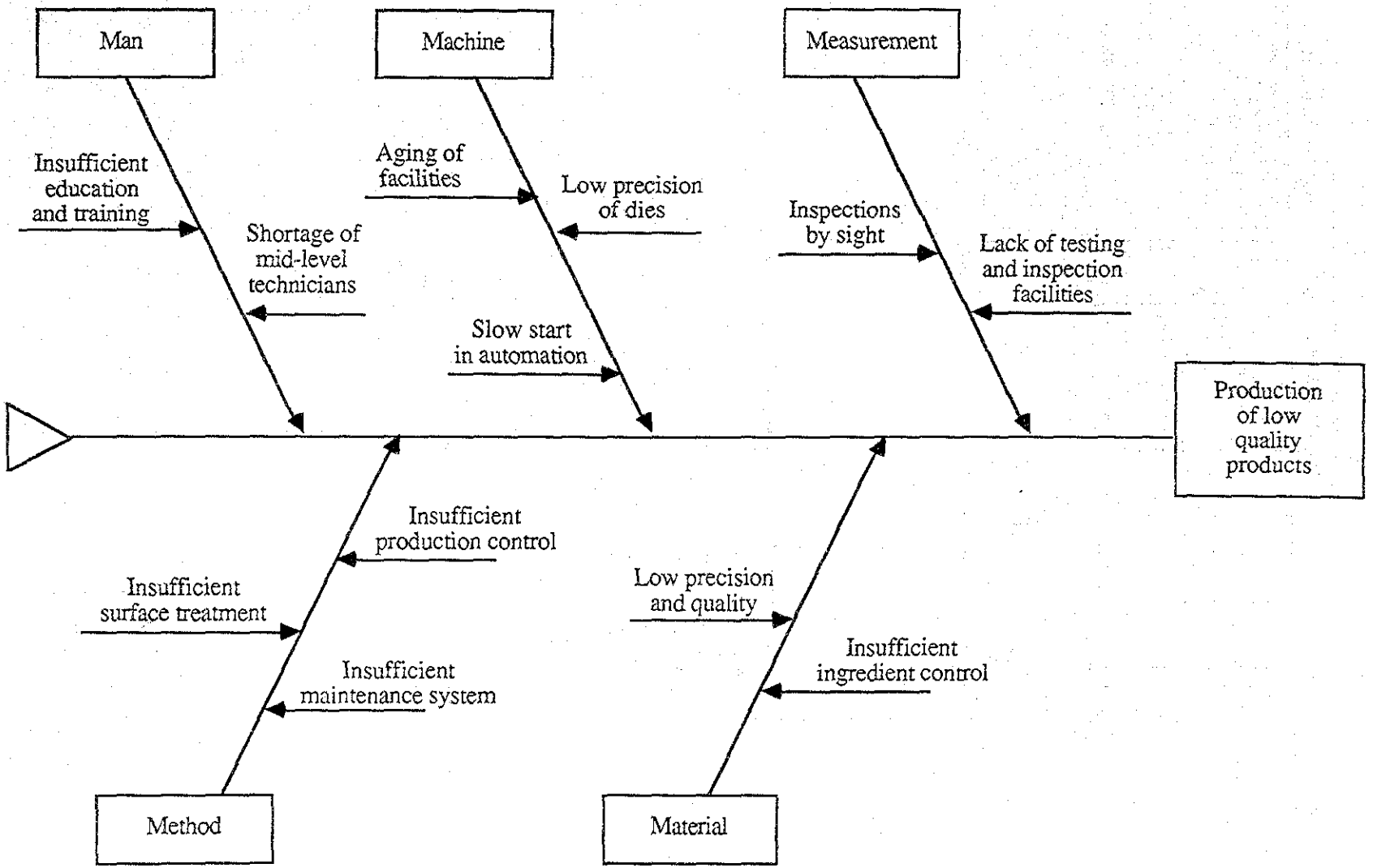


Fig. 3: Scenario for Export of Aluminium Downstream Products

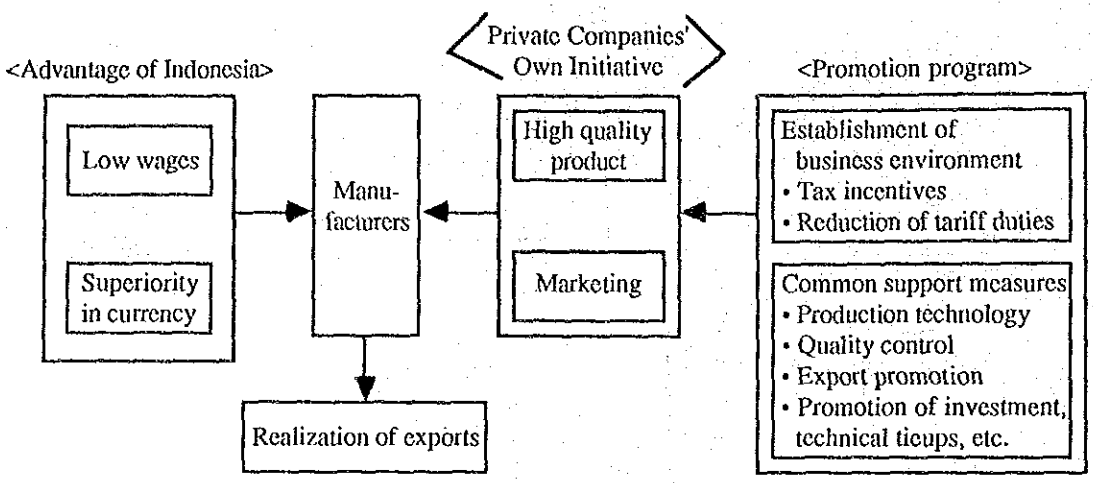
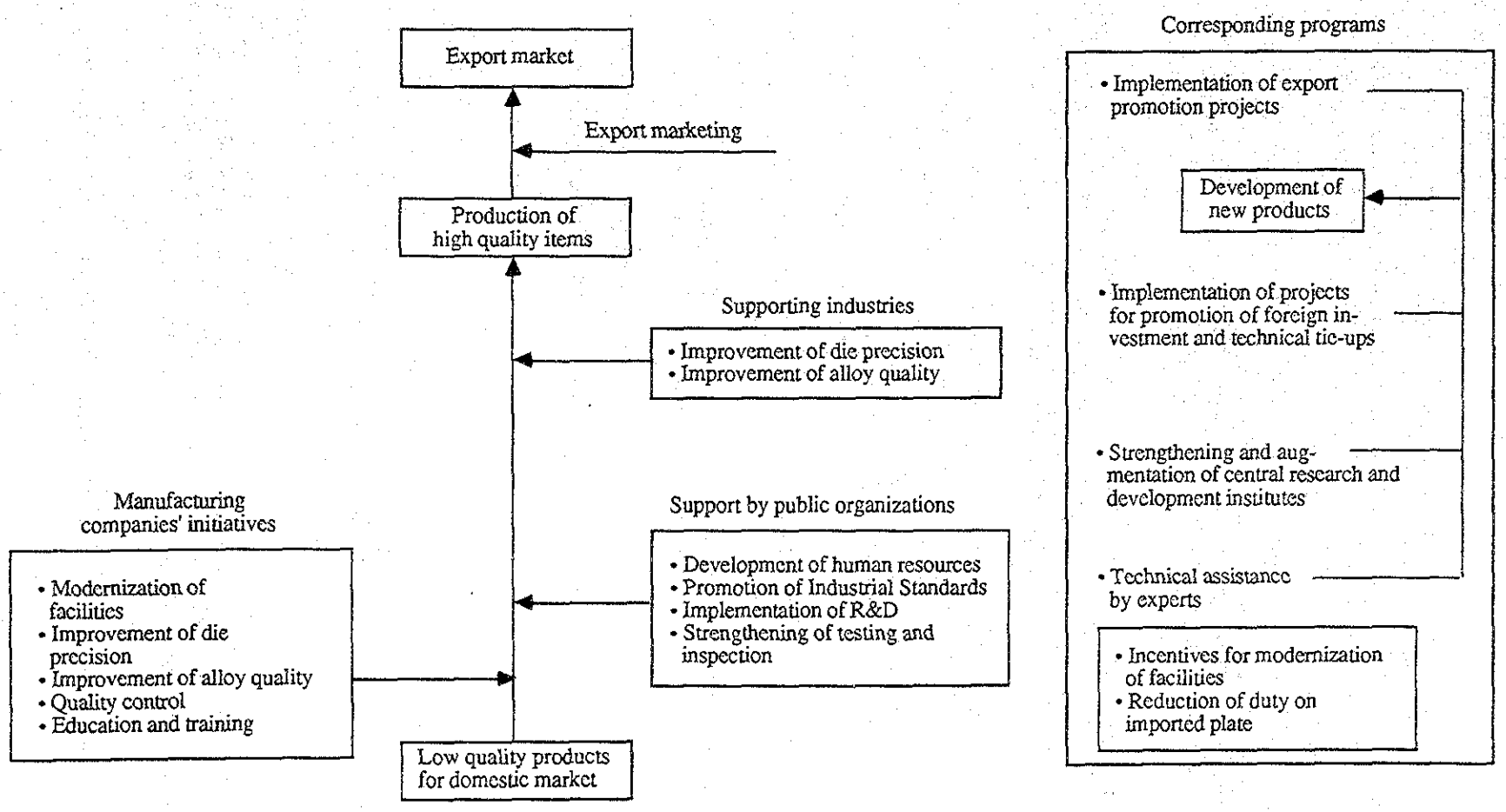


Fig. 4: Issues for Promotion of the Aluminium Downstream Products Industry



3. Aluminium Downstream Products Industry

3-1 Method of Survey

The survey is comprised of a field survey, a questionnaire survey in Japan, and a third country survey. Products covered by the survey are die cast products, sheets, sheet formed products and foils as specified in the Scope of Work. However, the field survey covered plate work such as utensils, impact tubes and cans, low pressure casting and mold casting.

In the field survey, the aluminium downstream product industry was surveyed by questionnaires and interviews to try to obtain a grasp of the current state of the industry. Interviews were held with 43 companies in all, including users. Face to face meetings were held with managers or staffs in charge and visits made to production sites to find problem points.

The questionnaires were given to 33 of the companies visited at the time of the visits and those companies asked to fill them out. Responses were obtained from 24 of them. By product, the response rate was low among rolling firms. By region, an insufficient number of responses were collected in Surabaya and Bandung.

The survey team visited related institutes and government organizations in addition to the related companies so as to survey the current situation regarding support measures for the industry and so as to collect statistics and other materials. The domestic survey made in Japan consisted of a questionnaire mailed to 204 member companies of Japanese aluminium product related industrial organizations with the aim of finding interest in investment in Indonesia. Responses were received from 85.

The third country survey was conducted selecting the U.S. and West Germany as the importers and Thailand as a competitor.

This report summarizes the results of analysis of the current situation as grasped by the above field survey, domestic survey, and third country survey.

3-2 World Production and Trade of Aluminium

3-2-1 World Production and Trade Trends and Position of Indonesia

(1) World Trends in Consumption and Production of Aluminium

1) Consumption trends

The total world consumption of aluminium in 1988, according to Metal Statistics, was 24.22 million tons. By region, Europe accounted for 6.41 million tons, Asia 4.58 million tons, Africa 280,000 tons, the Americas 8.13 million tons, Oceania 450,000 tons, and the Centrally Planned Economies 4.38 million tons, with Europe, the Americas, and Asia accounting for 80 percent together.

The main aluminium consuming countries outside of the Centrally Planned Economies were the U.S., the largest, at 3.72 million tons, followed by Japan at 2.97 million tons, West Germany at 1.92 million tons, Italy at 1.07 million tons, and France at 900,000 tons, with the countries at a high level of economic development being the major consumers.

The amount of consumption in 1988 represented an increase of 24.5 percent over

1978, but consumption declined for three years from 1980 to 1982, reflecting the effects of the global recession which occurred after the second oil crisis.

Countries with a high rate of increase of consumption in 1988 over 1978 were Republic of Korea at 157 percent, Australia at 100 percent, and Italy at 61 percent. Consumption in West Germany steadily increased 44 percent, Japan 42 percent, and France 31 percent. Consumption in the U.S., however, remained fairly level, growing only 5 percent, while consumption in the U.K. dropped 7 percent.

Table 3-2-1: Total Consumption of Aluminium in Key Countries and Areas (1988)

(Unit: 1000 tons)

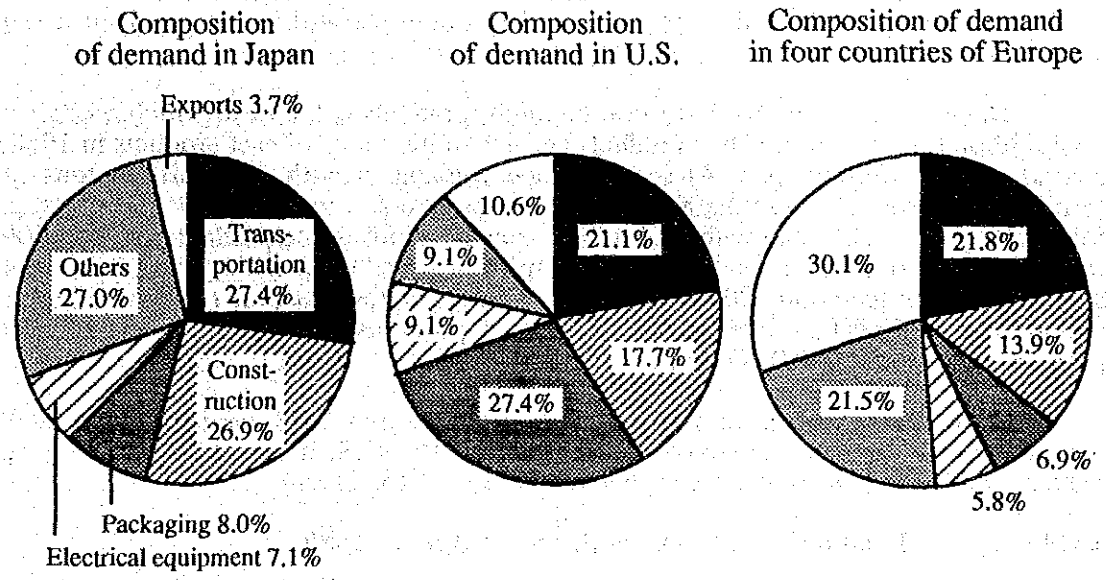
	Total consumption	Rate of increase over 1978 (%)
World	24,224	24.5
1. U.S.	6,720	4.8
2. Japan	2,957	41.9
3. West Germany	1,923	43.9
4. Italy	1,073	60.6
5. France	898	31.4
6. U.K.	528	-7.1
7. Canada	523	26.5
10. R. Korea	293	157.0

Source: Metal Statistics

By end uses, the demand in the U.S., Europe (U.K., France, West Germany, and Italy), and Japan was characterized by the following:

[1] In all countries and regions, the transportation machinery accounts for a large share.
[2] In U.S., packaging account for a large share.
[3] In Japan, use for window and door frames and other materials for construction is important.

Fig. 3-2-1: Demand in Japan, U.S., and Europe by End Uses (1989)



Source: Japan Aluminum Federation

2) Production trends

It is impossible to grasp the production trends for the world as a whole, so the production trends in aluminium products of key countries will be summarized using World Metal Statistics.

The world's largest producer of aluminium products is the U.S., which produced 5.45 million tons of semifinished products and 1.1 million tons of cast products in 1988, a total of 6.55 million tons. At second place was Japan with 2.25 million tons of semifinished products and 920,000 tons of cast products, a total of 3.17 million tons, followed by West Germany with 1.26 million tons of semifinished products and 450,000 tons of cast products, for a total of 1.71 million tons, Italy with 680,000 tons of semifinished products and 390,000 tons of cast products, for a total of 1.07 million tons, and France with 660,000 tons of semifinished products and 220,000 tons of cast products, for a total of 880,000 tons.

Countries with high rates of growth in production in 1988 compared with 1978 were Italy at 96 percent and Japan at 82 percent. The U.S. increased production 26 percent, while the U.K. saw a decrease in production of 13 percent.

Table 3-2-2: Production of Aluminium Products (1988)

(Unit: 1000 tons)

	Semifinished products	Cast products	Total	Rate of increase over 1978 (%)
1. U.S.	5,451	1,102	6,553	26.4
2. Japan	2,250	917	3,167	81.9
3. West Germany	1,258	449	1,707	38.3
4. Italy	680	392	1,072	95.7
5. France	666	223	879	30.8
6. U.K.	424	34	458	-13.4

Source: World Metal Statistics

(2) Global Trends in Trade of Aluminium Products and Position of Indonesia

A look will now be taken of the trends in global trade of aluminium products according to the trade statistics of the OECD countries, which account for about 80 percent of global trade.

[1] Plates, sheets, and strips

Total imports of the OECD increased from the US$2,283 million of 1980 to US$4,973 million in 1988. The biggest importer since 1985 has been the U.S., which accounted for an 18 percent share in 1988, followed at second place by West Germany with a 14 percent share. Japan imported US$200 million worth, for a 4 percent share.

The top 10 exporters were all Western countries, with West Germany being the largest at US$944 million, followed by France at US$700 million, and the U.S. at US$690 million. The main importers of these countries were mostly neighboring countries, with Canada being top for the U.S., France for West Germany, and West Germany for the U.K.

Looking at exports of the Asian countries and areas, Taiwan and Hong Kong have

been increasing their exports, primarily to Japan and the U.S., but the shares of Taiwan and Hong Kong in imports of the OECD were only small 0.3 percents (1988) each.

Exports of Indonesia have been rapidly increasing since 1986, mostly to Japan, but the value of the exports in 1988 was still only US$1.83 million.

Table 3-2-3: Imports of Plates, Sheets, and Strips by OECD

(Unit: US$ million)

Importer	1980	1985	1986	1987	1988
OECD as a whole	2,283	2,714	3,320	3,846	4,973
U.S.	136	767	809	746	874
West Germany	378	317	440	552	707
U.K.	295	295	356	463	583
Japan	81	39	49	95	201

Source: OECD trade statistics

Table 3-2-4: Exports of Plates, Sheets, and Strips of Asian Countries and Areas to OECD

(Unit: US$1000)

Importer	1980	1985	1986	1987	1988
R. Korea	15	283	576	836	1,917
Taiwan	3,941	430	1,379	8,740	16,844
Hong Kong	2,737	3,996	6,551	6,530	14,150
China		41	24	301	2,356
Indonesia		31	227	908	1,828
Malaysia		717	24	777	518

Source: Same as Table 3-2-3.

[2] Foil

Imports by the OECD substantially doubled from the US$900 million of 1985 to US$1,870 million of 1988. In 1980 and since 1985 the biggest importer has been France. In 1988, it imported US$300 million worth of foil, followed by West Germany and the U.S., with these three countries accounting for a 40 percent share of the total. Japan imported US$23 million, for a small 1 percent share.

The suppliers were neighboring European countries in the case of France and West Germany, with West Germany, Italy, and Switzerland being at top positions. The U.S. primarily imports from West Germany, Canada, and Japan.

The biggest exporter was West Germany, which accounted for 31 percent of the

imports of the OECD (1988). This was followed by Switzerland at 10 percent and Belgium and Luxembourg at 9 percent.

In the Asian countries and areas, R. Korea and Taiwan have been increasing their exports to Japan, but the value of their exports in both cases are low US$6 millions (1988). Indonesia exported US$80,000 in 1988.

Table 3-2-5: Imports of Foil by OECD

(Unit: US$ million)

Importer	1980	1985	1986	1987	1988
OECD as a whole	900	864	1,126	1,471	1,870
France	171	159	216	263	301
West Germany	113	112	165	212	264
U.S.	32	121	141	158	191
Japan	7	6	7	14	23

Source: Same as Table 3-2-3.

Table 3-2-6: Exports of Foil of Asian Countries and Areas to OECD

(Unit: US$1000)

Exporter	1980	1985	1986	1987	1988
R. Korea	611	1,558	1,996	3,238	6,030
Taiwan	57	133	115	2,555	6,209
China	76	1,136	313	473	511
Singapore	7	1,255	2,518	4,912	433
Indonesia		11		56	78

Source: Same as Table 3-2-3.

[3] Pipes

Imports of the OECD rose from the US$59 million of 1980 to US$394 million in 1987, but fell 15 percent in 1988 to US$337 million.

The European countries were the main importers, with the largest ones, France, West Germany, and the U.K., together accounting for a 48 percent share (1988).

The biggest exporter since 1985 has been West Germany, which accounted for 22 percent of imports of the OECD in 1988. This was followed by Belgium, Luxembourg, and the U.S.

Among the Asian countries and areas, R. Korea and Taiwan held the largest shares, but exports in 1988 fell compared with the previous year. There have been no

exports recorded for Indonesia since 1985.

Table 3-2-7: Imports of Pipes by OECD

(Unit: US$ million)

Importer	1980	1985	1986	1987	1988
OECD	59	214	325	394	337
France	4	38	55	79	63
West Germany	7	40	59	78	60
U.K.	8	25	30	35	37
Japan	2	1	2	3	3

Source: Same as Table 3-2-3.

Table 3-2-8: Exports of Pipe of Asian Countries to OECD

(Unit: US$1000)

Exporter	1980	1985	1986	1987	1988
R. Korea	19	22	381	1,994	410
Taiwan	422	479	655	1,342	177
Singapore	1	7	9	9	121
Indonesia	133				

Source: Same as Table 3-2-3.

[4] Pipe couplings

Imports of the OECD were a small US$59 million in 1988. The biggest importer up to 1987 was West Germany, but in 1988 Canada took that position by increasing imports seven fold compared with the previous year. The U.S. was the biggest exporter and did not have any imports. The other main exporters were West Germany and France, with these three countries accounting for a 58 percent share (1988).

In Asia, Taiwan has been exporting to the Netherlands and Australia.

Table 3-2-9: Imports of Pipe Couplings by OECD

(Unit: US$ million)

Importer	1980	1985	1986	1987	1988
OECD	35.6	26.2	33.3	42.8	59.2
Canada	2.3	1.0	1.0	1.1	7.8
West Germany	6.8	5.4	6.5	7.9	7.4
U.K.	2.7	3.1	3.3	3.7	7.6
Japan	1.2	1.4	1.3	1.5	1.9

Source: Same as Table 3-2-3.

Table 3-2-10: Exports of Pipe Couplings of Asian Countries and Areas

(Unit: US$1000)

Exporter	1980	1985	1986	1987	1988
Taiwan		116	231	334	422
Malaysia					120
Indonesia					

Source: Same as Table 3-2-3.

[5] Household goods

Imports of the OECD doubled from the US$212 million of 1980 to US$424 million in 1988. The biggest importer was Japan, pushing ahead of the U.S. in 1987 to assume top position. In 1988, it increased its share from 18 percent to 22 percent. The main suppliers of Japan are R. Korea and Taiwan, but Indonesia is also strong as the fifth placed supplier. The U.S. also imports large amounts from Taiwan and R. Korea, but in Europe regional imports are the rule.

The biggest exporters since 1980 have been Italy at top place followed by France at second. In the Asian countries and areas, the NIE's have been steadily increasing their exports and stand at top position among exporters. Indonesia appeared as an exporter in 1987 and increased its exports 17-fold in 1988.

Table 3-2-11: Imports of Household Goods by OECD

(Unit: US$ million)

Importer	1980	1985	1986	1987	1988
OECD	212	185	254	350	424
Japan	13	1	27	63	95
U.S.	41	48	52	61	74
West Germany	30	19	25	35	38

Source: Same as Table 3-2-3.

Table 3-2-12: Exports of Household Goods of Asian Countries and Areas to OECD

(Unit: US$1000)

Exporter	1980	1985	1986	1987	1988
R. Korea	10,428	8,668	14,018	33,401	51,292
Taiwan	17,692	25,723	29,676	37,608	38,743
Hong Kong	28,710	21,332	21,862	38,447	56,916
Thailand	317	740	1,045	1,467	3,631
Indonesia				269	4,535

Source: Same as Table 3-2-3.

3-2-2 State of Production and Imports/Exports of Third Country Markets and Position and Evaluation of Indonesian Products

(1) West Germany

1) Production and consumption

West Germany, according to Metal Statistics, is the world's fourth largest consumer of new aluminium metal after the U.S., Japan, and the Soviet Union. According to the statistics, the total consumption of aluminium was 1.92 million tons (1988) for West Germany, the largest in Europe, and the third largest in the world outside of the Centrally Planned Economies.

Total production of aluminium products, other than castings, in 1989 came to 1.28 million tons, a 35 percent increase compared with 1980. The 1.28 million tons breaks down into 880,000 tons of plate products and 400,000 tons of extruded products. The average annual rate of growth of rolled products from 1980 to 1989 was 4.1 percent, but for extruded products was 1.9 percent. The difference is due to differences in the growth of the demand industry. Plate products benefited from the performance of the automobile industry, which increased in demand for aluminium in the period, while extruded products felt the effects of the construction industry, which has been in a slump in activity. However, the construction industry has been improving since 1987 and along with this production of extruded products has been increasing as a general trend.

Table 3-2-13: Trends in Production of Aluminium Products

(Unit: 1000 tons)

Year	Plate products	Extruded products	Total
1980	615	338	953
1985	785	315	1,100
1989	881	399	1,280
1990 (Jan.-Jun.)	434	203	637

Source: Fachverband Aluminiumhalbzeug

Production of die cast products, which account for 53 percent (1989) of aluminium castings, increased from the 150,000 tons of 1981 to 250,000 tons in 1989, for a yearly increase of 7 percent.

Table 3-2-14: Trends in Production of Aluminium Castings

(Unit: 1000 tons)

Year	Aluminium castings	Die cast products
1981	307	146
1985	396	206
1989	476	252

Source: Gesamtverband Deutscher Metallgie Beveien

The increase in die cast products was due to the increased demand from the automobile industry, a major user. Castings feature [1] a high rate of production on order and [2] in-house production by major companies in the automobile industry. The rate of in-house production of die cast products has reached 41 percent.

Consumption of aluminium products reached 1.21 million tons in 1989. This breaks down into 770,000 tons of plate products and 470,000 tons of extruded products. The average annual rate of increase for the years 1980 to 1989 was 4.0 percent for plate products and 1.8 percent for extruded products. No statistics have been released on consumption by end uses.

Consumption of die cast products corresponds to production. By end uses, about 70 percent of the consumption is from the automobile industry.

2) Imports and exports

Table 3-2-15 shows the amount of imports and exports of plate products and extruded products. In particular, imports have grown since 1980. In 1989, imports stood at 260,000 tons for plate products and 190,000 tons for extruded products.

Table 3-2-15: Imports and Exports of Aluminium Products

(Unit: 1000 tons)

Year	Plate products				Extruded products			
	Exports	(Exports/ production)	Imports	(Imports/ consumption)	Exports	(Exports/ production)	Imports	(Imports/ consumption)
1980	210	(34.1)	140	(25.6)	73	(21.6)	101	(27.6)
1985	333	(42.4)	155	(25.5)	96	(30.5)	115	(34.4)
1989	373	(42.1)	257	(33.6)	120	(30.1)	188	(40.3)
1990 (Jan.-June)	174		139		59		109	

Source: Fachverband Aluminiumhalbzeug

A look at the ratios of exports to production and imports to consumption gives 42.1 percent for exports of plate products and 33.6 percent for imports and 30.1 percent for exports of extruded products and 40.3 percent for imports, with plate products being higher in exports and extruded products higher in imports.

Among the suppliers, the EC accounted for about 70 percent of the imports in 1989, but the EC's share fell for extruded products. A look at the amount of imports of plate products in 1989 by partner shows the EC at an overwhelmingly high 73.2 percent, but still lower than the 79.6 pecent of 1980. This was followed by Austria at 7.6 percent and Switzerland at 6.3 percent, with the European nations therefore being the main suppliers. Japan accounted for 1.2 percent, Bahrain, which first appeared in 1987, for 0.3 percent, and Venezuala, which began supplying in 1989, for 0.6 percent.

In extruded products, the EC accounted for 68.2 percent, but this fell from the 80.3 percent of 1980. The shares were increased by Austria, to 10.0 percent in 1989, followed by Norway to 4.8 percent and Switzerland to 3.4 percent, with nearby countries therefore holding top position. In Asia, India and Taiwan first appeared as suppliers in 1989, but the amounts of imports from them are very small.

3) Evaulation of Indonesian products

According to trade statistics, neither rolled products nor extruded products are being imported from Indonesia. The lack of imports was confirmed also from importers and industry parties.

In general, Indonesian products are viewed questionably in terms of price competitiveness due to the high cost of freight owing to the distance between West Germany and Indonesia. Further, there are concerns as to non price competition, such as quality, i.e., whether the quality is higher than that of other countries' products.

Leaving aside the general opinion, the experts could not in actuality make a specific evaluation due to the lack of participation of Indonesian products in the West German market.

First of all there is a problem in that detailed information regarding Indonesian aluminium products is not being supplied. At the very least provision of samples would be necessary for proposing entry into the West German market.

The experts agree that acceptance on the West German market requires that the DIN (Deutsches Institute für Normung) standards be met in the technology and quality of aluminium products.

Die cast products are by nature mostly produced on order or in-house, so entry into the West German market would probably be more difficult.

(2) U.S.

According to the 1988 edition of Metal Statistics, the U.S. led the world in both the production of new aluminium metal, at 3.94 million tons, and consumption, at 4.6 million tons. Total consumption of aluminium, which includes recycled metal and scrap, came to 6.72 million tons, 27 percent of the world consumption, again the largest amount in the world.

The U.S. aluminium market is characterized by a large share of plate products. Shipments of plate products in 1988 totaled 3.79 million tons, accounting for 68 percent of total shipments of aluminium products, excluding castings. The main application was for beverage cans, which account for about 50 percent of shipments of plate.

Table 3-2-16: Shipments of Aluminium Products

(Unit: 1000 tons)

Year	Plate products	Extruded products	Others	Total
1980	3,033	1,044	660	4,737
1985	3,290	1,267	473	5,030
1988	3,786	1,340	462	5,588

Source: Non Ferrous Metal Data 1988

1) Shipments and consumption

Shipments of plate products rose in volume an average annual 4.5 percent from the 3.01 million tons of 1986 to 3.45 million tons in 1989. It is estimated that shipments

increased 11.3 percent in 1987 compared with the previous year, while remained substantially the same in 1988 and increased slowly by 3.1 percent in 1989. Shipments increased in value from the US$7.4 billion of 1986 to US$10 billion in 1988.

Table 3-2-17: Shipments of Aluminium Products

(Unit: 1000 tons)

Year	Plate products	Foil	Bars and shapes	Pipes	Die cast products
1986	3,007	390	1,216	122	675
1987	3,347	393	1,238	124	684
1988	3,349	431	1,185	137	683
1989	3,453	402	1,121	130	662

Source: U.S. International Trade Commission

Shipments of foil increased in volume from the 390,000 tons of 1986 to 402,000 tons in 1989. It is estimated that shipments increased 9.6 percent in 1988 compared with the previous year, then fell 6.6 percent in 1989. Shipments fell slightly in value from the US$547.4 million of 1986 to US$546.6 million of 1987, but increased by a large margin of 30.6 percent to US$714 million in 1988.

A look will be taken now of the state of shipment of extruded products divided into bars and shapes and pipes. Shipments of bars and shapes increased slightly in volume in 1987 from the 1.22 million tons of 1986 the fell in 1988 and 1989 to hit 1.12 million tons in 1989. Shipments increased in value from the US$3.2 billion of 1986 to US$4.2 billion in 1988.

Shipments of pipes increased in volume from the 122,000 tons of 1986 to 140,000 tons in 1988, but dropped 5 percent in 1989 to 130,000 tons. Shipments increased in value from the US$470 million of 1986 to US$566 million in 1988.

Die cast products have increased in value, so while the volume of shipments has fallen, the value of the shipments have risen tremendously. The amount of shipments fell from the 675,000 tons of 1986 to 662,000 tons in 1989. On the other hand, the value of shipments increased from US$1.9 billion to US$2.7 billion in 1988, for an annual growth rate of 11.7 percent.

Imports and exports will be looked at in the next section, but the apparent consumption in 1989 and the average annual rate of increase from 1986 have been as follows: 3.4 million tons and a 1.8 percent increase for plate products, 392,000 tons and a decrease of 1.6 percent for foil, 1.1 million tons and a decrease of 8.1 percent for shapes, and 124,000 tons and a decrease of 0.3 percent for pipes.

Table 3-2-18: Trends in Apparent Consumption

(Unit: 1000 tons)

Year	Plate products	Foil	Bars and shapes	Pipes
1986	3,223	412	1,267	125
1987	5,470	408	1,276	123
1988	3,371	448	1,216	134
1989	3,403	392	1,101	124

Source: Same as Table 3-2-17.

2) Imports and exports

Exports of aluminium products increased by a wide margin in the period from 1986 to 1989 due to the depreciation of the dollar and the increase in overseas demand, while imports declined as a general trend.

Exports of plate products increased in volume from the 163,000 tons of 1986 to 382,000 tons in 1989, for an annual growth of 28.2 percent. On the other hand, imports declined from the 379,000 tons of 1986 to 344,000 tons in 1989, with the surplus in imports of 1986 reversing in 1989.

Table 3-2-19: Imports and Exports of Plate Products

(Unit: 1000 tons, %)

Year	Exports	Exports/shipments	Imports	Imports/consumption
1986	163	5.4	379	11.7
1987	228	6.8	347	6.3
1988	311	9.3	332	9.9
1989	382	11.1	344	10.1

Source: Same as Table 3-2-17.

Exports of foil increased by a wide margin from the 6,000 tons of 1986 to 35,200 tons in 1989 for an annual growth of 58.5 percent. On the other hand, imports declined from 27,300 tons to 24,500 tons in 1989.

Table 3-2-20: Trends in Imports and Exports of Foil

(Unit: 1000 tons, %)

Year	Exports	Exports/shipments	Imports	Imports/consumption
1986	6.0	1.5	27.3	6.6
1987	14.5	3.7	29.1	7.1
1988	15.6	3.6	33.1	7.3
1989	35.2	8.8	24.5	6.3

Source: Same as Table 3-2-17.

In extruded products, exports of bars and shapes increased from the 16,700 tons of 1986 to 38,400 tons in 1989. On the other hand, imports decreased from the 66,900 tons of 1986 to 18,500 tons in 1989, for a large 72 percent drop.

Table 3-2-21: Trends in Imports and Exports of Bars and Shapes

(Unit: 1000 tons, %)

Year	Exports	Exports/shipments	Imports	Imports/consumption
1986	16.7	1.4	66.9	5.2
1987	23.3	1.9	61.7	4.8
1988	22.8	1.9	53.8	4.4
1989	38.4	3.4	18.5	1.7

Source: Same as Table 3-2-17.

Exports of pipes increased from the 3,100 tons of 1986 to 7,700 tons in 1989, for an annual growth of 31 percent. Imports declined from 6,100 tons to 1,800 tons in 1989, a 70 percent drop.

Table: 2-2-22. Trends in Imports and Exports of Pipe

(Unit: 1000 tons, %)

Year	Exports	Exports/shipments	Imports	Imports/consumption
1986	3.1	2.6	6.1	4.9
1987	5.3	4.2	4.7	3.8
1988	6.4	4.7	3.8	2.9
1989	7.7	5.9	1.8	1.5

Source: Same as Table 3-2-17.

A look at imports of aluminium products from the Asian countries and areas shows Japan holding an overwhelmingly large share. Other suppliers were R. Korea, Hong Kong, Singapore, India, and Thailand. There were no imports from Indonesia.

Conversely, the U.S. exported aluminium products to Indonesia.

Table 3-2-23: Trends in Imports of Plate from Asian Countries

(Unit: 1000 dollars)

Year	Japan	Hong Kong	R. Korea	Brunei	India	Philippines	Thailand
1986	130,618	1,590	102	67			
1987	96,996	962	166		50		
1988	49,424	151	36			230	207

Source: Same as Table 3-2-17.

Table 3-2-24: Imports of Foil from Asian Countries

(Unit: 1000 dollars)

Year	Japan	India	R. Korea	Hong Kong
1986	4,389	302	14	
1987	4,594	432	17	
1988	9,492	221	148	21

Source: Same as Table 3-2-17.

Table 3-2-25: Imports of Pipe from Asian Countries

(Unit: 1000 dollars)

Year	Japan	R. Korea	Thailand	Singapore	Hong Kong	Malaysia	Philippines	India
1986	3,841	139	1.6	1.3				
1987	4,859	979			8.1			
1988	1,677	906				6.4	1.2	235

Source: Same as Table 3-2-17.

(3) Trends and Projections

The U.S. aluminum market continued on the path of recovery begun in 1987 in 1988, but slowed down in tempo in 1989. Domestic consumption of aluminum products fell from the previous year in volume in all products with the exception of plate products, which increased slightly. Therefore, while the volume of shipments has fallen for all except plate products, exports have increased, so the rate of decrease is smaller than the rate of decrease of domestic consumption. Behind the increase in exports have been the depreciation of the dollar and the booming demand in Eupope, Japan, and the Pacific Rim nations.

The decline in domestic demand in 1989 is due to the decline in shipments of transport machinery and construction, main users of aluminum. In transport machinery, while there are still orders on hand in the aircraft industry, the slump in the automobile industry has had its effect. The construction industry has been hit by the decline in housing construction and the increased use of alternatives to aluminum products.

The U.S. Department of Commerce believes that shipments remained substantially the same in 1990 despite the continued recession in the automobile industry and construction industry due to the increase in exports. From 1991 to 1994, the rate of use of aluminum in automobiles has increased, so an increase of about 2 percent a year is forecast.

(4) Suggestions on how to penetrate the U.S. aluminium products market

Imports of Indonesian aluminium products between 1986 and 1990 were almost nil. Importers and dealers are of the opinion that the following factors should be considered in order to make inroads into the U.S. aluminium market.

Quality is the first priority. Japanese aluminium products enjoy a share in the U.S. aluminium market because of their high quality. Price is a factor to be considered after quality. The U.S. aluminium market is believed to be price sensitive. Many companies consider on-time delivery important.

A recommended method for entering the U.S. market is the use of representatives. Approaches through trading houses such as J. Gerber are effective. Contact with the National Association of Aluminium Distributors is also recommended. Advertising in trade magazines such as Modern Metals and Metals Week and participation in trade fairs are useful activities. Considering the geographical distance between Indonesia and the U.S., it is suggested that the west coast market be targeted.

3-2-3 Production and Imports of Japan and Position of Indonesian Products

(1) Overview

Japan, according to Metal Statistics, is the world's second largest aluminium consuming country, consuming a total of as much as 2.97 million tons of aluminium (1988). The per capita consumption of aluminium is 28 kg (1988), top place in the world ahead of even West Germany and the U.S.

Domestic demand for aluminium products has grown rapidly, increasing about six-fold from the 380,000 tons of fiscal 1965 to 2.52 million tons in fiscal 1985 and reaching 3.26 million tons in fiscal 1988.

Table 3-2-26: Trends in Total Demand for Aluminium Products in Japan

(Unit: 1000 tons)

Year	Rolled products	Castings	Die castings	Domestic demand	Total demand
1965	234	62	62	379	443
1970	692	177	160	1,161	1,219
1975	1,076	171	207	1,593	1,745
1980	1,309	271	377	2,200	2,284
1985	1,686	292	500	2,527	2,756
1988	2,038	337	602	3,262	3,378

Source: Japan Aluminium Federation

A breakdown of rolled products, which account for 60 percent of demand, shows remarkable growth in plates and foil in recent years. Extruded products increased rapidly from 1965 to 1975 due to the increased use of aluminium for housing window and door frames. Plate products began growing tremendously around 1985.

Table 3-2-27: Trends in Demand for Rolled Products

(Unit: 1000 tons)

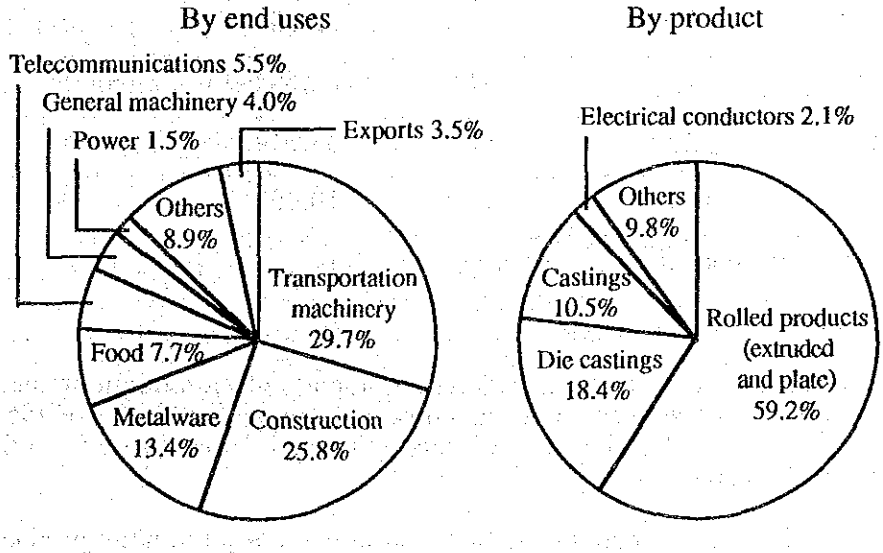
Year	Plate products	Extruded products	Foil
1965	152	69	17.9
1970	318	376	41.6
1975	343	612	52.6
1980	507	914	87.3
1985	802	890	112.1
1989	945	1,131	126.8

Source: Japan Aluminium Federation

By end uses, the demand for aluminium can be said to have the following features:

[1] Daily use items, which accounted for about 25 percent of demand in 1955, fell to 1.3 percent in 1989.
[2] Transport machinery where reduced weight is the aim has displayed remarkable growth and accounted for the largest share, 29 percent, of demand in 1989.
[3] Construction materials such as window and door frames for housing and buildings accounted for 26 percent of demand (1989).
[4] In plate, remarkable growth was shown by beverage cans such as beer cans, with 8 percent for food use (1989).

Fig. 3-2-2: Total Domestic Demand for Aluminum (1989)



Source: Japan Aluminum Federation

Next, looking at the supply system, the majors dominate the market for plate products, while 70 companies, including small and medium sized ones, produce extruded products.

First, production of primary ingot, the raw material, peaked at 1.19 million tons in 1977, but soaring energy prices after the oil crisis led a succession of companies to withdraw from refining, resulting in a drop to 35,000 tons in 1989. On the other hand, imports reached 2.15 million tons in 1988, with imports thus being relied on for almost the entire supply. Production of secondary ingot, however, increased steadily and reached 1.03 million tons in 1989.

Among rolled products, 16 companies are producing plate products, but the seven majors account for 96 percent of the shipments. Foil is being produced by seven firms.

Extrusion is handled along with rolling in six companies, by a building material group comprised mainly of five majors, and by a specialized group of 60 companies including small and medium sized firms.

Casting and die casting are handled in-house by large sized assembly companies, mostly in automobiles, and specialists comprised of small and medium sized firms. Electrical conductors are being produced by six large sized conductor manufacturers. In addition, there are canmakers and casters of daily use items.

Table 3-2-28: Trends in Imports of Aluminium Products

(Unit: tons)

Year	Rolled products	Daily use items	Others	Total	Share of demand
1965	1,322	17	789	2,128	0.5
1970	3,359	58	889	4,306	0.4
1975	20,607	1,309	1,785	23,701	1.0
1980	44,019	1,759	1,886	47,664	2.1
1985	33,371	2,435	3,108	38,912	1.4
1988	83,900	13,068	13,495	110,463	3.3

Source: Japan Aluminium Federation

(2) Imports and Position of Indonesia

According to the Japan Aluminium Federation, imports of aluminium products have increased overall, though with some ups and downs, from the 2,128 tons of 1965, and reached 110,000 tons in 1988. The share of imports in total demand rose from the 0.5 percent of 1965 to 3.3 percent in 1988.

An overview will be taken here of the trends in imports of aluminium products from 1985 to 1990, the countries of origin, and the state of imports from Indonesia according to Japanese trade statistics.

[1] Aluminium plate and strips (others)

The CCCN code of these products is 76.03-091 and the HS codes are 7606.11-

000 and 7606.91-000.

Imports increased in value from the 174.8 million yen of 1985 to 942.1 million yen in 1988, for a 5.4 fold rise, but dropped 11.1 percent in 1989 to 837.6 million yen. The main countries of origin since 1987 have been Romania, Hungary, Taiwan, and the U.S., with these accounting for about 60 percent of total imports. In 1989, Bahrain appeared as the fifth placed country of origin. Indonesia accounted for 98 million yen of imports, for a 1.2 percent share.

Table 3-2-29: Trends in Imports of Plates and Strips

(Unit: million yen)

Year	Import	Top three suppliers			Imports from Indonesia and share	
1985	1,748	Spain [1] 810	Brazil [2] 247	France [3] 214	8	0.5%
1986	2,386	Romania [1] 753	U.S. [2] 339	Spain [3] 316	—	—
1987	3,717	Hungary [1] 961	Romania [2] 907	U.S. [3] 462	5	0.1%
1988	9,421	Romania [1] 2,362	U.S. [2] 1,484	Hungary [3] 1,434	68	0.7%
1989	8,376	Romania [1] 1,453	Hungary [2] 1,194	Taiwan [3] 1,129	98	1.2%
1990	6,147	Romania [1] 1,308	Hungary [2] 1,113	France [3] 618	89	1.4%

Source: Japan Exports and Imports

[2] Aluminium alloy plate and strips (others)

The CCCN code of these products is 76.03-092 and the HS codes are 7606.12-090 and 7606.92-090.

Imports increased in value from the 733.7 million yen of 1985 to 1678.4 million yen in 1989, but decreased to 1511.9 million yen in 1990. The main countries of origin up to 1987 were the U.S., France, and Romania, but since 1988 there has been an increase in supplies from Bahrain, Belgium, and Taiwan. Japan imported 17 million yen worth of these products from Indonesia in 1986 and increased imports to 64 million yen in 1987, but imports fell once again to 17 million yen in 1989.

Table 3-2-30: Trends in Imports of Aluminium Alloy Plates and Strips
(Unit: million yen)

Year	Import	Top three suppliers			Imports from Indonesia and share	
1985	7,337	France [1] 1,725	U.S. [2] 1,719	Romania [3] 1,103	—	—
1986	5,799	U.S. [1] 2,167	France [2] 1,148	Romania [3] 731	17	0.3%
1987	9,923	U.S. [1] 4,260	France [2] 1,510	Romania [3] 701	64	0.6%
1988	15,665	U.S. [1] 4,285	Bahrain [2] 1,359	Taiwan [3] 920	38	0.2%
1989	16,784	France [1] 3,514	U.S. [2] 3,055	Belgium [3] 1,652	17	0.1%
1990	15,119	U.S. [1] 7,167	France [2] 3,221	Belgium [3] 899	14	0.01%

Source: Japan Exports and Imports

[3] Aluminium foil (thickness not more than 0.2 mm)

The CCN code of foil is 76.04-000 and the HS codes 7607.11-0000, 7607.19-000, and 7607.20-000.

Imports continued steadily to increase in value from the 1450 million yen of 1985 and reached 4179 million yen in 1989 but dropped to 3,573 million yen in 1990. The U.S. was the largest country of origin, with the U.S., Taiwan, and R. Korea being the top three suppliers since 1987. Starting from 1988, Italy also increased supplies. Imports from Indonesia stood at 9 million yen in 1990 for a 0.2 percent share.

Table 3-2-31: Imports of Aluminium Foil

(Unit: million yen)

Year	Import	Top three suppliers			Imports from Indonesia and share	
1985	1,450	U.S. [1] 487	R. Korea [2] 359	France [3] 353	—	—
1986	1,185	U.S. [1] 467	R. Korea [2] 293	France [3] 166	—	—
1987	2,038	U.S. [1] 644	R. Korea [2] 367	France [3] 309	—	—
1988	2,944	U.S. [1] 755	Taiwan [2] 691	R. Korea [3] 505	5	0.2%
1989	4,179	U.S. [1] 1,225	Taiwan [2] 829	R. Korea [3] 571	14	0.3%
1990	3,573	Taiwan [1] 839	U.S. [2] 583	R. Korea [3] 494	8	0.2%

Source: Japan Exports and Imports

[4] Parts for structures and aluminium plates, bars, shapes, pipes, and other materials processed for structures

The CCN code of these products is 76.08-0000 and the HS codes 7610.10-000 and 7610.90-000.

Imports grew about twelve-fold from the 1558 million yen of 1985 to 19,385 million yen of 1990. The biggest country of origin up to 1987 had been the U.S., but the lead position was taken by R. Korea in 1988 and Thailand in 1989. Indonesia stood at fifth place in 1988 with 588 million yen and at second place in 1990 with a four-fold increase to 2,499 million yen. The reasons for the rapid increases were the entry of Japanese company into Thailand and Indonesia and their export to Japan.

Table 3-2-32: Imports of Parts for Structures

(Unit: million yen)

Year	Import	Top three suppliers			Imports from Indonesia and share	
1985		U.S.	W. Germany	Netherlands		
	1,558	[1] 902	[2] 179	[3] 93	—	—
1986		U.S.	Canada	W. Germany		
	1,470	[1] 525	[2] 239	[3] 183	—	—
1987		U.S.	R. Korea	Taiwan		
	2,689	[1] 871	[2] 577	[3] 332	—	—
1988		R. Korea	Thailand	W. Germany		
	5,489	[1] 1,118	[2] 1,024	[3] 643	588	10.7%
1989		Thailand	Indonesia	U.S.		
	14,402	[1] 7,947	[2] 2,378	[3] 957	2,378	16.5%
1990		Thailand	Indonesia	U.S.		
	19,385	[1] 11,557	[2] 2,499	[3] 2,068	2,499	12.8%

Source: Japan Exports and Imports

[5] Household goods and parts for same

The CCCN code for these products is 76.15-100 and the HS code 7615.10-000.

Imports grew about five-fold from the 2737 million yen of 1985 to 13,475 million yen in 1989 but dropped to 10,730 yen in 1990. The biggest country of origin from 1986 to 1990 was R. Korea. Imports worth 36 million yen were recorded from Indonesia in 1987, but this rapidly rose to 558 million yen in 1988 and 1311 million yen in 1989. In 1990, Indonesia stood at third place with rapid increase to 1,720 million yen for 16.1% share in 1990. This is believed to have been due to OEM production by major utensil companies.

Table 3-2-33: Imports of Household Goods

(Unit: million yen)

Year	Import	Top three suppliers			Imports from Indonesia and share	
1985	2,737	France [1] 794	Taiwan [2] 594	Hongkong [3] 534	—	—
1986	4,411	R. Korea [1] 1,187	Hong Kong [2] 927	Taiwan [3] 873	—	—
1987	9,101	R. Korea [1] 3,528	Hong Kong [2] 2,356	Taiwan [3] 1,337	36	0.4%
1988	12,219	R. Korea [1] 5,041	Hong Kong [2] 3,231	Taiwan [3] 1,522	558	4.6%
1989	13,475	R. Korea [1] 4,370	Hong Kong [2] 3,963	France [3] 1,324	1,311	9.7%
1990	10,703	R. Korea [1] 3,710	Hong Kong [2] 2,540	Indonesia [3] 1,720	1,720	16.1 %

Source: Japan Exports and Imports

[6] Other aluminium products (others)

The CCCN code of these products is 76.16-090 and the HS code is 7616.90-000.

Imports increased from the 8,050 million yen of 1985 to 12,760 million yen in 1990. The biggest country of origin was the U.S., but its share has fallen from 59 percent in 1959 to 45 percent in 1990, while the shares of Taiwan and R. Korea have risen. There were 300,000 yen worth of imports from Indonesia in 1987 and 42 million yen in 1990, very small amounts.

Table 3-2-34: Imports of Other Aluminium Products

(Unit: million yen)

Year	Import	Top three suppliers			Imports from Indonesia and share	
1985	8,050	U.S. [1] 4,666	Hong Kong [2] 1,254	France [3] 504	—	—
1986	7,216	U.S. [1] 3,600	Hong Kong [2] 1,219	W. Germany [3] 526	—	—
1987	9,089	U.S. [1] 3,809	Taiwan [2] 1,393	Hong Kong [3] 807	0.3	0.0%
1988	9,456	U.S. [1] 3,446	Taiwan [2] 2,202	R.Korea [3] 1,071	—	—
1989	11,343	U.S. [1] 4,753	Taiwan [2] 3,096	R. Korea [3] 1,035	12	0.1%
1990	12,760	U.S. [1] 5,763	Taiwan [2] 2,863	R. Korea [3] 870	42	0.3%

Source: Japan Exports and Imports

(3) Interest of Japanese Companies in Investment in or Technical Tieups With Indonesia

A survey was run in October and November 1990 covering aluminium downstream product manufacturing companies in Japan to determine the possibilities of investment in and technical tieups with Indonesia.

Regarding the companies surveyed, questionnaires were sent to the 78 companies of the Japan Aluminium Federation for rolled products and the 131 aluminium die casting manufacturers among the companies belonging to the Japan Die Casting Association, for a total of 204 companies. Responses were obtained from 88, of which 85 were valid, for a response rate of 41.7 percent.

According to the findings of the survey, three companies were considering concrete investment projects in Indonesia and three companies were thinking of investing in Indonesia, but did not have specific investment projects in mind. Twenty-three companies responded that technical tieups with Indonesian companies were possible.

The merit of Indonesia as an investment site was given as low labor costs, while the problem mentioned overwhelmingly often was the shortage of engineers and skilled workers.

Overseas Investment

Looking at experience in overseas investment, 23 companies (27 percent) responded that they had such experience. The investment site mentioned most often, by 10 companies, was the U.S. In Asia, Malaysia was mentioned most often, by seven companies, followed by Taiwan by five companies, Thailand by four, and R. Korea by three. Indonesia was mentioned by two companies, with the investments being for aluminium construction materials and for balance weights.

Investment Sites of Companies Investing Overseas and Summary Thereof

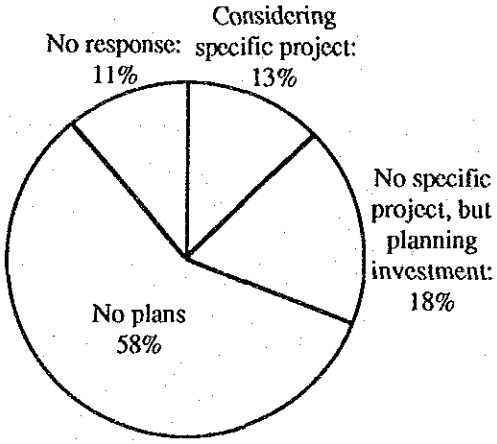
Country	Production line	Year of investment	Current state	Withdrawn
Taiwan	Die casting dies	1967		
5 companies	Auto parts, home sewing machines	1979	In operation	
	Auto parts	1987	In operation	
	Electronic related products	1982	In operation	
	Aluminium electronic components		In operation	
R. Korea	Die casting dies	1990	In preparation	
3 companies	Electronic related products, auto parts	1977	In operation	
	Aluminium foil rolling		In operation	
Thailand	Aluminium extrusions	1987	In operation	
4 companies	Aluminium extrusions	1988	In operation	
	Home construction materials	1987	In operation	
	Unknown	Unknown	In preparation	
Malaysia	Computer equipment parts	1990	In preparation	
7 companies	Aluminium precision products	1988	In operation	
	Manufacture of parts for various electronic products using aluminium/die castings	1990	In operation	
	Aluminium percolate fin	1990	In operation	
	Electronic related products	1988	In operation	
	Bauxite	1965	In operation	
	Home construction materials	1988	In operation	
U.S.	Die casting products	1986		
10 companies	Auto parts	1988	In operation	
	Aluminium disks	1987	In operation	
	Aluminium secondary alloy metal, scrap material	1987	In operation	
	Aluminium wheels etc.	1965	In operation	
	Die casting products	1987	In operation	
	Die castings	1985	In operation	
	Aluminium construction materials		In preparation	
	Aluminium secondary alloy metal	1989	In operation	
	Aluminium extrusion products	1986	In operation	
Indonesia	Rotors, balance weights	1989	In operation	
2 companies	Aluminium building materials	1988	In operation	
Singapore	Machine parts	1973	In operation	
2 companies	Auto parts	1988		
Philippines	Die castings and precision machining	1988	In operation	
Hong Kong	Building construction materials	1986	In operation	
China	Aluminium extrusions	1986	In operation	
India	Electronic related products	1987	In operation	
Mexico	Home sewing machines	1973	In operation	
U.K.	Die castings	1990	In preparation	
Canada	Aluminium metal	1974	In operation	

Regarding future overseas investment, 11 companies responded that they were considering specific projects. Eight countries/regions were mentioned as investment sites. Four companies were considering Thailand, three Indonesia and the U.S., and one each Malaysia, China, R. Korea, Taiwan, and the Philippines. Two had not yet decided.

Sixteen companies were considering overseas investment, but did not have specific projects yet in mind. Seven countries/regions were being considered as investment sites. Three companies mentioned Indonesia, and four for Thailand, two each for Malaysia and the U.S., and one each for China, R. Korea, and Europe, with two not yet decided.

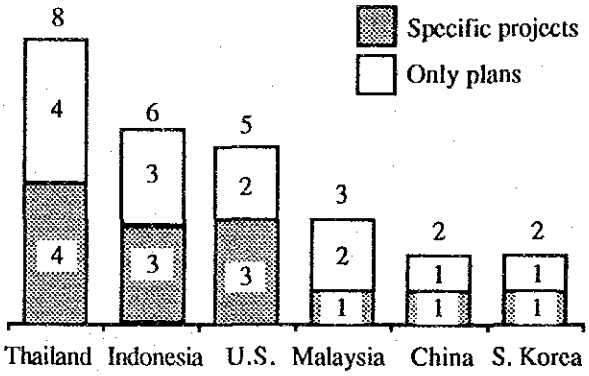
Putting together the companies considering specific projects and the companies planning to invest overseas but having no specific projects in mind, there are 27 companies interested in investment, that is, 31 percent of the companies showed an interest in overseas investment. The investment site mentioned most often, by a total of eight companies, was Thailand, but six companies expressed interest in Indonesia as well.

Fig. 3-2-3: Future Plans for Overseas Investment



Source: Survey in Japan

Fig. 3-2-4: Investment Sites



Source: Survey in Japan

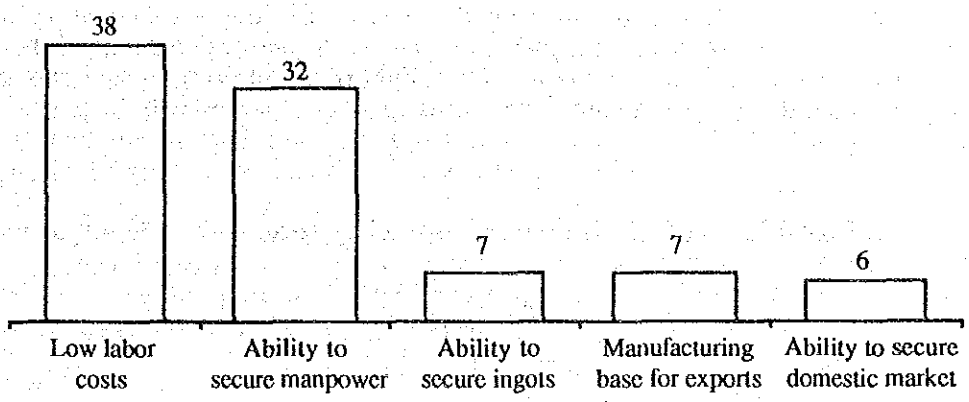
Regarding the object of the investment, 17 companies, the largest number, mentioned securing a market in the investment site, 11 imports of the products to Japan, and nine exports to third countries.

Investment in Indonesia

The merits of Indonesia as an investment site mentioned most often were the low labor costs, by 38 companies, and the ability to secure manpower, by 31 companies. The two combine for 69, making the cheap, abundant labor force the biggest attraction of Indonesia. Other responses were the ability to procure ingots domestically and the securing of an export base, by seven companies, and the ability to secure a market in Indonesia, by six companies.

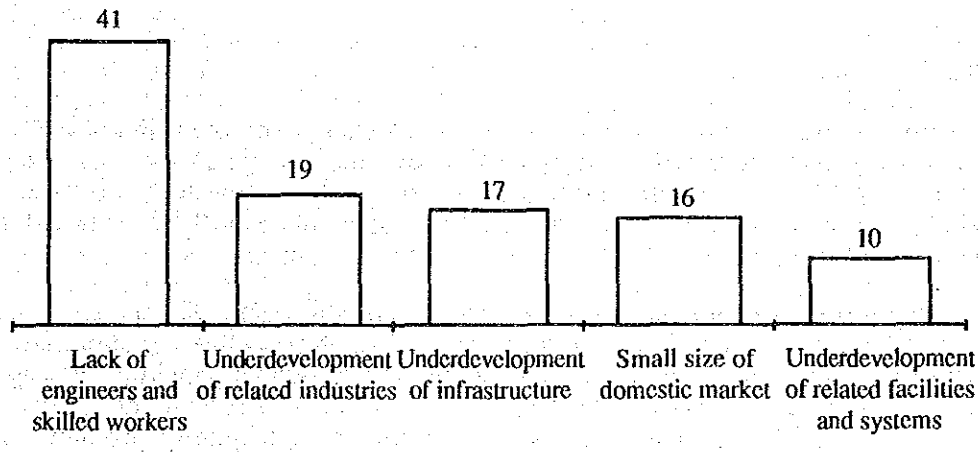
On the other hand, the biggest problems in Indonesia as an investment site are the shortage of engineers and skilled workers, mentioned by 41 companies, followed by the underdevelopment of related industries, by 19, the shortage of supply of adequate infrastructure, by 17, the small size of the domestic market, by 16, and the functional limitation of public testing and inspection organizations, research institutes, systems, etc., by 10.

Fig. 3-2-5: Merits of Indonesia as Investment Site



Source: Survey in Japan

Fig. 3-2-6: Problems in Indonesia as Investment Site

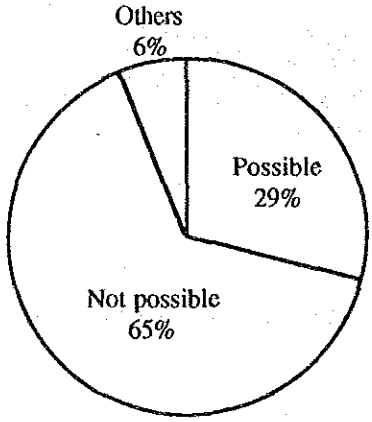


Source: Survey in Japan

Technical Tieups

Regarding the chance of meeting the desires of Indonesian companies for introduction of production technology, 23 companies (26 percent) responded there was such a chance. The conditions mentioned for supply of technology in such cases were reliability of the Indonesian company, mentioned by 24 companies, and the payment of a suitable fee, by 12.

Fig. 3-2-7: Possibility of Technical Tieup with Indonesian Companies



Source: Survey in Japan

Fifty-six companies responded there was no chance for extension of technology. The reasons given were that the companies did not transfer technology as a basic policy, mentioned by 20 firms, and that priority was given to direct investment over technical transfers, by eight. Other reasons given were the busy nature of the Japanese domestic market, lack of manpower, and the small size of the companies.

Regarding medium and long term management policies, the overwhelming majority of the companies, 74, mentioned reduction of costs through automation and labor saving, followed by 18 companies mentioning the establishment of a division of labor through overseas investment, technical transfers, and production tieups, by 17 mentioning technical innovation for specialization in high quality products, and 14 mentioning advancing into overseas markets to secure market shares there.

3-2-4 Production, Imports and Exports, and Promotional Policies of Thailand

Thailand's aluminium industry has grown as an import substitution industry for the past 10 years and in recent years has increased its exports as well. Thailand does not have smleter and relies on imports for the ingot. Imports of ingot had held at around 50,000 tons, but in 1988 reached 70,000 tons and in 1989 100,000 tons, reflecting an increase in the scale of production of the aluminium industry.

Consumption of aluminium is considered to be proportional to the level of economic development. The Thai economy has experienced continual high growth of around 10 percent a year since 1987 and this may be said to be a factor behind the increase in production of aluminium products.

(1) Overview

[1] For the electronic and telecommunications industries, aluminium products such as electrical conductors, foil, components for motors and power generators, and antennas are being produced. There are five companies producing electrical conductors.
[2] The household goods industry is producing components for home electrical appliances such as air-conditioners, refrigerators, washing machines, and fans and also manufacturing furniture and utensils. There are 12 companies manufacturing utensils.
[3] Production of aluminium products for the transport machinery industry has been rising rapidly. The products include cylinders, air-conditioners, wheels, carburetors, brakes, and oil filters. Thailand relies on imports for the majority of its dies.
[4] Fourteen companies are producing aluminium building materials for the construction industry. Production capacity is 60,000 tons a year. The liveliness of construction activity brought about by the economic growth and the changeover from wood to aluminium due to the termination of forestry concessions announced in 1989 have led to an increase in production aluminium materials. Production reached 11,350 tons in 1987, 16,315 tons in 1988, and 20,000 tons in 1989. Exports, which reached 7,000 tons in 1989, were mostly by the Japanese affiliate company.
[5] In addition, there is production of food packaging and containers and production, by small sized companies, of utensils, spoons, door handles, and propellers by sand molds.

(2) Imports and Exports

Thailand exports rods, wire, plates, foils, and pipes. Exports of rods have increased in volume, soaring from the 5 tons of 1983 to 615 tons in 1987, 1551 tons in 1988, and 6276 tons in 1989.

Table 3-2-35: Trends in Exports of Aluminium Products

(Unit: tons)

Year	Rods and profiles	Wire	Plates	Foil	Pipe
1983	5		512	250	135
1984	12		910	90	73
1985	214	1	616	110	91
1986	338	13	1,133	89	172
1987	615	34	363	43	384
1988	1,551	16	52	26	495
1989	6,276	14	66	167	93

Source: Third country survey

Looking at imports, there has been a plunge in imports of bars, domestic production of which has been boosted. Imports of wire, plate, and foil have increased since 1987.

Table 3-2-36: Imports of Aluminium and Products

(Unit: tons)

Year	Scrap	Ingot	Alloy	Powder	Bars and profiles	Wire	Plate	Foil	Pipe
1983		64,569	4,337	43	977	211	1,848	1,475	159
1984	51	43,825	5,415	28	1,323	214	2,225	2,195	170
1985	155	39,973	4,666	53	933	170	1,925	1,399	156
1986	420	42,206	5,606	33	511	345	1,140	1,145	76
1987	1,499	43,803	9,932	61	1,025	220	2,964	2,084	161
1988	4,716	45,500	26,601	82	767	342	2,509	6,638	267
1989	4,570	66,000	32,230	75	282	1,142	4,113	5,705	385

Source: Third country survey

(3) Projections and Policies

Thai's aluminium industry faces a bright future. In particular, production of aluminium die cast products for the automobile industry and motorcycle industry may be

expected to grow over the next 10 years. Production of aluminium products for the electronics industry, in which the number of companies being established is increasing, will probably grow as well.

Aluminium window and door frames and other building materials will probably be increasingly exported and will enjoy higher domestic consumption as well due to the changeover from wood materials.

There are no investment promotion policies or export promotion policies targeted solely at the aluminum industry, but general promotion measures are being applied. For example, in the aluminium building material industry, four out of 13 companies were making use of investment incentives from the Board of Investment. Looking at tariffs, the Thai government has held tariffs on raw materials low and raised tariffs on finished products. The import duty on metal is currently 6 percent and that for finished building materials is 35 percent.

3-2-5 Projections on Demand of Aluminium

(1) Projections by World Bank

The World Bank made projections of the total consumption of aluminium in the U.S., Japan, and four West European nations (West Germany, France, the U.K., and Italy) in 1988. These six countries together account for 71.1 percent of the total consumption of the world, outside of the Centrally Planned Economies.

According to the projections, total consumption of aluminium by the U.S., Japan, and the four West European countries will increase from the 13.52 million tons of 1988 to 16.52 million tons in the year 2000. This corresponds to an average annual growth rate of 1.4 percent. A look at the average annual growth rate by country shows Japan at the top with 2.0 percent, the four West European countries next at 1.8 percent, and the U.S. at the bottom at 1.0 percent.

A look at the end uses by countries shows high rates of increase for exports and transport in the U.S., packaging in Japan, and packaging in the four West European countries. Usage for electrical machinery is projected as falling in Japan and remaining stagnant in the four West European countries.

Table 3-2-37: Projections of Total Demand for Aluminium (By Main Sectors)

(Unit: 1000 tons)

	Results 1986	Projections 1990	1995	2000	Growth rate % 2000/86
U.S.					
Transportation machinery	1,441	1,500	1,350	1,800	1.6
Electrical machinery	629	620	605	590	-0.5
Construction	1,484	1,550	1,500	1,450	-0.5
Packaging	1,899	2,100	2,200	2,300	1.4
Others	1,182	1,240	1,320	1,400	1.2
Exports of semifinished goods	376	380	440	500	2.0
Total	7,001	7,390	7,715	8,040	1.0
Japan					
Transportation machinery	785	800	950	1,100	2.4
Electrical machinery	165	164	157	150	-0.6
Construction	736	750	850	950	1.8
Packaging	202	225	312	400	5.0
Others	602	611	650	690	1.0
Exports of semifinished goods	231	220	260	300	1.9
Total	2,721	2,770	3,179	3,590	2.0
Western Europe					
Transportation machinery	841	830	935	1,040	1.5
Electrical machinery	232	225	232	240	0.2
Construction	487	490	520	550	0.9
Packaging	298	320	410	500	3.8
Others	887	880	1,015	1,150	1.9
Exports of semifinished goods	1,062	1,075	1,238	1,401	2.0
Total	3,807	3,820	4,350	4,890	1.8

Source: World Bank

(2) Features of Aluminium Demand and Comparison with Demand for Ferrous Metals

Iron has been in use for thousands of years, while aluminium began to be used about a hundred years ago. Due to its superior properties, however, aluminium has come to be used for a wide variety of applications such as household goods, building construction materials, transport machinery, telecommunication equipment, etc. It ranks second among metal materials after iron in the amount of use.

The amount of aluminium consumed is said to be proportional to the level of the standard of living of a country.

Figure 3-2-38 shows the correlation between the per capita aluminium consumption and per capita national income in 1988 for the 15 countries for which data on both could be obtained. The coefficient of correlation between the per capita aluminium consumption and per capita national income of the 15 countries is 0.936, indicating that the amount of consumption of aluminium is strongly correlated with the per capita national income. (Note)

Table 3-2-38: Per Capita Consumption of Aluminium and Per Capita National Income (1988)

	Per capita aluminium consumption (kg)	Per capita national income (US$)
Japan	28.0	21,020
U.S.	27.5	19,840
Canada	26.8	16,960
Sweden	22.7	19,300
Singapore	20.8	9,070
Australia	20.3	12,340
Autria	18.1	15,470
Italy	18.0	13,330
Netherlands	17.5	14,520
France	16.0	16,090
Saudi Arabia	7.3	6,200
Turkey	2.2	1,230
R. Korea	1.2	3,600
Cameroon	1.2	1,010
Mexico	1.2	1,760

Source: Aluminium Statistics Review
World Bank Report 1990

Next, calculation of the coefficient of correlation of domestic demand for aluminium in Japan and the real gross national product for the years 1955, 1960, 1965, and 1967 to 1988 gives a value of 0.984, indicating a strong correlation. Demand for aluminium indeed may be said to increase along with economic development.

(Note) The coefficient of correlation is calculated according to the following equation:

$$r = \frac{\Sigma xy - (\Sigma x \Sigma y) / N}{\sqrt{[\Sigma x^2 - (\Sigma x)^2 / N][\Sigma y^2 - (\Sigma y)^2 / N]}}$$

Next, let us compare the demand of aluminium and the demand for iron.

It is also said for iron that the higher the level of income of a country the greater the consumption, but iron is characterized by a surge in consumption when an economy advances to the stage of full-scale industrialization and then slows in the rate of increase.

For example, the elasticity of the apparent domestic consumption of ferrous metals with respect to the rate of growth of the real gross national product in the case of Japan was 2.84 from 1960 to 1970, 0.24 from 1970 to 1980, and -0.18 from 1980 to 1987, i.e., fell continuously.

The reason why the increase in domestic demand for iron slows after a certain stage of economic development is that during a period of high economic growth, material consumption type heavy industries, such as the heavy machinery and chemical industries, and social capital grow rapidly, so the use of iron increases proportionally, but when an advanced stage of economic development is reached, [1] the importance of materials declines due to the higher grade of industrial products made, [2] higher added value industries such as electronics, which use less energy and materials, become the mainstream, and [3] the share of the service industries rises, so the consumption of ferrous metals per unit economic size falls. While somewhat old data, a look at the elasticity of the growth rate of consumption of ferrous metals from 1968 to 1978 with respect to the growth of the GDP shows low values in the advanced industrialized nations, i.e., 0.21 in the U.S. and 0.45 for West Germany, and higher ones for R. Korea, 1.97, and Brazil, 1.30.

Note that the elasticity of consumption of aluminium with respect to the real growth of the gross national product in the case of Japan was 1.79 from 1960 to 1970, 1.43 from 1970 to 1980, and 1.13 from 1980 to 1987.

Table 3-2-39: Trends in Demand for Aluminium in Japan and Real Gross National Product

Year	Domestic demand for aluminium (ton)	Real gross national product (billion yen)
1955	69,104	36,677.6
1960	209,333	56,371.0
1965	378,747	87,991.6
1967	649,770	108,193.6
1968	839,450	122,071.9
1969	1,059,673	137,331.6
1970	1,161,194	152,112.7
1971	1,260,495	158,766.8
1972	1,569,232	172,317.7
1973	1,994,054	185,922.9
1974	1,435,121	183,285.2
1975	1,592,788	188,189.2
1976	1,935,763	197,214.8
1977	1,858,646	207,737.9
1978	2,110,691	218,521.5
1979	2,368,139	230,073.7
1980	2,199,620	239,914.5
1981	2,210,285	248,725.9
1982	2,223,835	256,395.2
1983	2,381,154	264,703.7
1984	2,435,174	278,140.1
1985	2,526,918	291,806.9
1986	2,602,506	299,023.9
1987	2,979,807	312,903.2
1988	3,262,223	330,886.9

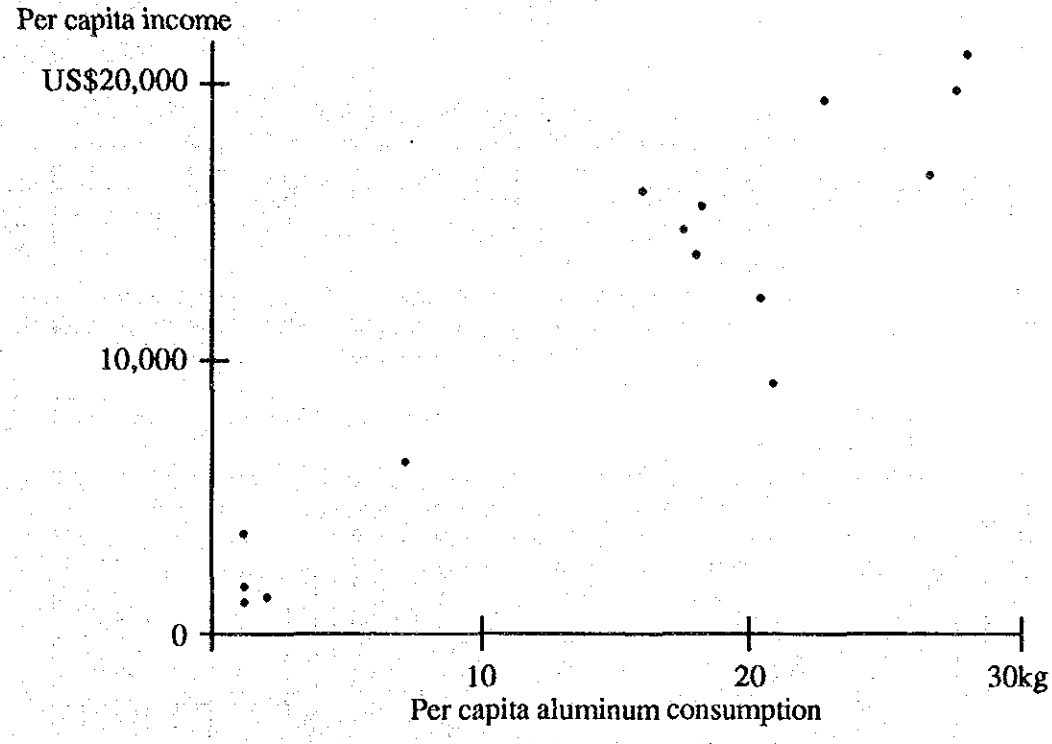
Source: Japan Aluminium Federation and Keizai Tokei Yoran (Economic Statistical Review)

Table 3-2-40: Elasticity of Aluminium Demand and Consumption of Ferrous Metals to Real Gross National Product

	Average annual growth rate of domestic demand for aluminium [1]	Elasticity [1]/[3]	Average annual growth rate of apparent consumption of ferrous metals [2]	Elasticity [2]/[3]	Average annual growth rate of real gross natural product [3]
1960~70	18.7%	1.79	29.6%	2.84	10.4%
1970~80	6.6%	1.43	1.1%	0.24	4.6%
1980~88	4.4%	1.13	-0.7%	-0.18	3.9%

Source: Same as Table 3-2-29. The figures for the apparent consumption of ferrous metals are taken from Tekko Tokei Yoran 1988 (Ferrous Metal Statistical Review)

Fig. 3-2-8: Point Graph of Correlation between Per Capita Aluminium Consumption and Per Capita National Income

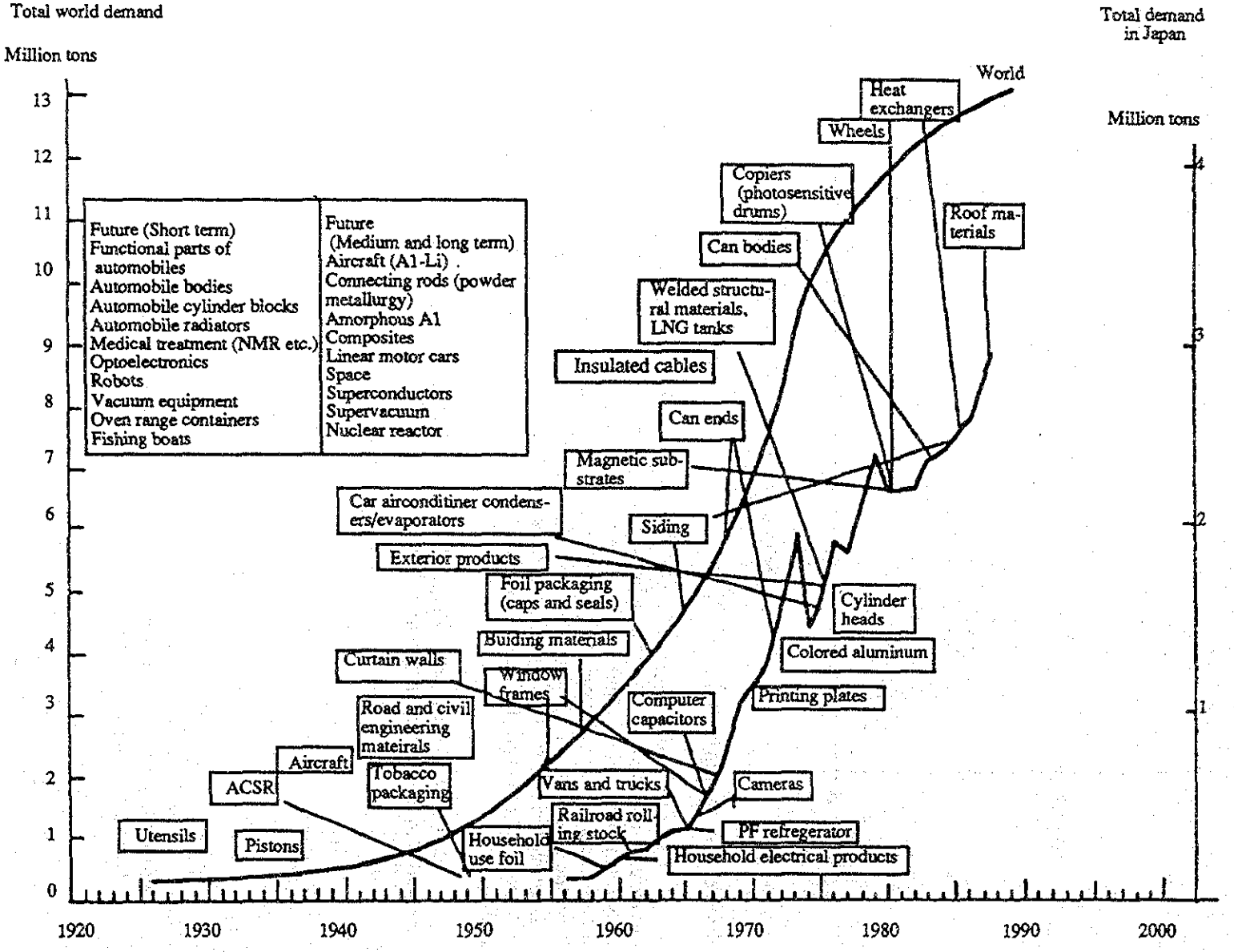


Source: Prepared from Table 3-2-38.

The reason why demand for aluminium has grown in the advanced nations is the development of diverse products using the same due to its lightness, corrosion resistance, easy formability, good conductivity, ease of recycling, and other superior features, with it therefore replacing other metal materials and wood. Prime examples of this in Japan have been the conversion from wood window and door frames to aluminium ones, the changeover from beer bottles and steel beer cans to aluminium cans, the use of aluminium external wall materials for skyscrapers, and the greater use of aluminium in railroad rolling stock.

Figure 3-2-8 shows the relationship between the development of aluminium products and the growth in demand.

Fig. 3-2-9: Examples of Products Creating New Demand for Aluminum



Source: Tsusan Shiryo Chosaikai

3-3 Aluminium Industry of Indonesia

3-3-1 Current State of Aluminium Industry

(1) Summary

The aluminium industry is classified in the nonferrous metal industry (industrial classification code 372) by the three-digit classification of Indonesia's industrial statistics. No data for the aluminium industry per se is given. Therefore, it is impossible to obtain a grasp of the number of companies, number of employees, or amount of value added production of the aluminium industry from the industrial statistics.

Therefore, an effort was made to obtain a grasp of the actual situation by materials supplied by the Ministry of Industry, materials of private research companies, and data acquired from companies by the survey team in the field survey.

1) Structure and scale of aluminium industry

The Indonesian aluminium industry began with the production of cups for collecting rubber tree milk. According to Nota Keuangan 91/92, production of aluminium extruded products and plate products began in fiscal 1975 and 1976, with production in fiscal 1975/1976 reaching 2,400 tons in extruded products and 5,200 tons in plate products.

Figure 3-3-1 shows the structure of the industry from refining to final processed products based on various materials.

Table 3-3-1: Trends in Production of Aluminium Products

(Unit: 1000 tons)

	75/76	80/81	85/86	86/87	87/88	88/89	89/90	90/91
Extruded products	2.4	11.8	11.0	12.0	12.5	14.6	17.4	40.0
Plate products	5.2	59.8	26.5	24.7	29.0	32.7	28.4	47.2

Source: Nota Keuangan 91/92, Lampiran Pidato Kenegaraan Presiden 1991
Note: Figures for fiscal 1990/91 are provisional.

Fig. 3-3-1: Structure of Indonesian Aluminum Industry

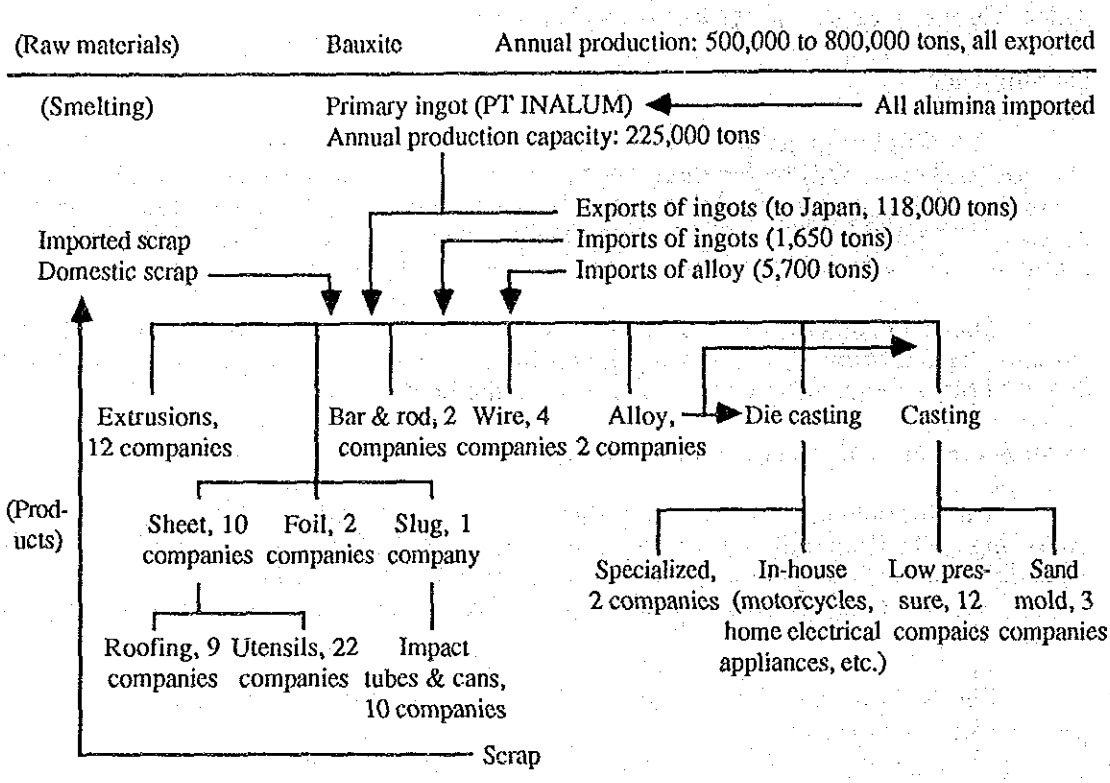
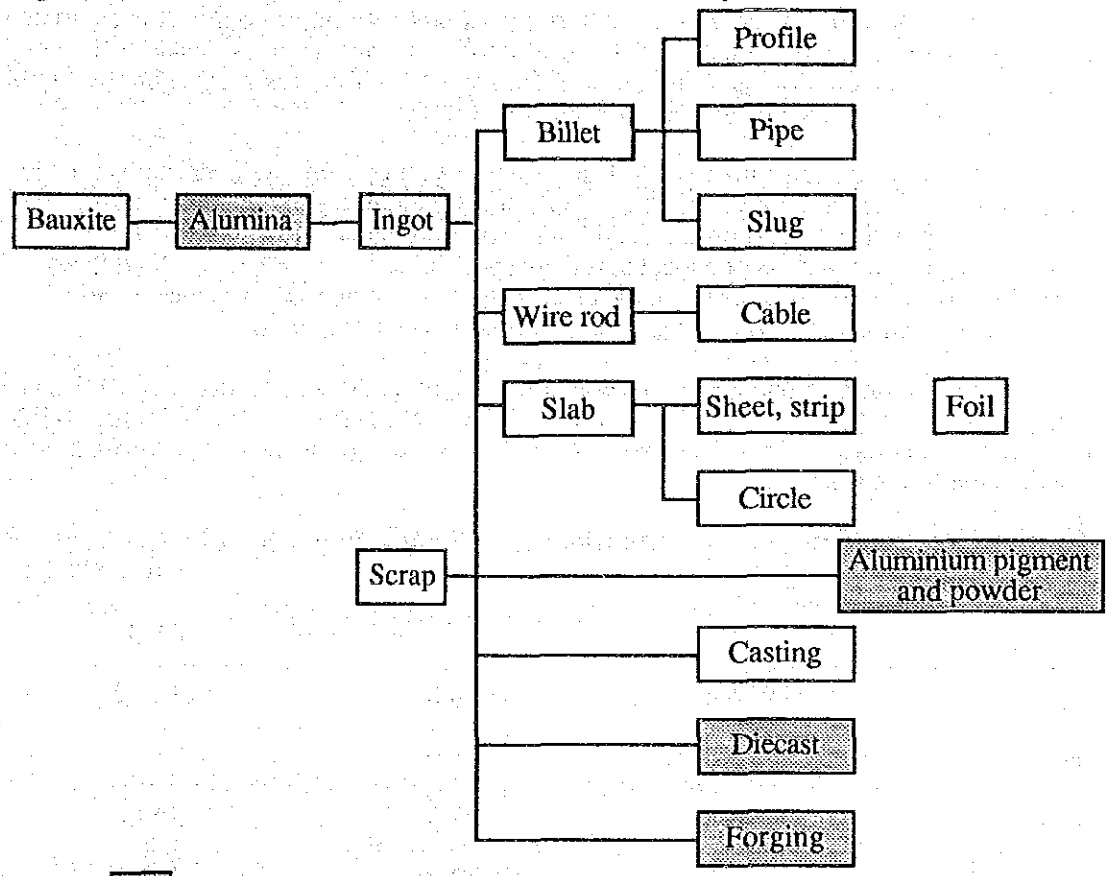


Fig. 3-3-2: Flow Chart of the Aluminium Industry



Note: Items which are not domestically produced

Source: Ministry of Industry, Replita V

It is difficult to obtain a grasp of the amount of aluminium used due to the limitations on data, but if the various materials available are put together, it is estimated that 30,000 tons of extrusions and 40,000 tons of sheet are used. According to Metal Statistics, 55,000 tons of new metal was consumed by Indonesia in 1988, so about 70,000 tons is considered probable as of the end of 1990.

According to the Ministry of Industry, items ranging from raw material bauxite to final products which are not yet produced domestically include alumina, aluminium pigment and powder, forged products and diecasting products. However, the field survey revealed that there is one local company specialized in diecasting production and several motorcycle manufacturers, home electric appliance manufacturers and electric component manufacturers which make parts through in-house diecasting.

The amounts of primary ingot consumed by other Asian countries in 1988 were 340,000 tons for India, 270,000 tons for R. Korea, 175,000 tons for Taiwan, 70,000 tons for Thailand, and 36,000 tons for Malaysia, with Indonesia positioned between Thailand and Malaysia.

Table 3-3-2: Amount of Consumption of Primary Ingot by Asian Countries
(Unit: 1000 tons)

	1986	1987	1988
Japan	1624.6	1696.8	2123.2
India	310.0	326.0	337.0
R. Korea	196.8	207.9	268.0
Taiwan	150.4	177.8	175.7
Thailand	47.8	53.8	72.0
Indonesia	51.4	68.0	55.0
Malaysia	26.4	31.5	35.7

Source: Metal Statistics

Looking at the demand by end uses, sheet products, utensils account for a high approximately 70 percent share while sheet roofing is increasing. In the advanced industrialized countries, the share of utensils is a low 10 to 20 percent due to the growth in demand for aluminium cans, packaging materials, and electrical components. The high share accounted for by utensils shows that the Indonesian aluminium rolling industry is still in the early stages of development. Extrusions mainly consist of showcase parts and parts for other facilities, building materials, and exports.

2) Number of companies, production, etc.

Using materials of the Ministry of Industry and data of companies visited, the number of companies and production by product are estimated as follows: It was not possible, however, to confirm if some companies were still at the stage of acquiring licenses or had already commenced operations.

Table 3-3-3: Number of Manufacturers of Aluminium Products, Production Capacity, and Number of Employees

Product	No. of companies	Production capacity (tons/year)	No. of employees	PMA companies
Aluminium alloy	5	121,600	464	1
Note: 1. PMA company is now in construction. 2. According to PMA company which is planning to produce 24,000 tons a year, was approved in 1990.				
Aluminium wire rod	3	20,600	275	
Note: One company is excluded as production could not be confirmed.				
Aluminium alloy Wire rod	2	14,200	(205)	
Note: The number of employees is calculated twice with that of aluminium wire rod.				
Aluminium extrusion	12	37,700	3,383	1
Aluminium bar	2	1,390		
Aluminium sheet	10	73,300	1,509	1
Note: 1. According to the field survey, one company in Medan (1200 tons) is producing sheet. Further, Indonesia Commercial Newsletter indicates that another company (1200 tons) is producing sheet. 2. According to BKPM, PMA company, which is planning to produce 20,000 tons of sheet a year, was approved in 1985, and PMDN company, which is planning to produce 15,000 tons a year, was approved in 1990.				
Aluminium can	1	10,000	155	
Note: 1. Test production started in December 1990 and commercial production started in February 1991.				
Aluminium foil	2	4,800	280	
Note: 1. Production capacity indicates capacity for only one company. 2. According to BKPM, one PMA company, which is planning to produce 5000 tons a year, was approved in 1985, and one PMDN company, which is planning to produce 10,000 tons, was approved in 1990.				
Aluminium slug	3	3,400	118	

Source: Ministry of Industry, Daftar Perusahaan Industri Logam dan Dasar 1990.

In addition, according to data of Directorate General of Multifarious Industries 22 companies produce household utensils, the seven major companies which were visited were producing a total of about 20,000 tons a year. Impact tubes and cans were produced by 10 companies, but the amount of production and numbers of employees are not known.

The aluminium industry, with the exception of one company located in Riau, is located in Jakarta and its environs (Jabotabek region), Bandung, Surabaya, and Medan. In particular, numerous companies are located in the Jabotabek region.

(2) Summary of Companies Surveyed

The survey team visited 42 aluminium downstream product companies during its field survey of September 26 to November 22, 1990. Broken down by products, these included nine companies making extrusions, seven rollings, six impact tubes and cans, seven die castings, seven utensils, four roofing, two low pressure castings, three mold castings, two wires, and one alloy. Some companies were manufacturing plate, utensils, and roofing, so when broken down by product the total comes to 47 companies. In addition, one utensil company and one impact tube and can company were surveyed by questionnaire alone, bringing the total number of companies surveyed to 49. As mentioned earlier, however, responses to questionnaires could not enough be obtained from Surabaya and Bandung, so only 24 questionnaires were recovered.

Regarding the year of establishment of the companies surveyed, the majority of them, 19, were established from 1971 to 1980, followed by 17 from 1981 to 1990, reflecting the fact that the aluminium product industry is a new industry. Four companies were established before 1970 and two utensil companies were established in the 1950's. In terms of location, the largest number of companies, 25, were located in the Jabotabek region. In addition, there were nine companies in Surabaya (including one in Madiun), four in Medan, and two in Bandung

Table 3-3-4: Year of Establishment of Companies Surveyed

	Extrusions	Rollings	Roofing	Utensils	Impact tubes and cans	Die casting	Low pressure castings	Mold castings	Wire	Alloys	Total
1970 or earlier		1		2(1)	1	1					5 (1)
1971-80	5	5	3 (3)	5 (2)	1	4			1		24 (5)
1981-85	2 (1)	1	0	1 (1)	2	2	1	1	1		11 (2)
1986-1990	2		1		1		1	2		1	8
Total	9	7	4	8	5	7	2	3	1	1	48

Notes: One of the impact tube and can companies did not respond. Figures in parentheses indicate number of overlapping companies.
Source: Interview survey and questionnaire survey.

Table 3-3-5: Location of Companies Surveyed

	Extrusions	Rollings	Roofing	Utensils	Impact tubes and cans	Die casting	Low pressure castings	Mold castings	Wire	Alloys	Total
Jabotabek	4	2	2 (1)	3 (1)	3	7	1	2	2	1	27 (2)
Surabaya	1 (1)	3	1 (1)	3 (1)	2		1	1			12 (3)
Medan	3	1		1 (1)							5 (1)
Bandung	1	1	1 (1)	1 (1)							4 (2)
	9	7	4	8	5	7	2	3	2	1	48

Notes: One of the impact tube and can companies did not respond. Figures in parentheses indicate number of overlapping companies.
Source: Interview survey and questionnaire survey.

Table 3-3-6: Size of Companies Surveyed

	Extrusions	Rollings	Roofing	Utensils	Impact tubes and cans	Die casting	Low pressure castings	Mold castings	Wire	Alloys	Total
500 or more employees	1	3	1 (1)	4 (2)		6					15 (3)
100 to 499	7 (1)	4	2 (2)	2 (2)	3		1	2	2		23 (5)
20 to 99	1			2	2	1	1	1		1	9
19 or less			1								1
Total	9	7	4	8	5	7	2	3	2	1	48

Notes: One of the impact tube and can companies did not respond. Figures in parentheses indicate number of overlapping companies.
Source: Interview survey and questionnaire survey.

A look at the size of the companies shows that 30 of the 48, the majority of the companies, were large companies as defined by the Central Bureau of Statistics, i.e., had 100 or more employees. There were also a large number, 12, of companies with 500 or more employees. A look by product shows that the highest proportions of large companies were in rollings and extrusions, showing the fact that the industry requires a large initial capital investment.

Next, a look will be taken of the situation for individual products. Note that the state of exports and corporate management and production technology are discussed in detail later in section 3-3-2.

Extrusions

Nine of the 12 companies estimated to have been engaged in production were visited. One company was even rolling its own plate. One company was established in 1970, four from 1971 to 1980, and four from 1981 to 1990. Four were located in Jabotabek and three in Medan. There were one company each in Surabaya and Bandung. All but one company, a medium sized one, were large companies. One company, company A, was a foreign affiliate. Company K changed in status from PMA to PMDN in 1988.

In terms of production volume, the Japanese affiliated company A had the largest capacity, 600 tons/month. Other majors were company B in Surabaya, at 500 tons/month, and company E in Jabotabek, at 400 tons/month. Six out of nine companies were working on three shifts. A comparison of the production capacities and production volumes shows that most of the companies are working at full or near full capacity production. The operating rates have been rising due to construction boom which started in 1989. Four companies were exporting. Among the local companies, company B and company C were receiving technical guidance from foreigners.

Table 3-3-7: Summary of Companies Surveyed (Extrusions)

Company	(1) Year of establishment	(2) Location	(3) Employees	(4) Production capacity (tons/month)	(5) Production volume (tons/month)	(6) Shift	(7) Export experience	(8) Main products	(9) Remarks
A	1986	Jabotabek	472	600	600	3	Yes	Aluminum construction materials	Japanese affiliated
B	1985	Surabaya	450	500	700	2	Yes	Extruded shapes	
C	1972	Jabotabek	325	320	320	3	Yes	Aluminum construction materials	Changed from PMA to PMDN
D	1972	Bandung	160	100	200	2	No	Extruded shapes	
E	1977	Jabotabek	440	400	400	3	Yes	Extruded shapes	
F	1971	Jabotabek	30	30	50	1	No	Aluminum construction materials	
G	1983	Medan	172	100	100	3	No	Extruded shapes	
H	1970	Medan	150	150	150	3	No	Extruded shapes	
I	1986	Medan	215	100	100	3	No	Extruded shapes	

Plate and Foil

It is estimated that 10 companies are making plate and two companies are making foil. Of these, seven companies were surveyed. In most cases the plate manufacturing companies also were producing other products, such as roofing in one company, extrusions in one, and utensils in four. One company had changed in status from PMA to PMDN, making all the companies local companies. In terms of production facilities, the pull-over rolling system, which disappeared in Japan over 20 years ago, was used by four companies. Three companies were engaged in coil rolling.

Looking at the year of establishment, company E, producing utensils, was the oldest, being established in 1950. Five were established from 1971 to 1980 and one in 1985, with these companies thus being relatively older in history than those in extrusions. A look at the size of the companies shows all of the companies are large ones, with three even having 500 or more employees, this being due in part to the fact that most of the companies also have utensil manufacturing divisions.

Company A of Surabaya was superior to the other companies in terms of production capacity and production volume. The company was supplying plate material to other utensil manufacturing companies and roofing manufacturing companies. A comparison of the production capacities and production volumes shows that most companies are operating at a rate of about 80 percent. Four of the eight companies were exporting.

Table 3-3-8: Summary of Companies Surveyed (Plate and Foil)

Company	(1) Year of establishment	(2) Location	(3) Employees	(4) Production capacity (tons/month)	(5) Production volume (tons/month)	(6) Shift	(7) Export experience	(8) Main products	(9) Remarks
A	1980	Surabaya	600	1,600	2,000		Yes	Coil and foil	
B	1973	Jabotabek	160	400	500	2.3	No	Sheet and coil	Changed from PMA to PMDN
C	1985	Surabaya	450	400	500	2	Yes	Sheet	
D	1973	Jabotabek	642	150	150	2	No	Sheet (utensils)	PMA, pull-over
E	1950	Bandung	770	100	100		Yes	Sheet (utensils)	Pull-over
F	1976	Surabaya	270	180	200		No	Sheet (utensils)	Pull-over
G	1977	Medan	120	100	100		Yes	Sheet (utensils)	Pull-over

Roofing

Four of the nine companies believed to be engaged in production activities were visited. Company A is the same as company A of plate, company C the same as company D of extrusions, and company D the same as company C of extrusions. Company A was the largest and monopolizes the supply of aluminium coil material. Two companies were exporting.

Table 3-3-9: Summary of Companies Surveyed (Roofing)

Company	(1) Year of establishment	(2) Location	(3) Employees	(4) Production capacity (tons/month)	(5) Production volume (tons/month)	(6) Shift	(7) Export experience	(8) Main products	(9) Remarks
A	1980	Surabaya	600	300			Yes	Roofing and coil	
B	1988	Jabotabek	19	150		1	Yes	Roofing	
C	1972	Bandung	160	100		2	No	Roofing	
D	1972	Jabotabek	300	150			No	Roofing	

Utensils

Eight of the 22 companies estimated to be engaged in production activities were visited. Four of the companies were also producing sheet. The production of aluminium products in Indonesia began with cups for collecting rubber tree milk. The utensil companies therefore have a long history, with two even going back to the 1950's. Five companies were established from 1971 to 1980. Two companies were medium size and six large size. Three were located in Jabotabek, three in Surabaya, and one each in Medan and Bandung.

Judging from the company size, production volume, and level of technology, company A of Surabaya is the top ranked firm and even exports Teflon coated products and OEM products to Japan. Company B of Bandung also manufactures Teflon coated products and also thick high class products.

Four companies were exporting, and one company, company C, was of foreign equity.

Table 3-3-10: Summary of Companies Surveyed (Utensils)

Company	(1) Year of establishment	(2) Location	(3) Employees	(4) Production capacity (tons/month)	(5) Production volume (tons/month)	(6) Shift	(7) Export experience	(8) Main products	(9) Remarks
A	1972	Surabaya	4,000	800		2	Yes	Kitchenware, Teflon coating	
B	1950	Bandung	770	150		1	Yes	Kitchenware, Teflon coating	
C	1973	Jabotabek	642	150		2	Yes	Kitchenware	PMA
D	1976	Surabaya	270	180		2	No	Kitchenware	
E	1954	Surabaya	750	310		1	No	Kitchenware	
F	1981	Medan	63	100		1	Yes	Kitchenware	
G	1980	Jabotabek	272	50		1	No	Kitchenware	
H	1977	Jabotabek	40			1	No	Kitchenware	

Impact Tubes and Cans

Five of the 10 companies estimated to be engaged in production were visited. Only a response to a questionnaire was received from another company. Two companies were established in the1970's and three in the 1980's. Three companies were located in Jabotabek and two in Surabaya. The companies were smaller than those dealing in other products, with two being medium size and three large size, but all of the latter having under 150 employees. Six out of the six companies were exporting. Company B of Surabaya was PMA in status, while the rest were local companies.

Table 3-3-11: Summary of Companies Surveyed (Impact Tubes and Cans)

Company	(1) Year of establishment	(2) Location	(3) Employees	(4) Production capacity (tons/month)	(5) Production volume (tons/month)	(6) Shift	(7) Export experience	(8) Main products	(9) Remarks
A	1982	Jabotabek	70	150		2	Yes	Impact can	
B	1970	Surabaya	126	30		3	No	Impact tube	PMA
C	1977	Jabotabek		20			Yes	Impact can	
D	1989	Jabotabek	103	10		2	Yes	Impact tube	
E	1982	Surabaya	24	15		1	Yes	Impact can	
F		Jabotabek	150			2	Yes	Impact can	