Die Castings

In the field survey, while it was estimated that several companies were specializing in die casting, only one specialized company could be visited. In addition, however, there were motorcycle manufacturers, home electrical appliance manufacturers, and electrical component manufacturers which made parts from die castings in-house. These latter companies were all PMA companies. The only local company was the specialized one. The PMA companies bring in production facilities from their parent countries, have foreign engineers stationed, and have levels of technology, quality control, etc. based on those of their parent companies. Therefore, the gap from the local company is striking in all of these areas.

In terms of the volume of production, the motorcycle manufacturing company F stands largest at 170 tons/day. The local specialized company A receives dies and technical guidance from a Japanese affiliated motorcycle manufacturer and Japanese affiliated electrical equipment manufacturer and supplies those companies with parts. According to the electrical equipment manufacturer, company A's products suffer from many pinhole defects but the rate of acceptance is raised to 80 percent by covering these with paint.

The reasons why companies making die casting products in-house do not farm out the work to local companies are (1) the instability of the supply (delivery schedules etc.), (2) the fact that local companies do not have the necessary equipment for heat treatment etc., and (3) concerns over quality (porocity and analysis of materials).

Table 3-3-12: Summary of Companies Surveyed (Die Castings)

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	1984	Jabotabek	50	38		3	Yes	Motorcycle, electrical equipment parts	Local Specialized manufacturer
B	1970	Jabotabek	1,200	1		1	No	Motorcycle parts	PMA, in-house
C	1974	Jabotabek	1,100	40		2	Yes	Electrical equipment parts	PMA, in-house
D	1981	Jabotabek	700	12.5		3	Yes	Motorcycle parts	PMA,
E	1974,1984	Jabotabek	650	35		2	Yes	Motorcycle parts	PMA, in-house
F	1971	Jabotabek	1,234	170		3		Motorcycle parts	PMA, in-house
G	1971	Jabotabek	850	20		2	Yes	Motorcycle parts	PMA, in-house

Low Pressure Castings

Two companies, located in Jabotabek and Surabaya, were visited. Both the companies had technical tieups with foreign companies (one company with Japan and one with Germany). The products were high in quality and were exported as after-market products.

Table 3-3-13 : Summary of Companies Surveyed (Low Pressure Castings)

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	1984	Surabaya	250	300			Yes	Aluminum wheels	Japanse technology
B	1988	Jabotabek	77	50		3	Yes	Aluminum wheels	German technology

Mold Castings

Three companies manufacturing pistons and other motorcycle and automobile parts were visited. Company B was a PMA manufacturing automobiles. The local companies used Taiwanese machinery and imported dies from Taiwan and Japan. Company A in Madiun was shipping parts to a Japanese affiliated machinery manufacturer.

Table 3-3-14: Summary of Companies Surveyed (Mold Castings)

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	1987	Madiun	300	30		2	Yes	Auto parts	
B	1985	Jabotabek	200	16~17			Yes	Auto parts	PMA in-house
C	1987	Jabotabek	66	10		2	No	Auto parts	

Wire and Alloy

While these products were not covered by the current survey, two wire companies and one alloy making company were visited. Table 3-3-15 summarizes the findings.

Table 3-3-15: Summary of Companies Surveyed (Wire and Alloy)

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	Jabotabek	175	200			Yes	Wire	
B	1982	Jabotabek	168	1,000		3	No	Wire	PMA

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	43	150		2	Yes	Alloy (recycled ingots)	

(3) Imports and Exports of Aluminium Products

1) Summary of imports and exports

Indonesia's aluminium products may be classified into three rough groups: [1] products for which Indonesia depends completely on imports, [2] products which Indonesia has begun to export, but still imports in large amounts, and [3] products where exports outweigh imports. If using trade specification coefficients, [1] would be indicated as -1.0, [2] as 0 to under -1.0, and [3] 0 to less than 1. Further, as exports increase, the trade specification coefficient would rise from -1 to 1 (note).

Note that die castings are not recorded as die castings in the trade statistics, so it is impossible to obtain a grasp of imports and exports.

[1] Product for which Indonesia depends completely on import is stranded wire.
[2] Products which Indonesia has begun to export, but still imports in large amounts are wire, plate and sheet, foil, containers, and other aluminium products. Of these, the trade specification coefficient for other aluminium products is continuing to be near -1, i.e., the degree of dependence on imports is high. The trade specification coefficient for sheet changed from -0.96 in 1985 to -0.54 in 1990, close to 0, reflecting an increase in exports and relative decline in imports. The trade specification coefficient for foil in 1990 was -0.86, still a high degree of dependence on imports, but had been -0.98 in 1985, showing an increase in exports.
[3] Products where exports outweigh imports were bars and rods, pipes, structures and their parts, gas containers, and household goods. Gas containers and household goods changed to plus trade specification coefficients in 1987, the year after the devaluation of the rupiah. Structures and their parts changed to 0.74 in 1988 from the -0.74 of the previous year.

In the above way, there are products for which Indonesia continues to rely on imports, but exports are increasing steadily for most products, showing that competitiveness is being strengthened.

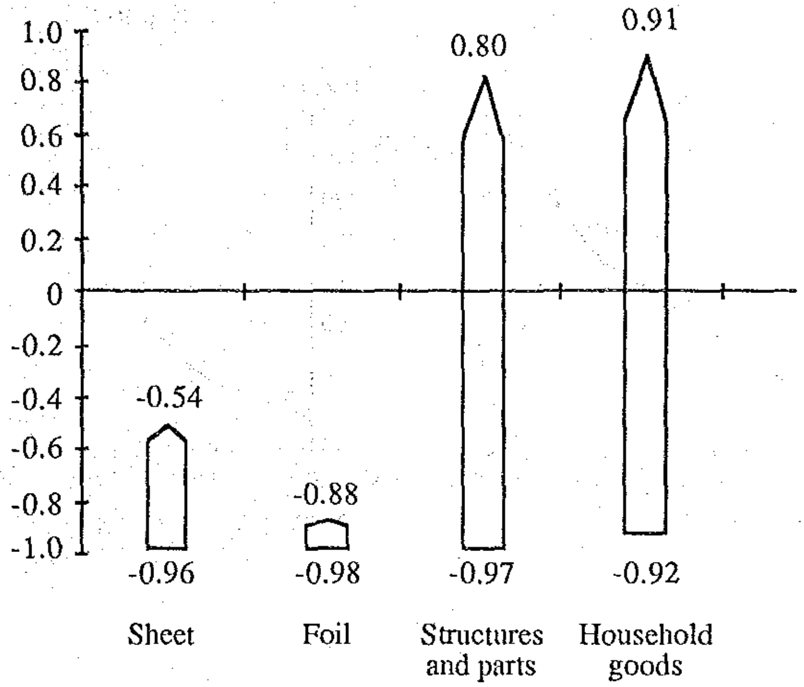
(Note) The trade specification coefficient is expressed as Ei-Mi/Ei+Mi, where exports of a product by a country are Ei and imports Mi.

Next, a look will be taken at the trends in imports and exports of sheet, foil, extruded products, and utensils.

[1] Sheet

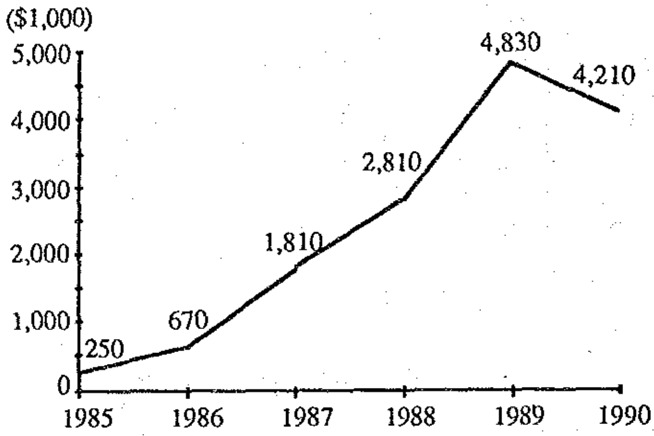
Imports declined in the recession year of 1986, but increased in both 1987 and 1988 along with the business recovery and grew widely by 71 percent a year from the US$259,600 of 1985 to US$440 million in 1989. Therefore, while exports continued to outpace imports, the trade specification coefficient changed from the -0.96 of 1985 to -0.38 of 1988. In 1990 import increased owing to the economic boom and the trade specification coefficient changed to -0.54.

Fig. 3-3-3: Change of Trade Specification Coefficients between 1985 and 1990



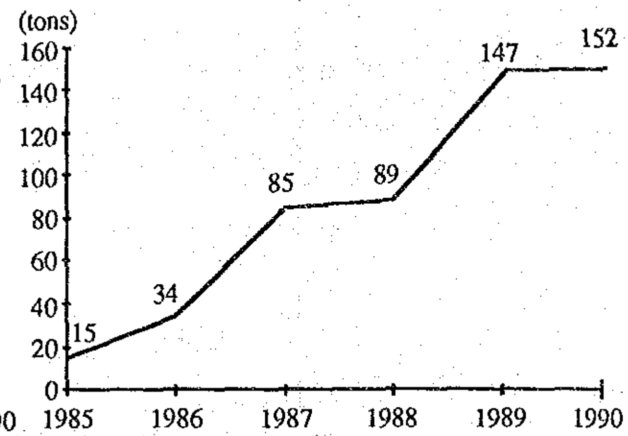
Source: Indonesian Foreign Trade Statistics

Fig. 3-3-4: Value of Plate and Sheet Exports



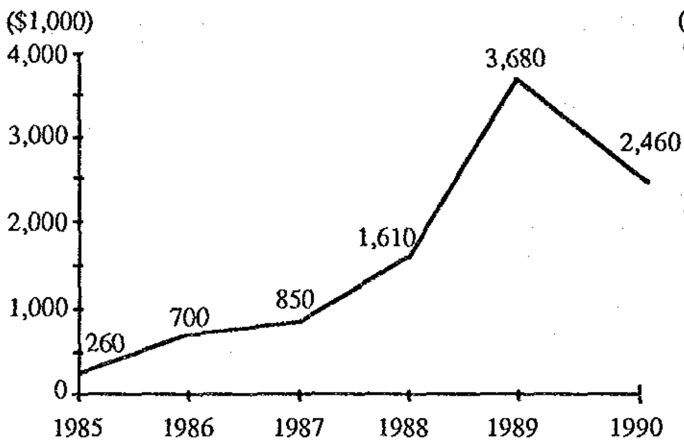
Source: Same as Fig. 3-3-3.

Fig. 3-3-5: Volume of Plate and Sheet Expotts



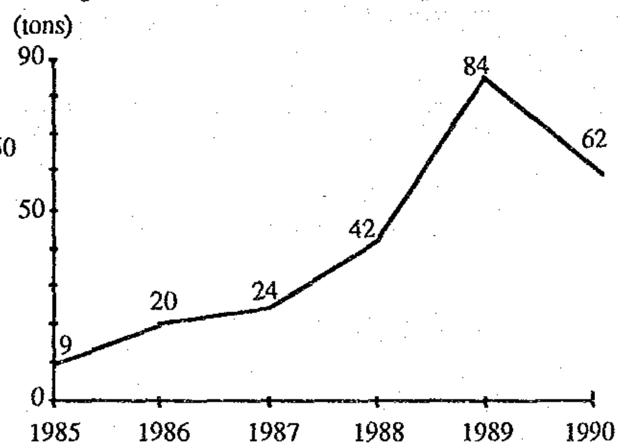
Source: Same as Fig. 3-3-3.

Fig. 3-3-6: Value of Foil Exports



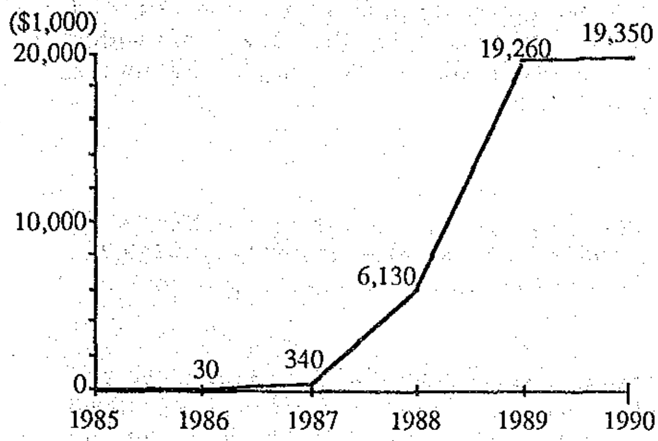
Source: Same as Fig. 3-3-3.

Fig. 3-3-7: Volume of Foil Exports



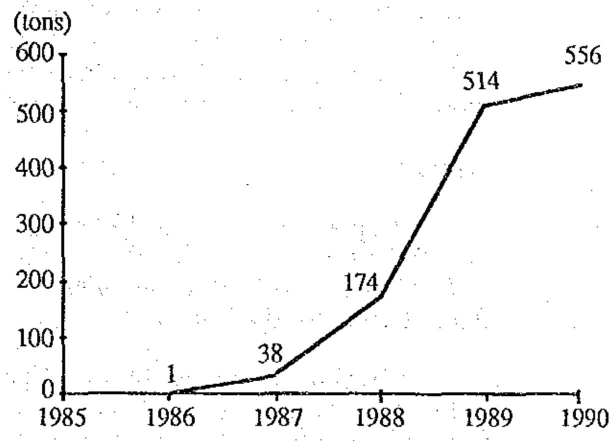
Source: Same as Fig. 3-3-3.

Fig. 3-3-8: Value of Structure and Part Exports



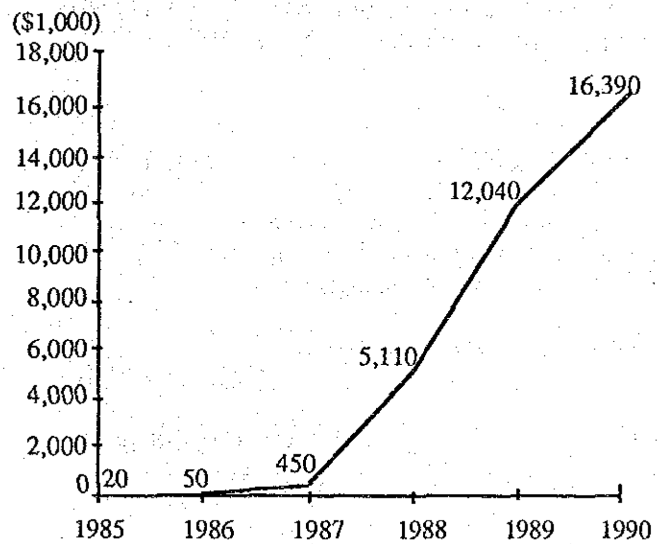
Source: Same as Fig. 3-3-3.

Fig. 3-3-9: Volume of Structure and Part Exports



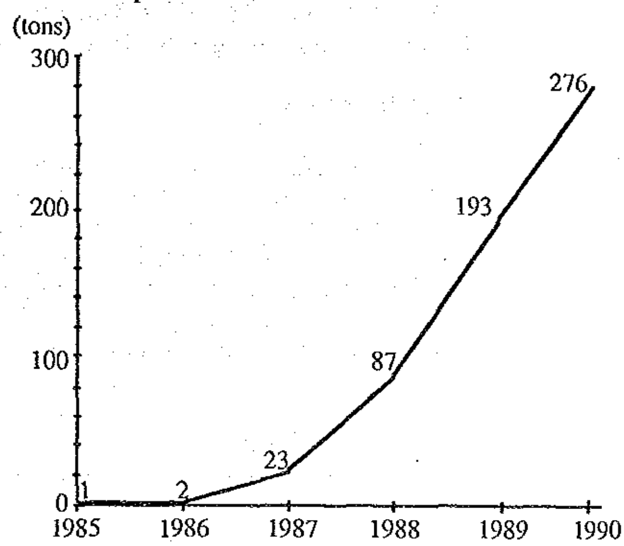
Source: Same as Fig. 3-3-3.

Fig. 3-3-10: Value of Household Good Exports



Source: Same as Fig. 3-3-3.

Fig. 3-3-11: Volume of Household Good Exports



Source: Same as Fig. 3-3-3.

Breaking down sheet products by the HS nine digit classification, other aluminium (excluding alloy) plate accounted for 3 percent of exports and aluminium (excluding alloy) blind slats for 53 percent, with these two product groupings accounting for 84 percent in total. Exports outpaced imports for blind slats of less than 1,000 mm width. For eight products, including blind slats of aluminium alloy of a width of 1,000 mm or more, there were only imports. No exports were made.

[2] Foil

Imports increased in 1987 and continued to move at a high level in 1988 as well, then fell 19 percent in 1989. Exports, on the other hand, increased from the US$262,700 of 1985 to US$367 million in 1989. The trade specification coefficient changed from the -0.98 of 1985 to -0.88 in 1990.

Breaking down foil by the HS nine digit classification, the main exports were of foil without surface treatment and foil without backing. All foil with surface treatment and foil with backing, with the exception of one item, was imported, i.e., there were no exports. Foil without backing and without surface treatment (7607.11100) was exported to the tune of US$1.26 million and was imported to the tune of US$15 million, with imports vastly exceeding exports.

[3] Extruded products

The trade specification coefficients for bars and rods and parts of structures in 1990 exceeded 0.80, showing exports far surpassed imports. Pipe imports fell from the US$3.4 million of 1985 to US$1.1 million in 1990, while exports rose from the US$31,100 to US$825,500. The trade specification coefficient for extruded products has been remarkably improved since the start of operations of PMA company in 1988.

[4] Household goods

Imports fluctuate, but a sharp increase in exports begun in 1987 and continued up to 1990. The export value for 1990 of US$16 million represented over a 700-fold increase from 1985. Behind this surge was, it seems, the strengthening of the price competitiveness of Indonesian products due to the devaluation of the rupiah in 1986 and the OEM production by Japanese importers who took note of the same.

Table 3-3-16: Imports and Exports Value of Bars and Rods

(Unit: US$1000)

Year	Exports	Imports	Trade specification coefficient
1985			
1986			
1987			
1988			
1989	47,116.6	8,284.4	0.70
1990	7,090.6	8,284.4	0.70

Source: Indonesian Foreign Trade Statistics

Table 3-3-17: Imports and Exports Volume of Bars and Rods

(Unit: 1,000kg)

Year	Exports	Imports
1985		
1986		
1987		
1988		
1989	706,562	2,749
1990	581,684	220

Source: Same as Table 3-3-16

Table 3-3-18: Imports and Exports of Wire

(Unit: US$1000)

Year	Exports	Imports	Trade specification coefficient
1985	629.8	18,935.9	-0.94
1986	1,204.1	16,161.6	-0.86
1987	2,328.5	6,094.2	-0.45
1988	5,996.6	9,823.1	-0.24
1989	947.0	1,213.3	-0.12
1990	504.9	4,776.2	-0.81

Source: Same as Table 3-3-4.
Note: Wire was split into rods (7604) and wire (7605) in the HS classification after 1989.

Table 3-3-19: Imports and Exports Volume of Wire

(Unit: 1,000kg)

Year	Exports	Imports
1985	300	
1986	53,606	
1987	558,749	
1988	786,395	
1989	454	202
1990	230	1,778

Table 3-3-20: Imports and Exports of Plate and Sheet

(Unit: US$1000)

Year	Exports	Imports	Trade specification coefficient
1985	259.6	11,333.3	-0.96
1986	672.7	7,753.3	-0.84
1987	1,869.1	8,692.3	-0.64
1988	2,812.8	11,353.6	-0.60
1989	4,385.5	9,850.1	-0.38
1990	4,208.0	14,102.0	-0.54

Source: Same as Table 3-3-4.

Table 3-3-21: Imports and Exports Volume of Plate and Sheet

(Unit: 1,000kg)

Year	Exports	Imports
1985	147	3,186
1986	335	2,974
1987	853	2,497
1988	894	3,409
1989	1,472	2,848
1990	1,518	4,654

Source: Same as Table 3-3-16

Table 3-3-22: Imports and Exports of Foil

(Unit: US$1000)

Year	Exports	Imports	Trade specification coefficient
1985	262.7	29,323.2	-0.98
1986	703.3	29,147.1	-0.95
1987	855.3	40,781.8	-0.96
1988	1,613.3	40,173.8	-0.92
1989	3,665.2	32,546.2	-0.80
1990	2,457.5	38,838.9	-0.88

Source: Same as Table 3-3-4.

Table 3-3-23: Imports and Exports Volume of Foil
(Unit: 1,000kg)

Year	Exports	Imports
1985	85	12,832
1986	197	9,105
1987	245	11,280
1988	417	9,631
1989	843	8,224
1990	616	9,070

Source: Same as Table 3-3-16

Table 3-3-24: Imports and Exports of Pipe
(Unit: US$1000)

Year	Exports	Imports	Trade specification coefficient
1985	31.1	3,378.2	-0.98
1986		1,062.0	-1.00
1987	347.0	758.3	-0.37
1988	939.7	358.7	0.45
1989	817.7	503.7	0.24
1990	825.5	1,084.6	-0.13

Source: Same as Table 3-3-4.

Table 3-3-25: Imports and Exports Volume of Pipe
(Unit: 1,000kg)

Year	Exports	Imports
1985	2	345
1986		297
1987	146	146
1988	194	72
1989	248	107
1990	278	93

Source: Same as Table 3-3-16

Table 3-3-26: Imports and Exports of Pipe Couplings

(Unit: US$1000)

Year	Exports	Imports	Trade specification coefficient
1985		156.6	-1.00
1986			
1987		74.4	-1.00
1988	1.5	204.2	-0.99
1989	19.1	180.1	-0.81
1990	44.6	479.2	-0.83

Source: Same as Table 3-3-4.

Table 3-3-27: Imports and Exports Volume of Pipe Couplings

(Unit: 1,000kg)

Year	Exports	Imports
1985		107
1986		44
1987		15
1988	0.1	33
1989	1.0	33
1990	3.0	113

Source: Same as Table 3-3-16

Table 3-3-28: Imports and Exports of Structures and Parts of Same

(Unit: US$1000)

Year	Exports	Imports	Trade specification coefficient
1985			
1986	27.9	1,985.7	-0.97
1987	342.5	2,054.7	-0.71
1988	6,129.8	908.6	0.74
1989	19,261.9	2,601.3	0.76
1990	19,353.0	2,133.0	0.80

Source: Same as Table 3-3-4.

Table 3-3-29: Imports and Exports Volume of Structures and Parts of Same

(Unit: 1,000kg)

Year	Exports	Imports
1985		979
1986	12	257
1987	381	291
1988	1,735	249
1989	5,143	227
1990	5,555	329

Source: Same as Table 3-3-16

Table 3-3-30: Imports and Exports of Containers

(Unit: US$1000)

Year	Exports	Imports	Trade specification coefficient
1985	1.4		1.00
1986	0.09	525.2	-0.99
1987	2.9	251.5	-0.98
1988	37.1	348.4	-0.81
1989	254.6	735.7	-0.49
1990	596.6	1,408.2	-0.40

Source: Same as Table 3-3-4.

Table 3-3-31: Imports and Exports Volume of Containers

(Unit: 1,000kg)

Year	Exports	Imports
1985	0.2	73
1986	1.0	43
1987	45	121
1988	4	151
1989	47	87
1990	58	116

Source: Same as Table 3-3-16

Table 3-3-32: Imports and Exports of Gas Containers

(Unit: US$1000)

Year	Exports	Imports	Trade specification coefficient
1985	122.1	6.1	0.90
1986	216.4	325.8	-0.20
1987	432.0	265.4	0.24
1988	875.0	182.8	0.65
1989	863.5	217.0	0.60
1990	1640.2	380.5	0.62

Source: Same as Table 3-3-4.

Table 3-3-33: Imports and Exports Volume of Gas Containers
(Unit: 1,000kg)

Year	Exports	Imports
1985	24	35
1986	37	76
1987	87	26
1988	159	87
1989	125	32
1990	256	46

Source: Same as Table 3-3-16

Table 3-3-34: Imports and Exports of Household Goods
(Unit: US$1000)

Year	Exports	Imports	Trade specification coefficient
1985	23.3	575.6	-0.92
1986	54.5	1,048.2	-0.46
1987	454.0	187.5	0.42
1988	5,114.5	640.3	0.78
1989	12,035.2	1,026.6	0.84
1990	16,391.0	769.9	0.91

Source: Same as Table 3-3-4.

Table 3-3-35: Imports and Exports Volume of Household Goods
(Unit: 1,000kg)

Year	Exports	Imports
1985	9	188
1986	19	224
1987	230	54
1988	874	149
1989	1,930	247
1990	2,755	175

Source: Same as Table 3-3-16

Table 3-3-36: Imports and Exports of Other Aluminium Products
(Unit: US$1000)

Year	Exports	Imports	Trade specification coefficient
1985		334.0	-1.00
1986	24.3	1,878.3	-0.97
1987	18.4	2,619.5	-0.98
1988	26.2	1,996.8	-0.97
1989	30.5	2,856.1	-0.98
1990	63.5	4,965.8	-0.97

Source: Same as Table 3-3-4.

Table 3-3-37: Imports and Exports Volume of Other Aluminium Products
(Unit: 1,000kg)

Year	Exports	Imports
1985		516
1986	3	703
1987	3	
1988	6	506
1989	3	679
1990	33	932

Source: Same as Table 3-3-16

Table 3-3-38: Imports and Exports of Aluminium Powder
(Unit: US$1000)

Year	Exports	Imports	Trade specification coefficient
1985		27,180.8	-1.00
1986		620.3	-1.00
1987		4,012.2	-1.00
1988		10,382.2	-1.00
1989		296.0	-1.00
1989	5,774	661.2	0.79

Source: Same as Table 3-3-4.

Table 3-3-39: Imports and Exports Volume of Other Aluminium Powder
(Unit: 1,000kg)

Year	Exports	Imports
1985		82,397
1986		317
1987		21,307
1988		41,295
1989		63
1990	3,600	1,023

Source: Same as Table 3-3-16

Table 3-3-40: Imports and Exports of Aluminium Storage Tanks
(Unit: US$1000)

Year	Exports	Imports	Trade specification coefficient
1985		222.2	-1.00
1986		37.7	-1.00
1987			
1988		403.9	-1.00
1989		176.9	-1.00
1990	9.2	262.7	-0.93

Source: Same as Table 3-3-4.

Table 3-3-41: Imports and Exports Volume of Aluminium Storage Tanks
(Unit: 1,000kg)

Year	Exports	Imports
1985		25
1986		23
1987		
1988		42
1989		55
1990	0.5	95

Source: Same as Table 3-3-16

Table 3-3-42: Imports and Exports of Stranded Wire

(Unit: US$1000)

Year	Exports	Imports	Trade specification coefficient
1985		64.1	-1.00
1986		1,046.2	-1.00
1987		6,382.7	-1.00
1988		2,474.5	-1.00
1989		1,755.2	-1.00
1990		4,311.4	-1.00

Source: Same as Table 3-3-16.

A look at the export destinations of main products shows that a large share of the foil went to Hong Kong and that Japan was also a main market. In particular, 80 percent of the window and door frames and utensils go to Japan.

Table 3-3-43: Imports and Exports Volume of Strauded Wire

(Unit: 1,000kg)

Year	Exports	Imports
1985		22
1986		562
1987		2,257
1988		1,253
1989		523
1990		82.5

Source: Same as Table 3-3-16

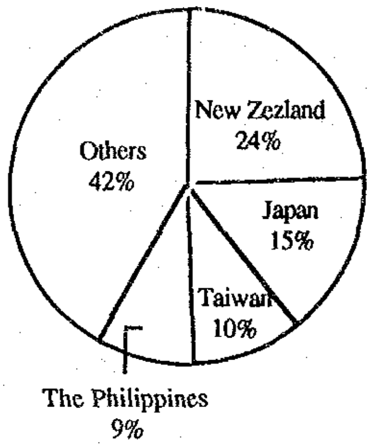
Table 3-3-44: Exports Destinations of Main Aluminium Products and Shares of 1990

(Unit: $1000)

	Sheet and Plate (7606)		Foil (7607)		Structures and Parts (7610)		Household Goods (7615)	
1	New Zealand		Singapore		Japan		Japan	
	1,021	24.3%	1,082	44.0%	16,547	85.5%	12,163	74.2%
2	Japan		Hong Kong		Singapore		U.S.	
	638	15.1%	467	19.0%	2,436	12.6%	2,385	14.5%
3	Taiwan		The Philippines		R. Korea		Singapore	
	418	9.9%	344	14.0%	209	1.1%	317	1.9%
4	The Philippines		Sweden		Hong Kong		Malaysia	
	382	9.1%	135	5.5%	135	10.7%	282	1.8%
5	Thailand		Finland		Switzerland		Papua New Guinea	
	373	8.9%	125	5.1%	20	0.1%	204	1.2%
Others	1,376	32.7%	305	6.0%			1,040	6.4%
Total	4,208	100.0%	2,458	100.0%	19,347	100.0%	16,391	100.0%

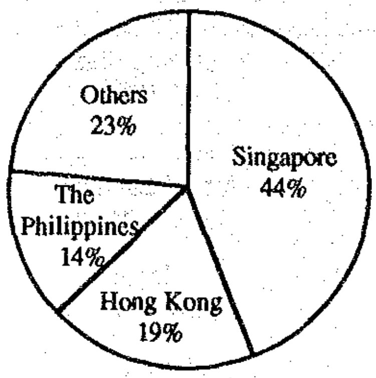
Note: ( ) indicates four digits HS Number
Source: Indonesian Foreign Trade Statistics 1990

Fig. 3-3-12: Main Destinations of Sheet Exports



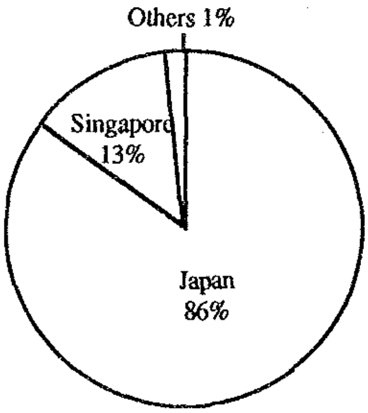
Source: Export Statistics 1990

Fig. 3-3-13: Main Destinations of Foil Exports



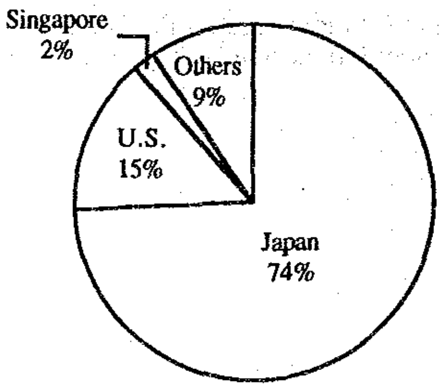
Source: Same as Fig. 3-3-12.

Fig. 3-3-14: Main Destinations of Structure and Part Exports



Source: Same as Fig. 3-3-12.

Fig. 3-3-15: Main Destinations of Household Good Exports



Source: Same as Fig. 3-3-12.

(4) State of Exports of Companies Surveyed

According to the interview and questionnaire surveys, a total of 30 of the 49 companies surveyed were exporting. Eliminating duplications, this comes to 23 companies. A look by product shows that four of the nine companies making extrusions were exporting, four of the seven making plate, two of the four making roofing, four of the eight making utensils, five of the six making impact tubes and cans, five of the seven making die castings, all two making low pressure castings, two of the three making mold castings, one of the two making wires, and one making alloys.

Looking now at the export destinations by products, the companies making extrusions, plate, and utensils are ranked as A, B, and C according to their level of production technology, as mentioned later, so this will be viewed by the company rankings. In extrusions, the A rank company was exporting to Japan while the two B rank companies were exporting to Singapore (two companies) and Taiwan. One of the six C rank companies was exporting to Singapore, Taiwan, and Hong Kong. The A rank company was a Japanese affiliate and was exporting 80 percent of its products to Japan. Company B of the B rank companies was exporting stepladders under the guidance of foreign engineers.

In rollings, there was some duplication with companies making utensils, but the A rank company was exporting to Southeast Asia and New Zealand, one of the two B rank companies was exporting to Singapore and Taiwan, and two of the four C rank companies were exporting to Singapore, the U.S., the Cameroon, and Japan.

In utensils, the two A rank companies were exporting to Japan (two companies), Singapore, the U.S., and Hong Kong, one of the two B rank companies was exporting to Saudi Arabia, Singapore, the U.S., and the Cameroon, and one of the four C rank companies was exporting to the Middle and Near East. The A rank companies were producing teflon coated products using technology transferred under licence from DuPont. Further, company A was engaged in OEM production for a Japanese company.

In addition, roofing was being exported to New Zealand, Singapore, and Southeast Asia, and impact tubes and cans to Singapore (four companies), Taiwan (two companies), Hong Kong, Japan, and Southeast Asia. Low pressure die castings were being exported to Japan (two companies), permanent mold castings to Japan (two companies), wire to Japan and R. Korea, and alloy to Japan. Die castings were in some cases exported as die casting products and in some cases exported as parts of other finished products. The export destinations include Japan (five companies), Taiwan (two companies), and Singapore.

Looking at the export destinations for all products together, the ones mentioned most often were Japan, by 16 companies, and Singapore, by 13 companies, followed by Taiwan by seven companies, the Middle and Near East/Africa by four companies, Hong Kong, the U.S., and Southeast Asia by three companies each, New Zealand by two companies, and Republic of Korea by one company.

Table 3-3-45: State of Exports and Export Destinations by Products

	A	B	C	Total
Extrusions	1 company Japan	2 out of 2 companies Singapore (2), Taiwan	1 out of 6 companies Singapore, Taiwan, Hong Kong	4 out of 9 companies
Rollings	1 company Southeast Asia, New Zealand	1 out of 2 companies Singapore, Taiwan	2 out of 4 companies Singapore, Cameroon, U.S., Japan	4 out of 7 companies
Utensils	2 out of 2 companies Japan (2), Singapore, U.S., Hong Kong	1 out of 2 companies Saudi Arabia, Singapore, U.S., Cameroon	1 out of 4 companies Middle and Near East	4 out of 8 companies
	4 out of 4 companies	4 out of 6 companies	4 out of 14 companies	
Roofing	2 out of 4 companies: New Zealand, Southeast Asia, Singapore			2 out of 4 companies
Impact tubes and cans	5 out of 6 companies: Singapore (4), Taiwan (2), Hong Kong, Japan Southeast Asia			5 out of 6 companies
Die castings	5 out of 7 companies: Japan (5), Taiwan (2), Singapore			5 out of 7 companies
Low pressure castings	2 out of 2 companies: Japan (2)			2 out of 2 companies
Mold castings	2 out of 3 companies: Japan (2)			2 out of 3 companies
Wire	1 out of 2 companies: Japan, R. Korea			1 out of 2 companies
Alloy	1 company: Japan			1 company
	Japan (16), Singapore (13), Taiwan (7), the Middle and Near East /Africa (4), Hong Kong (3), U.S. (3), Southeast Asia (3), New Zealand (2), R. Korea (1)			30 out of 49 companies

Note: Regarding company rankings, see 3-3.2 Current State and Problems in Corporate Management and Production Technology

Source: Prepared from interview and questionnaire surveys.

In extrusions, rollings, and utensils, for which corporate ranks were assigned, the following features could be seen: (1) the higher the level of production technology of the group, the higher the percentage of exporting companies, (2) the A rank companies frequently exported to Japan, (3) in the B and C rank companies, the main destinations were Singapore, Taiwan, the Middle and Near East/Africa, and the U.S., (4) all of the companies receiving technical guidance from foreign engineers (company B and company C in extrusions, company A in rollings, and comapny A in utensils) and the companies with technical tieups with foreign companies (company A and company B in utensils and company A and company B in low pressure castings) were exporting, and (5) some companies had succeeded in exporting to Japan through OEM production (company A in utensils and company G in die castings).

Current State of Exports as Seen From Results of Questionnaire

A look will now be taken at the current state of exports as seen from the results of the questionnaire. Of the 24 companies responding to the questionnaire, 12 were exporting.

Regarding the trends in exports in 1990, 10 companies responded that exports were increasing.

Use of incentives: Six of the 12 exporting companies were using export incentives. The incentives being used were drawbacks, by three companies, and export financing, by three companies.

Method of starting export: Visits from overseas buyers was the most frequently mentioned method, by 10 companies, followed by participation in exhibitions, by seven companies, and use of local trading companies and business inquiries, by four companies, with most companies therefore being passive.

Route of acquisition of foreign market data: Six companies obtained data from affiliated foreign companies and three from foreign trade organizations. Only two companies used the Ministry of Industry and only one NAFED.

Required overseas market information: The greatest number of companies, six, required information on competing companies and information on buyers, followed by five requiring information on import trends, four on distribution channels, and three on laws and systems.

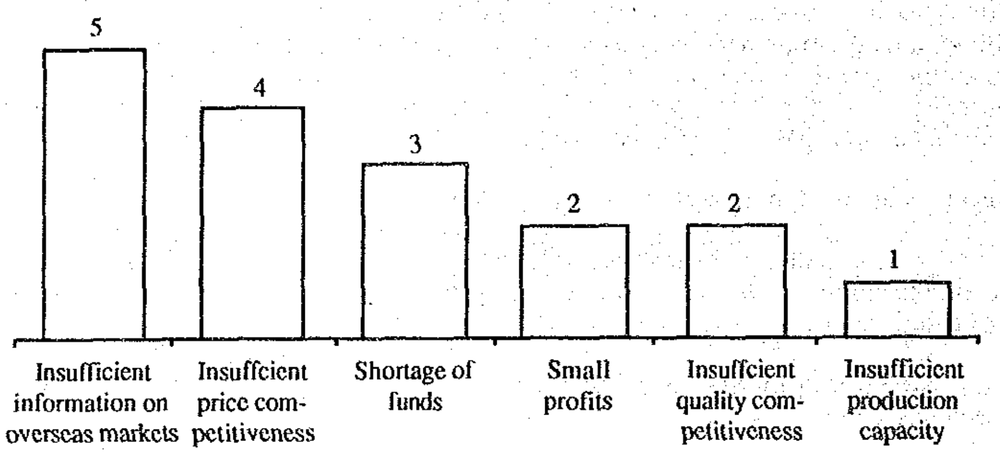
Intention of increasing exports: Sixteen of the 24 companies indicated they wanted to increase their exports.

Requirements for increase of exports: The requirement for increasing exports mentioned most frequently, by eight companies, was acquisition of overseas market information, followed by development of new markets by six companies, improvement of quality by five companies, development of new products and compliance with requirements of importing markets by four, and strengthening of quality control and reduction of costs by three.

Factors inhibiting exports: The lack of overseas market information was mentioned most often, by five companies, folowed by a lack of price competitiveness by four companies and a lack of funds by three companies.

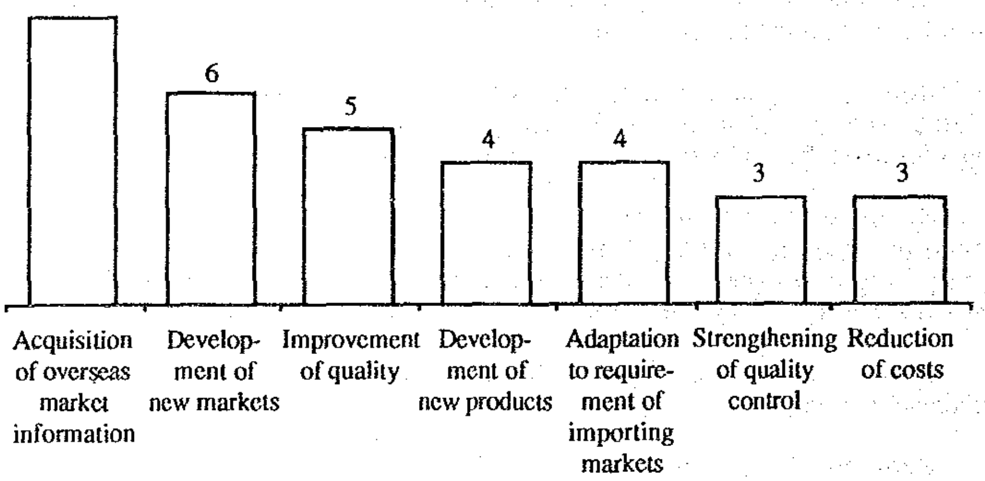
Summarizing the above, numerous companies have the desire to positively tackle exports, but most companies are passive when it comes to specific activities. The biggest problem is the lack of information on overseas markets. What is required most for exports is the acquisition and dissemination of overseas market information such as on competing companies and buyers.

Fig. 3-3-16: Factors Inhibiting Exports



Source: Questionnaire survey

Fig. 3-3-17: Requirement for Increase of Exports



Source: Questionnaire survey

(5) Estimate of Domestic Demand

The domestic demands for plate, foil, extruded products, and utensils were estimated by adding the imports to the production and subtracting the exports. Accurate data on the exports and imports can be obtained from trade statistics, but there is no accurate data on the productions, so these were estimated through interviews and by data of the Ministry of Industry etc. The figures for the exports and imports are for 1989, while the figures for the productions are as of the survey period of 1990. Further, the surveyed companies tended to give smaller production in their responses than actual ones, so caution should be taken in that the figures for the domestic demands are only estimates for obtaining a rough grasp of the overall situation.

The estimated production of plate is 38,280 tons, imports 285 tons, and exports 147 tons, for an estimated domestic demand of 38,418 tons. The ratio of domestic production to domestic demand is a high 99.6 percent, indicating that import substitution has been substantially realized.

The production of foil is 7,200 tons, imports 822 tons, and exports 84 tons, for an estimated domestic demand of 7,938 tons. The ratio of domestic production to domestic demand is 90.7 percent.

The estimated production of extruded products is 29,400 tons, imports 36 tons, and exports 540 tons, for an estimated domestic demand of 28,896 tons. The ratio of domestic production to domestic demand is 101.7 percent, over 100 percent.

The estimated production of utensils is 20,800 tons, imports 25 tons, and exports 193 tons, for an estimated domestic demand of 20,632 tons. The ratio of domestic production to domestic demand is 100.8 percent.

Table 3-3-46. Estimation of Domestic Demand for Main Aluminium Products and Ratio of Domestic Production

(Unit: tons/year)

	(1) Estimated production	(2) Imports	(3) Exports	(4) Domestic demand (1)+(2)-(3)	(5) Domestic production/ Domestic demand (1)/(4)
Plate	38,280	285	147	38,418	99.6%
Foil	7,200	822	84	7,938	90.7%
Extruded products	29,400	36	540	28,896	101.7%
Utensils	20,800	25	193	20,632	100.8%

Notes: 1990 production was estimated based on interviews plus material of the Ministry of Industry. Many utensil making companies could not be visited, so the actual production is probably higher than the estimate. For the amount of exports and the amount of imports, use was made of the figures for 1989 since the figures for 1990 were not yet announced.

Source: Interviews, Indonesian Foreign Trade Statistics

Expansion Plans

According to the interview survey and information from the BKPM, industrial journals, etc., the plans for future expansion of facilities for main aluminium products or new establishment of facilities are as shown in Table 3-3-46.

Regarding plate, the interview survey showed that two companies were planning an expansion of a total of 19,200 tons/year. According to the Indonesian Commercial Newsletter, company H is planning to build a factory with a yearly production of 1,200 tons and a leading corporate group a factory with a yearly production of 15,000 tons. Further, according to the BKPM, the production capacity of two approved companies will total 35,000 tons. Putting these together, we get a yearly production of 70,400 tons.

Regarding foil, according to the Indonesian Commercial Newsletter, a leading corporate group is planning production of 10,000 tons a year.

For extruded products, the interview surveyed showed that five companies were planning a total yearly production of 17,160 tons. According to a Japanese industrial newspaper, a major Japanese affiliate has started construction to increase production by 700 tons/month, which will give it a yearly production of 25,560 tons.

Table 3-3-47. Plans for Expansion in Main Aluminium Products

Plate				
	[1] (Interview survey)			
	Company A	1,500 tons/month		
	Company F	100 tons/month		
	Total	1,600 tons/month		<u>19,200 tons/year</u>
	[2] (Indonesian Commercial Newsletter)			
	Company H	100 tons/month		
	I Group	15,000 tons/year	[1]+[2] total	<u>35,400 tons/year</u>
	[3] (BKPM)			
	Company J	20,000 tons/year		
	Company K	15,000 tons/year	[1]+[2]+[3] total	<u>70,400 tons/year</u>
Foil	(Indonesian Commercial Newsletter)			
	B Group	10,000 tons/year	Total	<u>10,000 tons/year</u>
Extrusions				
	[1] (Interview survey)			
	Company B	500 tons/month		
	Company C	480 tons/month		
	Company D	200 tons/month		
	Company H	150 tons/month		
	Company I	100 tons/month		
	Total	1,430 tons/month		<u>17,160 tons/year</u>
	[2] (LM News)			
	Company A	700 tons/month	[1]+[2] total	<u>25,560 tons/year</u>

(6) Future Outlook

Let us now look at the future prospects for the Indonesian aluminium industry. This can be done by [1] estimates based on plans of the Ministry of Industry, [2] estimates based on plans for expansion of production by companies, [3] estimates based on past production and demand trends, etc.

[1] Plans of Ministry of Industry

The Directorate of Metal Industries plans to achieve the following production capacities and production volumes for the aluminium industry during REPELITA V.

Table 3-3-48: Plans for Production Capacities and Production Volumes of Aluminium During REPELITA V

	Capacity		Average annual rate of increase	Production		Average annual rate of increase
	89	94		89	94	
Ingots	225,000	375,000	10.7%	210,000	250,000	3.6%
Slabs	40,000	60,000	8.4%	38,000	44,000	2.9%
Billets	43,000	43,000	0%	22,000	28,000	4.9%
Plate	48,000	72,000	8.4%	34,000	40,000	3.3%
Foil	4,800	9,800	15.3%	4,700	6,100	5.3%
Extrusions	37,000	50,000	6.2%	15,400	19,000	4.2%
Die castings		3,000			1,500	
Pigment and powder		500			250	

Source: Hearings at Directorate of Metal Industries

According to interviews held with companies during the field survey, it is estimated that production of plate in 1990 will reach 40,000 tons and production of extrusions 30,000 tons, with the production of extrusions thus exceeding the plans of the Ministry of Industry for 1994. Production of plate is also increasing at a faster pace than planned for by the Ministry of Industry. This is due to the surge in production along with the recovery in business which began in 1989.

[2] Plans for Expansion of Production by Companies

The plans for expansion of production as learned from the companies visited and the plans for expansion of production as gleaned from the BKPM and other sources of information indicate that production will be increased to 70,400 tons for plate, 25,560 tons for extrusions, and 10,000 tons for foil. This data, however, is problematical in that [1] the period of implementation is unclear and [2] the possibilities of actual implementation are unclear. Many of the companies visited were engaged in full production and can be understood as being strongly interested in increasing production due to the favorable business environment, but their intentions cannot be considered a reliable basis for making future projections.

[3] Estimates by Past Trends

Figures for production of plate and extrusions from fiscal 1975 to fiscal 1990 are available (see Table 3-3-1). This data, however, fluctuates too widely. Further, from 1989 to 1990, there were structural changes in the industry, i.e., rapid progress made in industrialization through a rapid increase in domestic and foreign investment in the industrial sector. Therefore, it would be improper to make estimates of trends from 1991 on based on past trends.

[4] A leading company engaged in the production of extruded products estimates that demand for extruded products will grow from 14,000 tons in 1989 to 19,900 tons in 1995, for an average annual rate of growth of 6.0 percent. These figures were obtained by projecting the growth rate of the economy and estimate demand in proportion to the same.

Demand for aluminium products is strongly correlated with the stage of economic development (see 3-2-5). Taking note of this characteristic, an estimate will be made here of the consumption of aluminium in 2000.

The per capita national income of Indonesia in 1988, according to the 1990 Report of the World Bank, was US$440. On the other hand, the World Bank estimates that the real GNP will grow by a rate of 4.9 percent from 1989 to the year 2000 (note 1). This estimate is based on the growth rate achieved from 1982 to 1988 and may be said to be somewhat low judging from the 7.4 percent growth achieved in 1989 and the 7.0 percent (estimated) growth achieved in 1990. However, looking at the Asian NIE's and Thailand, which reduced their growth rates after a few years of high growth after 1987, it is difficult to expect that 7 percentile growth will continued in the 1990's. Therefore, two cases will be considered: that of 4.9 percent growth as projected by the World Bank and that of a slightly higher 6.5 percent growth. Note that it is estimated that the average rate of increase of the population up to the year 2000 will be 1.7 percent.

[a] In the case of 4.9 percent growth, the rate of increase of the per capita national income will be 3.2 percent a year. The per capita national income was US$440 in 1988, so if this increases by 3.2 percent a year will reach US$640 in the year 2000.

[b] In the case of a 6.5 percent growth, the income will similarly reach US$937 by the year 2000.

In section 3-2-5, the coefficient of correlation of the per capita national income and the per capita consumption of aluminium for 15 major countries was sought. The regression equation for finding the per capita consumption of aluminium from the per capita national income is therefore $x = 1.76 + 1.318y$. Using this regression equation, the per capital consumption of aluminium in the year 2000 may be calculated as 1.02 kg in the case of [a] 4.9 percent growth and 1.41 kg in the case of [b] 6.5 percent growth. It is estimated that the population in the year 2000 will be 214 million, so the total demand for aluminium will be 218,000 tons in the case of a [4.9 percent growth and 302,000 tons in the case of [b] 6.5 percent growth. In Indonesia's case, however, the total population is large, so multiplying the per capita consumption by the total population would given an excessively large total demand. If the total demand for aluminium in the year 1990 is calculated using the recurrence formula, a figure of 138,000 tons is obtained, but according to the field survey, the actual total demand was estimated at 70,000 tons, 50.2 percent of the value found by the recurrence formula. The aluminium product industry will grow at a faster rate than the rate of increase of population along with economic growth, so this percentage should rise in the future. Therefore, total demand of aluminium in the year 2000 should be not less than 109,000 tons in the case of 4.9 percent growth not less than 152,000 tons in the case of 6.5 percent growth.

Next, it is projected that the product composition of demand and the application composition of demand will change. For example, it is expected that the share of utensils in aluminium plate will fall and the share of construction materials versus showcase members in extrusions will increase. This will depend, however, on how new products are developed and new demand created.

(Note 1) According to P.T. Data Consulting (1989) Indonesian Economic Trends

(Note 2) Regression equation is found by

$$b' = \frac{N\Sigma xy - \Sigma x \Sigma y}{N\Sigma y^2 - (\Sigma x)^2}$$

$$a' = (\Sigma x - b'\Sigma y)/N$$

$$x = a' + by$$

3-3-2 Current State of and Problems in Production Technology and Corporate Management

(1) Current State of and Problems in Production Technology

Aluminium and aluminium alloy products are classified, like other metal products, into plate, foil, shapes, pipe, rods and wire, forgings, castings, etc. Here, however, they are classified by method of manufacture into rollings, extrusions, plate work, die castings, and other castings (mold casting and low pressure casting). The current state and problems in corporate management and production technology for each field of manufacture will be explained below.

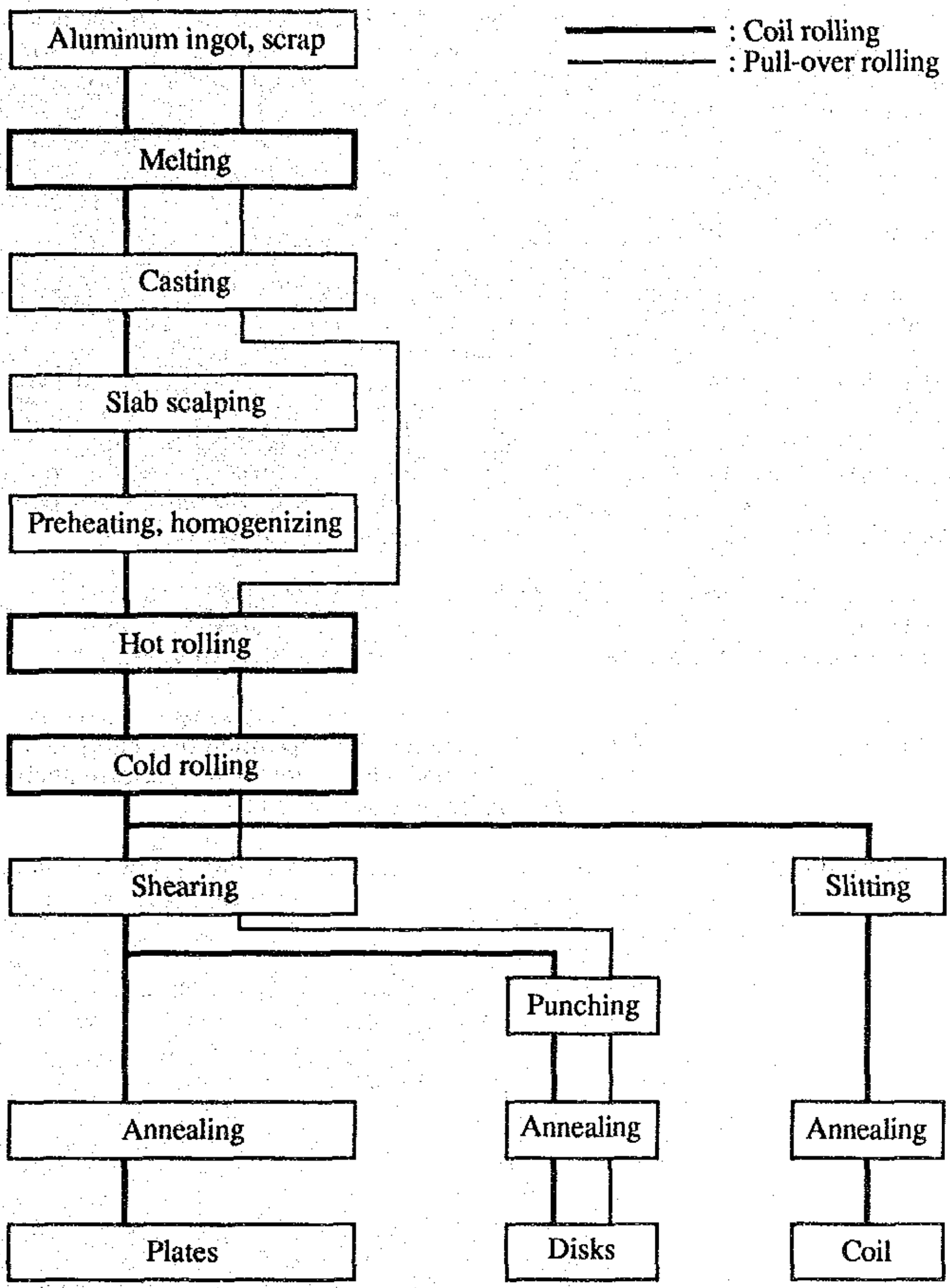
1) Rolling

[1] Manufacturing process

The main processes in the manufacture of aluminium plate are the melting of the aluminium material, casting of it into rolling slabs, and then the rolling. The rolling technology in Indonesia, however, is still in the infant stage in all aspects. Pull-over rolling systems, which are primarily manually operated and have already disappeared in the advanced countries, still survive and serve as the central facilities in many factories. They coexist with the advanced coil rolling systems.

The flow of production of rolled aluminium products is as follows:

Fig. 3-3-18: Flow of Rolled Aluminium Product Production



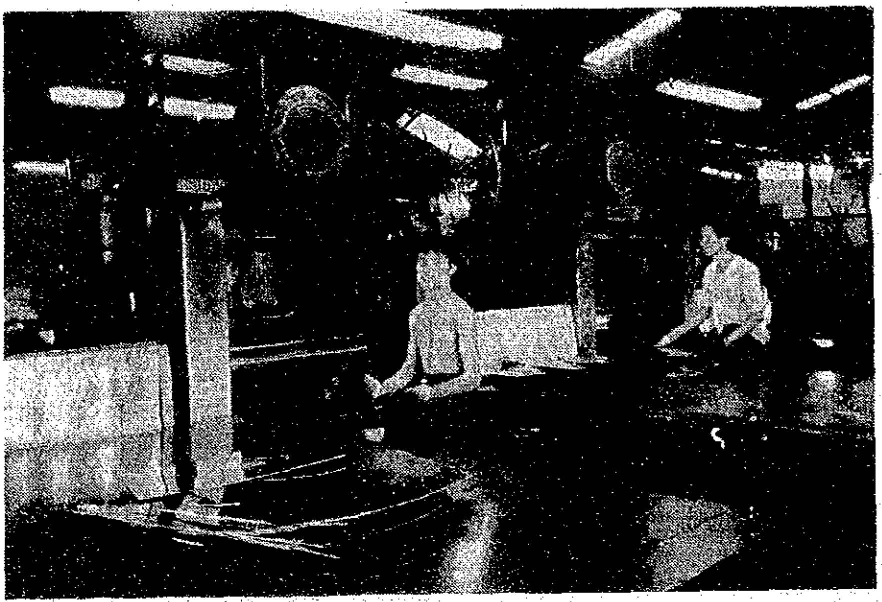
The most outstanding feature of the pull-over system widely used in Indonesia is the extreme labor intensity of the manufacturing process. Both hot and cold rolling are performed, but it is all done by manual labor. The rolling work is performed in small lots of 10 to 20 kg or so from the stage of the casting slabs. The dimensions of the plate are limited to 1 meter or so both laterally and longitudinally due to the fact that the plates have to be able to be handled manually, so productivity is low. Further, quality wise, it is difficult to control the precision of flatness, thickness, and the like of the plates due to their being rolled by hand. The surface finish features numerous scratches etc., necessitating buffing etc. to remove the scratches after processing into pots and water kettles. Due to the above situation, with one exception, there are no companies which sell intermediate aluminium plate products to other firms. The entire amount is used internally for processing into utensils.

The coil rolling system stands in sharp contrast to the pull over system in that the plates are handled not by manual labor but by machine. This makes possible the casting of large sized slabs and rolling in the coil state, enabling uniform mass production. Quality wise, the oxide film of the surface is cut off at the prerolling slab stage and the rolling is mechanized, so the rate of occurrence of scratches is small. The surface finish is excellent. When the surface is processed as with anodizing, it is possible to obtain a beautiful surface making full use of the features of aluminium. Further, the coil rolling system enables rolling of even various types of alloys, so the mechanized work enables the production of aluminium plate products with a wide range of applications.

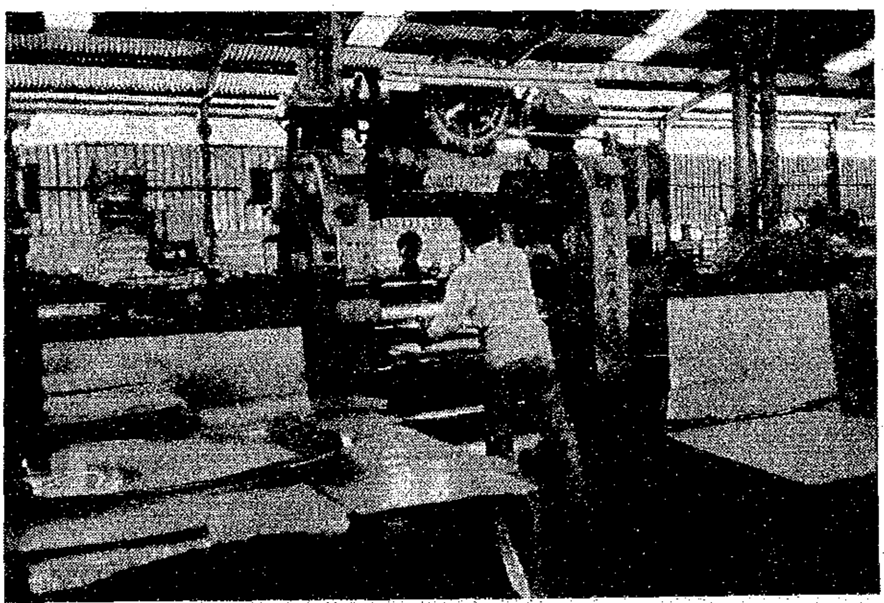
The production processes enclosed in broad lines in the flow chart shown in Fig.3-3-18, as well as final inspections, are the major problem areas at many rolled aluminium product manufacturers in Indonesia. These problems can be summarized as follows:

a) Melting:	Analysis of the chemical composition of melting aluminium is not properly conducted. Most firms perform analysis without using inspection appliances.
b) Hot/cold rolling:	The rolling process, especially in the pull over system, is done manually and this easily leads to damage to the surface of rolled aluminium plate.
c) Final inspection:	Final inspection, which in most cases is done by visual checking, is not thorough. Minor damage is usually overlooked and the products are shipped out.

Photo 3-3-1 : Pull-over Rolling System

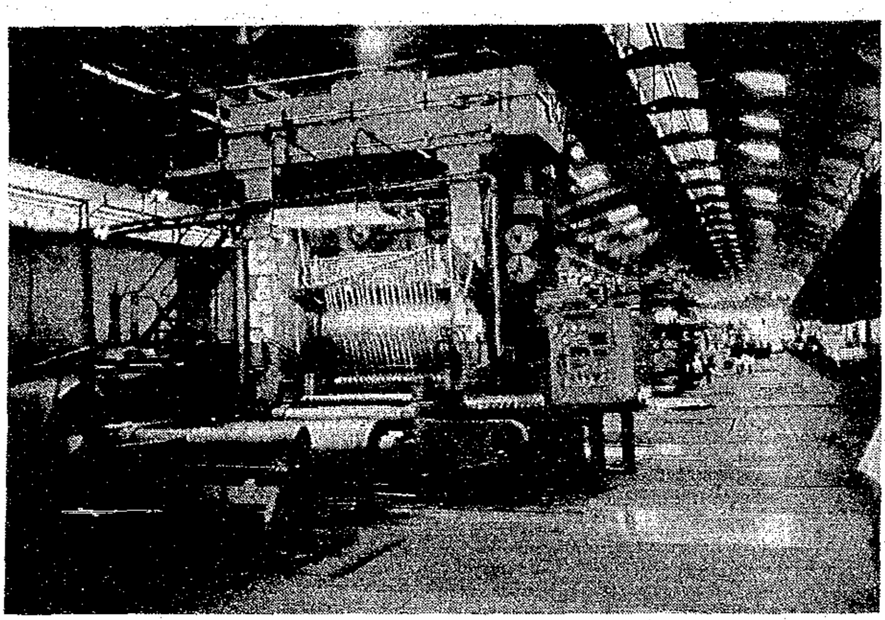


(Labor intensive and less efficient production results in poor quality rolled plates)



(Used machines imported from Japan are fully operational)

Photo 3-3-2: Coil Rolling System



(Large-scale production with modern rolling systems requires a large investment)

(High productivity and good quality rolled coil)

[2] Technical level

The aluminium rolling industry of Indonesia has left the initial stage where plate for use as materials for aluminium utensils accounts for the majority of the work and is now at the stage where production is starting to grow in the fields of aluminium roofing and aluminium foil. Good quality plate which can be used for other fields can only be produced by the coil rolling system. At present, only three companies have coil rolling facilities in Indonesia. Further, of these, two companies can only produce plate of down to 600 mm width and cannot roll various types of aluminium alloy. On the other hand, the rolling companies which use pull over facilities only produce plate for inexpensive utensils and only for their own use.

The Indonesian aluminium rolling companies were ranked as to their overall level of production technology, judged by to the facilities owned, production capacity, and technical level, in three ranks of A, B, and C.

	Production capacity (month)	Current production (month)	Rolling facilities (units)	Maximum plate width (mm)
Class A				
Company A	2,000 MT	1,600 MT	HOT ROLL (1)	
			COLD ROLL (4)	1,240
Class B				
Company B	500 MT	400 MT	HOT ROLL (1)	
			COLD ROLL (3)	600
Company C	500 MT	400 MT	HOT ROLL (1)	
			COLD ROLL (3)	600
Class C				
Company D	150 MT	150 MT	PULL OVER (5)	1,000
Company E	100 MT	100 MT	PULL OVER (5)	1,000
Company F	200 MT	180 MT	PULL OVER (5)	800
Company G	100 MT	100 MT	PULL OVER (4)	400
Total	3,550 MT/month	2,930 MT/month		

Source: Field survey

As indicated above, the seven aluminium rolling firms of Indonesia include one classified as class A, two as class B, and four as class C. The one class A company produces aluminium plates, processed products and foil. The features of the companies belonging to each class and a summary of the technical levels are given below.

Class A:
(a) The company can produce plates of a width of up to 1,240 mm and a monthly production of over 2000 tons
(b) The company produces plate used not only for general utensils, which include those of Teflon processing, but also alloy plates for building material use and plate for foil
(c) The company has facilities for rolling coils for roofing and for foil as related processing facilities and produces and sells such products
(d) Further, it is engaged in trial operation of a cold rolling facility for plate of 1,600 mm width and, along with this, is newly installing melting and

casting lines and plans to expand the current production capacity from the monthly 2,500 tons or so to 4,000 tons by wide width lines.

As mentioned above, company A is a giant in the Indonesian aluminium plate rolling industry and is judged to have reached a technical level of an equal advancement as the average aluminium rolling companies of R. Korea and Taiwan.

Class B: (a) The companies can produce plate of a width of up to 600 mm, use facilities which are over 20 years old, and have not made any major improvements during that period.
(b) They use just plate for utensils for domestic Indonesian use due to poor surface condition, despite coil rolling.
(c) Company C uses the production for in-house consumption only, while company B supplies its total products to a single utensil manufacturer.

From the above, the technical level of this class of companies may be considered to have stopped at the state of 20 years back, with entry of overseas competitors, changes in the items in demand, etc. likely to cause difficulties.

Class C: (a) The companies produce entirely for in-house consumption and make "cheap and poor" quality of utensils.
(b) They rely on low personnel costs and demand from low income households, who presently occupy majority in Indonesia and are being pressed to consider whether to withdraw along with economic growth.

[3] Product development

The class A company is considered to have the technical ability to develop new products domestically in Indonesia and to diversify its products. Specifically, it is able to expand the usages of its products from the current utensils, roofing, and foil to electrical components, automobile components, and packaging materials in the form of following trends in demand for aluminium products in the advanced nations. However, company A, which is the only company in class A, represents a giant presence with no competitors domestically and, further, is protected in some of its products from competing overseas products by high import duties. Further, it is able to make a sufficient profit by just the current domestic demand. Therefore, it is not necessarily positive for the company to tackle new product development at the present time.

The class B companies manufacture using the coil rolling system, but their rolling facilities were installed over 20 years ago and there have been no major renovations made since then. Almost the entire production is used as materials for making household utensils. Judging from the technical background and judging from the current facilities and in view of the fact that there is sufficient domestic demand for utensils for the production capacity, these companies are negative when it comes to product development.

The class C companies have pull over rolling facilities which can only produce low quality utensils. Further, the surfaces of the plate rolled and the precision of thickness do not come up to standard. These companies survive due to the "human wave" tactic of using inexpensive labor and making cheap and poor quality utensils. Therefore, there is little hope at all for development of new products with this level of technology.

[4] Production management

The production management in Indonesia's aluminium plate rolling factories was seen as having the following features:

(a) Short run production: Only three types of aluminium plate was being produced in the class A company: plate for utensils.

(b) Anticipatory production: The aluminium plate produced by all the manufacturers was used as material for final products of the manufacturers themselves and their corporate groups. As the final products are produced based on, forecast, so the aluminium plate is produced anticipatively.

(c) Strict division of work: Work is divided into two levels: managerial works and simple work. Managerial work is performed by the owners' families, university graduate higher level management, and overseas engineers employed from Hong Kong etc., and simple work is done by factory labors. Factories are controlled by orders and instructions from higher management. Almost no in-house education or training is given to workers as a whole. As a result, factory workers,in most factories, do not participate activities such as productivity improvement and quality improvement.

[5] Quality control

The basic point in quality control in the production of aluminium plate is what degree of control should be exercised in the different manufacturing processes. The state of quality control for different manufacturing processes in the companies ranked above will be summarized below:

Manufacturing process	Main control item	Class A	Class B	Class C
Melting	Control of components	Analysis by lot	Work based on experience	Work based on experience
	Melt filter	Facilities present	No	No
Casting	Control of cooling water and melt temperature	System present	No	No
Slab cutting	Dimensional precision	Facilities present	No	No
Slab Surface grinding	Removal of surface defects	Facilities present	Some	No
Heating and Homogenizing	Homogenization and uniform preheating	System present	Yes	No
Rolling	Mechanical rolling and automatic control of thickness and shape	Yes	No	No
Finishing	Dimensions and thickness of product	Yes	Yes	Yes
Annealing	Control by program	Yes	Yes	Yes
	Use of atmosphere gas	Yes	No	No

Source: Field survey

If the types of products increase, control of the above processes will become essential requirements, but with the exception of the single class A company, sufficient control is not now being performed. The class B and class C companies, however, are producing single item, that is, plate for utensils which is consumed in-house, so there is no particular problem even with insufficient control of the processes. The class A company is producing products for export to the advanced countries and is equipped with a quality control system as the checking procedure for each process demands advanced inspection procedures.

[6] State of Factories

During factory visits, the state of production areas at aluminium rolling firms was surveyed based on a "factory check list." This check list consist of 25 items for evaluation. Each item was assigned points based on evaluation (excellent...3 points, average ....2 points, and inferior...1 point). A summary of the results of the survey of two companies is given in Table 3-3-49.

While there are differences between the manufacturers, based on the field survey results it may be said that there are problems in the working environment, safety and sanitation, and motivation in the area of labor management. Problems in the area of production and technology are small in number compared with those of labor management. It is believed that production technology which was introduced from advanced countries in the past has been successfully adopted and has reduced problems in this area. However, the JICA Study Team found that there are more problems with quality control and plant management than with work management and product management.

Table 3-3-49: Results of the Field Survey at Factories (Rolling)

Evaluation Item	Check Points	Average Points
Production and technology		
Work management		
1. Dispatched workers	• Level of automation, Job range	2
2. Speed of operation	• Earnest attitude, A look in eyes, A chat during work (talking during work?)	1.5
3. Working speed	• Speed of manual work, Working speed	2
4. Operation efficiency	• Frequency of operation stoppage, The number of workers walking about, Meetings	2
5. Management style	• Posting of notices regarding production targets and achievements, posting of notices regarding attendance	1.5
6. Operation improvement	• The amount of wastefulness, Improvements in jigs and fixtures	1.5
Product management		
7. Materials, parts	• Containers, Storage methods, Manner of piling, Use of shelf labels	2
8. Semi-processed products	• The degree of accumulation, Use of stock slips	2
9. Finished products	• Types of packing, Cleanness of packages	1.5
10. Material handling	• Notice of storage space, Transportation method, Manner of placing	1.5
Quality control		
11. Process inspection	• Posting of notices regarding inspection standards, The level of inspection skill, Boundary samples	1.5
12. Handling of defective products	• Notices regarding defective units, Classification of storage spaces	1
13. Inspection equipment	• Manner of handling, Inspection marks	2
14. Management method	• Control charts, Posting of notices of defect and other ratios	1.5
Plant management		
15. Factory layout	• The level of adopting assembly line, The level of continuous operation	2
16. Maintenance of equipment	• Soil on equipment, Proper pipe laying and wiring	1.5
17. Maintenance of building	• Uneven floor, Broken windows, Coloring, Rain-cover, Roof leakage	1.5
Labor management		
Working environment		
18. Proper arrangement	• Establishment and indication of aisles, Manner of placing jigs and fixtures	1.5
19. Clothing	• Uniform and regulation cap, Work shoes, Name tag	2
20. Lighting	• Lighting levels, Lighting method	1.5
21. Ventilation	• Dust, Foul odors, Windows, Ventilating fans	1
22. Rest area	• Existence of space for a rest area	1
Safety & sanitation		
23. Safety	• Posting of danger signs, Use of safety equipment, Posters promoting safety in operations	1.5
24. Sanitation	• Cleaning of building and aisles, existence of a sashhand stand	1.5
Morale		
25. Motivation	• Existence of a bulletin board, Existence of a quality control bulletin board, Posting of a company slogan	1

Source: Factory survey

[7] Procurement of raw materials

Aluminium ingot, the raw material for the aluminium rolling industry, is produced in Indonesia by P.T. Indonesia Asahan Aluminium. The quality is of an international level and it is judged that there are no problems at all with it. On the other hand, imports of aluminium ingots from Australia have begun, mostly to meet the soaring domestic demand for aluminium products. There is currently no import duty assessed on aluminium metal and the price is based on the price of the London LME. Basically, there is no difference in price from metal procured domestically.

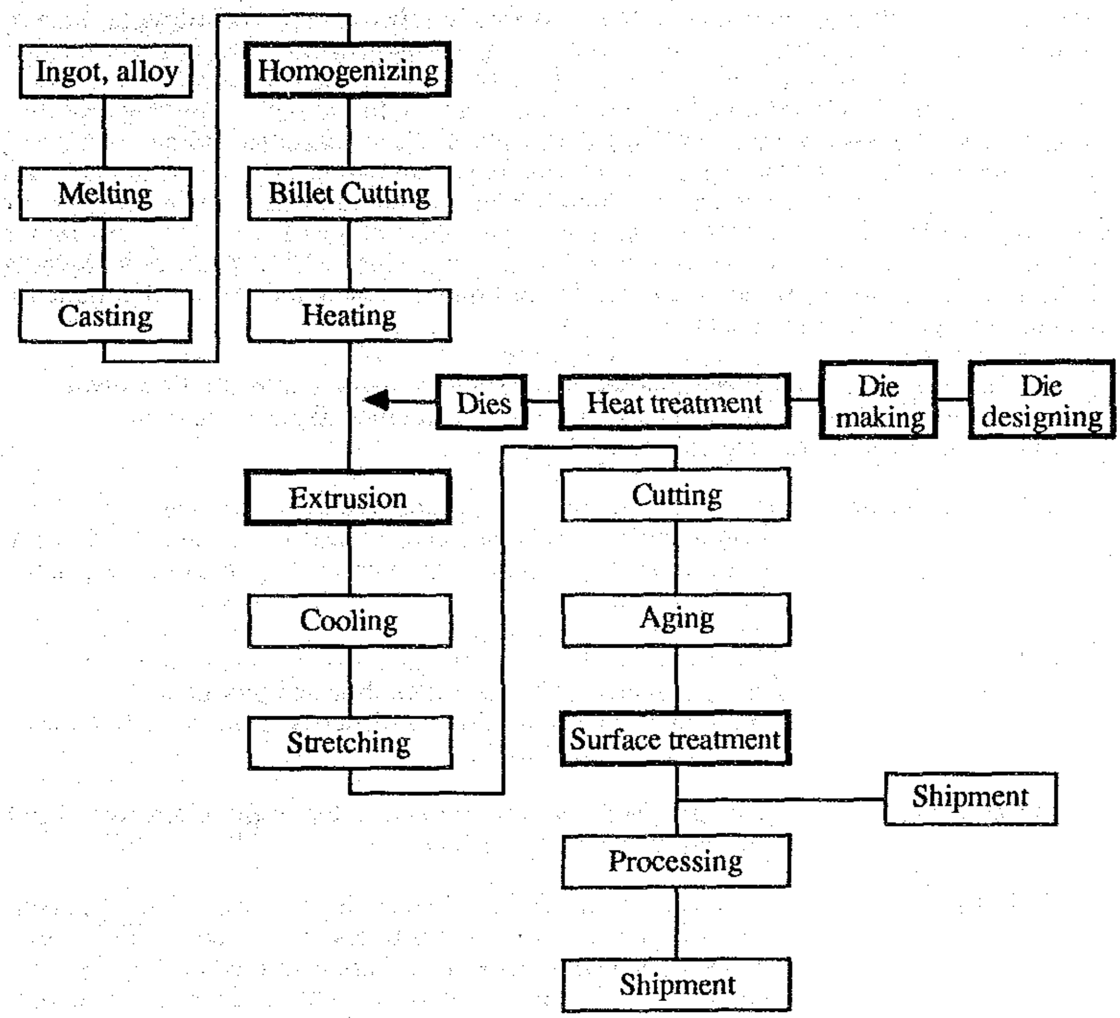
2) Extrusion

[1] Manufacturing process

Aluminium extruded shapes are mainly made of 6063 alloy. The alloy is prepared by combining pure aluminium ingots with alloying metals, which are melted and adjusted in composition, cast into billets which are then extruded, pulled and straightened, cut, and aged to make the shapes. In general, little material is shipped out as extruded. The material is subjected to anodizing surface treatment and other surface treatment and then shipped out as bar materials or else assembled into window or door frames or the like and then shipped out.

The flow of extruded aluminium products is as follows:

Fig. 3-3-19: Flow of Extruded Aluminium Product Production



Almost all companies which produce extruded aluminium products are equipped with complete production systems but the quality of the machinery and equipment and the presence or absence of medium level engineers varies. The size of the finished products is governed by the capacity of the extrusion machines and the size of the billets used. Domestic manufacturers may be roughly classified into two groups according to the size of the products produced.

Companies belonging to the first group manufacture mostly pipe materials for decorative showcases and other building material parts. They use billets with diameters of up to 5 inches and have forming machines with capacities of up to 900 tons. Companies belonging to the other group produce mostly aluminium window and door frames for building use, building materials and various types of processed items. They use billets with diameters of 6 to 8 inches and have forming machines with capacities as high as 2,200 tons. In addition, surface treatment is not limited to mere anodizing treatment but includes composite film treatment.

The production processes enclosed in broad lines in the production flow chart shown in Fig.3-3-19 are the major problem areas at many manufacturers and the problems can be summarized as follows:

a) Homogenizing: Homogenizing treatment is not performed at many manufacturers. This may cause extrusions to lack the required characteristics and may subsequently affect the quality of the final products.

b) Dies: The accuracy of the dies for extrusion is low, which in turn brings a wider tolerance among finished products. In addition, insufficient heat treatment of the surface of the dies shortens the life of the dies.

c) Extrusion: Extrusion facilities at most manufacturers are relatively old and lack efficiency and accuracy.

d) Surface Treatment: The thickness of the film of anodizing treatment does not meet requirements at most manufacturers, mainly because they are not equipped with proper inspection equipment. Because of both poor surface treatment equipment and lack of technology, only one manufacturer of extruded products can perform composite film treatment.

[2] Technical level

In these past few years, the economic development in the country and the increase in capital investment have been accompanied by a construction boom in Jakarta and other metropolitan areas. Demand for aluminium extrusions, as represented by construction materials, has been steadily growing. In addition to such typical extruded products as window and door frames for buildings, demand for small products such as showcase components and parts of various facilities and machinery has been growing tremendously. The following shows the overall level of production technology of companies considering the nature of the currently owned facilities, technical level, scheduled additional installation, etc. of aluminium extrusion factories by company. In the same way as with the ranking for aluminium rolling companies, ranking was made with three levels: A, B and C.

	Production capacity (month)	Actual production (month)	Capacity of molding machines (unit)	Billet diameter (inches)
Class A				
Company A	600 MT	600 MT	1,800 TON (1) 2,200 TON (1)	6', 8'
Class B				
Company B	700 MT	500 MT	1,800 TON (1) 1,600 TON (1) 350 TON (2)	3.5', 5' 7', 8'
Company C	320 MT	320 MT	1,850 TON (1)	7'
Company D	200 MT	100 MT	1,800 TON (1)	7'
Class C				
Company E	400 MT	400 MT	600 TON (2) 880 TON (2)	5'
Company F	50 MT	30 MT	1,600 TON (1)	6'
Company G	100 MT	100 MT	600 TON (2)	3',5'
Company H			800 TON (1)	
Company I	150 MT	150 MT	950 TON (1) 350 TON (1)	3', 5'
Company J	100 MT	100 MT	650 TON (2) 880 TON (2)	4', 5'
Total	2,620 MT/month	2,300 MT/month	22 units	

Source: Field survey.

The above-mentioned production capacities and production volumes were based on the in-depth interviews made during visits of the survey team, but estimates based on the actual factory visits indicate that the actual figures are at least 30 percent higher than the figures given in the above table. Therefore, the aluminium extrusion production of Indonesia is estimated to be over 3000 tons a month.

In the above manner, the nine main aluminium extrusion manufacturers of Indonesia include one company in class A, three in class B, and five in class C. These nine companies currently own a total of 22 extrusion facilities, of which just under 80 percent, or 17, are of Taiwanese make. Specific scheduled augmentation of facilities include plans for nine further facilities by nine companies, of which seven units are scheduled to be imported from Taiwan. A breakdown of the new facilities shows company B obtaining one 2,500 ton unit, company C one 1,800 ton unit, company E four units (capacity unknown), and company H one 2,000 ton unit.

The features and technical levels of the companies belonging to the different classes are summarized below:

Class A: (a) This is a joint venture factory of a large Japanese window and door frame manufacturer and has the latest manufacturing equipment. It exports over 80 percent of its production to Japan for sale on the Japanese market. The products are of a quality acceptable in Japan. The manufacturer is judged as being first class even from international standards.

(b) Looking at the facilities, machinery, and layout, to ensure the above quality and productivity, the latest Japanese equipment has been introduced and is operating on all lines.

(c) In technical guidance, Japanese engineers are stationed at key locations (seven) to provide guidance and perform inspections. On the other hand, about 10 Indonesian employees are dispatched to the parent Japanese company every year to receive six months of training. As a result, there are now over 50 employees who have received training in Japan, so the latest technology is being smoothly transferred.

(d) The same work standards are used as in Japan for all processes, from the melting of the aluminium metal to the completion of the aluminium window and door frames, and the products are produced based on those standards. QC activities are starting from the initial stage of safety measures. In the future, the activities are plauned to apply to improvement of productivity and quality.

(e) Computer aided designing (CAD) is used for manufacturing dies. The computer software for this is being developed by the Japanese head office. The materials for the dies are special steel alloys imported from Japan. The machine tools and heat treatment furnaces used are the latest ones from Japan. As a result, about the same quality of dies are produced as in Japan.

(f) To develop domestic demand for aluminium window and door frames for general housing, standardized sizes of window and door frame designs for the domestic Indonesian market are being developed in an effort to boost sales.

Class B:

(a) These companies are joint ventures with overseas firms and have in the past received technical guidance or else have employed experts from Japan and other advanced countries and have received technical guidance from those experts. These activities were aimed at improvement of productivity and quality.

(b) The companies have extrusion machines of 1,800 ton capacities or so and mainly produce shapes for aluminium window and door frames for domestic buildings. The surface treatment applied is of a high level in Indonesia.

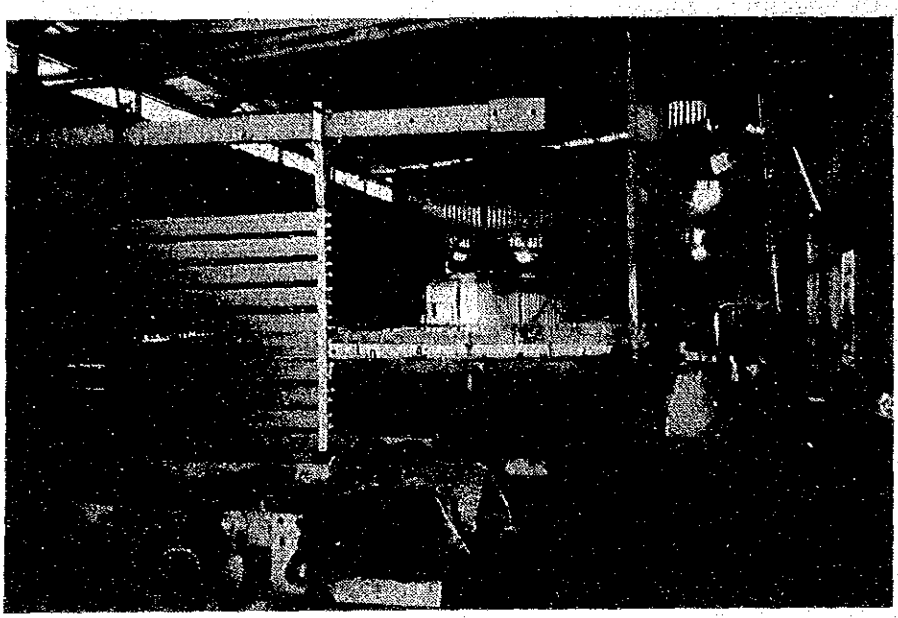
(c) Looking at die making, the companies have introduced the latest machine tools from Japan and are performing both machining and heat treatment. The lack of design knowhow and the insufficient heat treatment after the machining result in short die lifetimes in many cases, however.

(d) For billets, the companies import some billets and use them as materials for products for which high qualities are required.

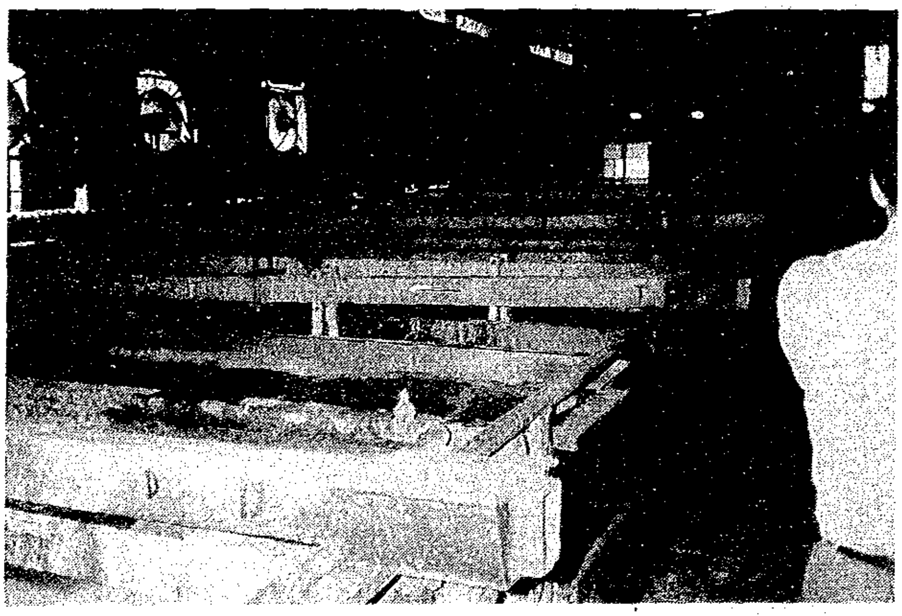
(e) On the other hand, billets produced in-house are used as materials for products where the quality demands are not that severe, but the analysis of composition, deoxidation, and degasification treatment are not necessarily sufficient and sufficient control is not exercised over the temperatures in homogenizing treatment.

(f) The companies perform all processes with their own equipment, but lack sufficient overall process control, so the quality of the final products is not stable.

Photo 3-3-3: Surface Treatment of Extrusion Products



(Surface treatment equipment at a class B company: moderate size equipment which cannot perform composite film treatment)



(Control of temperature and PH value is not well done and the anodizing film is thin)

Class C: (a) These companies specialize in production of extruded shapes for small objects of a maximum diameter of 5 inches which are used for materials for decorative showcases and parts of building materials in the country. The users demand lower price rather than higher quality, so if the shape is satisfactory to a certain degree, the important condition is low price. Demand has been growing at a considerable pace in recent years.

(b) Numerous companies have introduced Taiwanese made melting and casting facilities and extrusion machines, so are judged to be at substantially the same technical level as Taiwanese firms. With the exception of the technical guidance received at the start of operations, they do not make use of engineers from other countries. At the present time, each time a problem occurs, they tend to inquire with the supplier of the equipment.

(c) The companies do not exercise any control over the composition of lots of billets in melting and casting by use of analytical equipment and rely completely on experience and intuition. Further, there are no homogenizing treatment facilities for billets. The only alumite surface treatment is chemical treatment and no control is exercised over the thickness.

(d) Dies are manufactured by cutting specialty steel from Europe using Taiwanese or Chinese machine tools. Considerable use is made of medium grade specialty steel. Together with the precision of the machine tools, this results in a lower precision and durability of the dies produced. Further, the designs of the dies are not that strict.

(e) The facilities used by numerous companies are inexpensive Taiwanese makes, but due to the stress on shape in the quality demands, these facilities are sufficient. Further, these facilities involve less initial investment than facilities such as aluminium plate rolling mills, and therefore new entry into this field has been easy.

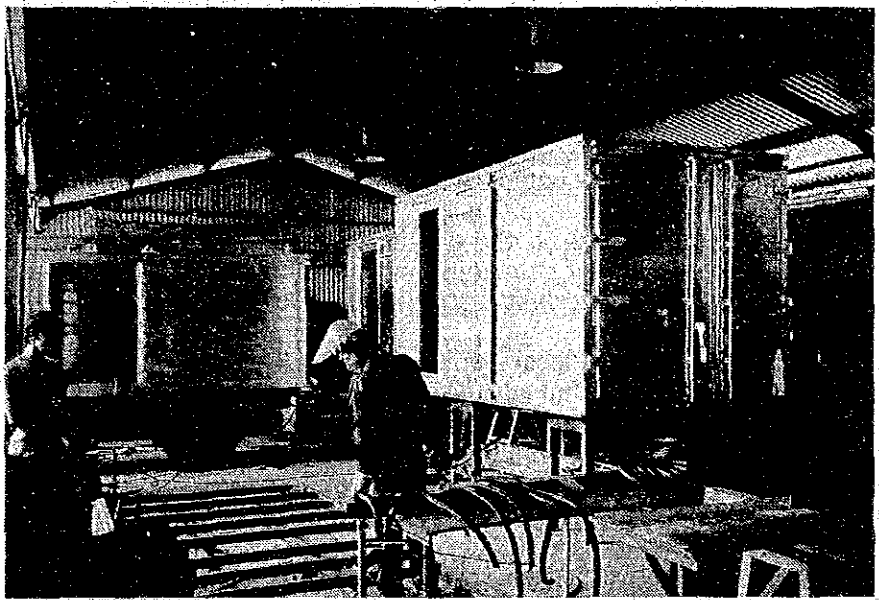
[3] Product development

The class A company anticipates, from the experience in Japan and other advanced nations, that there will be increased use of plate for building material use, particularly aluminium window and door frames for housing, and therefore is working to develop designs tailored to the domestic Indonesian market and to thus boost sales. Due to the low average level of income in the country, it will take time before such products spread throughout the country, but the company considers that they will first be used for high class housing and gradually stimulate demand.

Further, the company is exporting aluminium building material products which are labor intensive in the advanced countries, for example, screen doors etc. preassembled in Indonesia. In the future, it is believed that it will gradually increase OEM production of storm doors, fences, verandas, and other standard products.

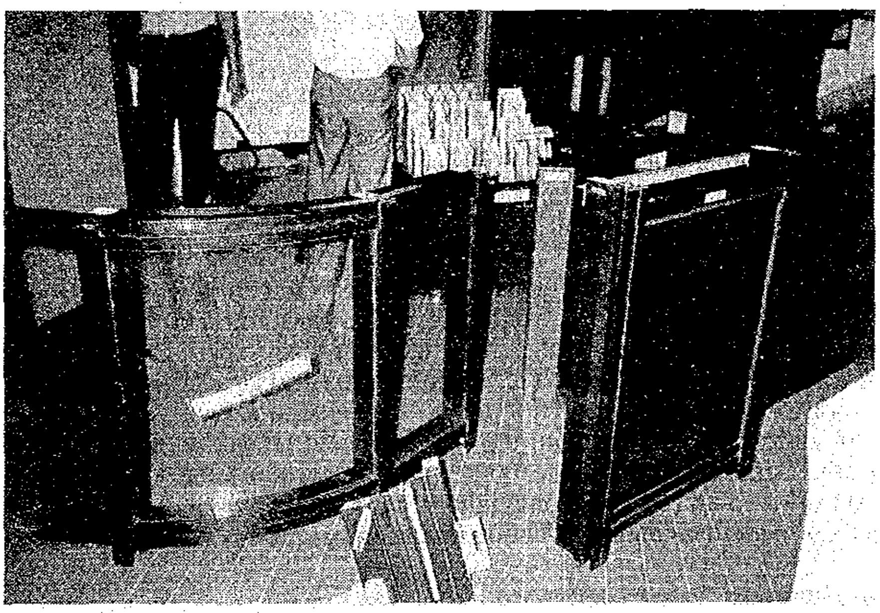
Domestic demand for general aluminium shapes has been increasing along with the establishment of factories in Indonesia by electrical machinery and automobile manufacturers. The industry is being pressed to upgrade its melting and casting technology so as to enable it to meet with the increased demand for shapes made of not only 6063 alloy but also 2000 high strength alloy and 5000 corrosion resistant alloy.

Photo 3-3-4: Aluminium Truck Body



(Usage of aluminium for transportation equipment and components has just begun and great demand is expected in the future)

Photo 3-3-5: Aluminium Sashes for Buildings



(Demand for sashes and curtain walls made of aluminium is expanding rapidly as a result of the latest construction boom in the country)

[4] Production management and quality control

The afore-mentioned company A is a Japanese affiliated joint venture belonging to class A and produces aluminium window and door frames, a major application for aluminium extruded products. The production management and quality control are both of high levels making this a model factory of aluminium extrusion industry for the country. Features of these are as follows:

(a) The latest production lines equipped with modern machinery and equipment from Japan
(b) Control technology based on the abundant experience of the Japanese parent company and preparation of numerous manuals for the same. Stationing of Japanese engineers as supervisory technical staff to provide support for smooth production activities in the factories
(c) Guidance and education of local employees basically through on-the-job training by Japanese staff in the field, but advanced education and training provided at suitable times to employees by dispatching them to the Japanese parent company.
(d) A method of control starting with work safety and aiming at steady improvement.
(e) Continuous comparison with the factories of the parent company to create an environment conducive to early discovery of problems and suitable and swift support in their resolution.
(f) Solid progress not governed by short term profit based on a loose management policy founded on the long term perspective of the parent company.

In this way, the class A company is applying quality control to the field based on the experience in Japan. The inspection facilities for each process step which are installed and used are the same as those of the Japanese parent company.

There is thoroughgoing preparation of manuals on work and manuals on inspection processes and products of a stable quality not governed by the skills of the individual workers are made.

On the other hand, the class B factories receive overseas engineers from Japan and other countries with the aim of improving production technology and stabilizing quality through guidance in factory control and quality control. However, the machinery and equipment, in particular the extrusion machines, are more than 20 years old and there are limits to the mechanization and automation. Further, there are problems with the precision etc. of products produced by current machinery and equipment.

The class C companies are engaged in production activities using mostly second class extrusion machines imported from Taiwan. The casting facilities are also based on technology from Taiwan or are copies of the same in most cases. The focus in corporate management is on increasing the volume of production and almost no effort at all is being made on factory control or quality control. They produce inexpensive low quality products of which materials, conditioning, dimensional precision, etc. do not meet industrial standards. As the Indonesian aluminium product market changes from its emphasis on price to an emphasis on quality, these companies will probably be weeded out unless they modernize their production facilities and production technology.

[5] State of Factories

The state of the production areas at aluminium extrusion manufacturers was surveyed based on the same "factory check list" used for aluminium rolling firms. A summary of the results of six local Indonesian companies and one foreign affiliated company is given separately in Table 3-3-50.

The survey revealed a wide gap between the foreign affiliated company, which owns up-to-date production facilities and employs the latest technology as well as various production know-how introduced by its foreign principal company, and local companies, which use less sophisticated equipment. This gap exists in all areas of production and technology and in labor management as well.

The local companies are behind in safety and sanitation, factors which are considered to be the most basic requirements in running a factory. Improvement of factory environment is also lagging. For instance, uniforms are supplied at only one of the six local factories. Only one of the local companies provides employees with an area to rest during breaks. In the area of production and technology, the local manufacturers have more problems in quality control than in work management or plant management. It can be said that most of the local manufacturers are simply concerned with increasing production and that they pay little attention to quality.

Table 3-3-50: Results of the Field Survey at Factories (Extrusion)

Evaluation Item	Check Points	Average Points Domestic	Average Points Foreign
Production and technology			
Work management			
1. Dispatched workers	• Level of automation, Job range	1.8	3
2. Speed of operation	• Earnest attitude, A look in eyes, A chat during work (talking during work?)	1.8	3
3. Working speed	• Speed of manual work, Working speed	1.8	3
4. Operation efficiency	• Frequency of operation stoppage, The number of workers walking about, Meetings	1.7	3
5. Management style	• Posting of notices regarding production targets and achievements, posting of notices regarding attendance	1.5	3
6. Operation improvement	• The amount of wastefulness, Improvements in jigs and fixtures	1.3	3
Product management			
7. Materials, parts	• Containers, Storage methods, Manner of piling, Use of shelf labels	1.5	3
8. Semi-processed products	• The degree of accumulation, Use of stock slips	1.3	3
9. Finished products	• Types of packing, Cleanness of packages	1.8	3
10. Material handling	• Notice of storage space, Transportation method, Manner of placing	1.7	3
Quality control			
11. Process inspection	• Posting of notices regarding inspection standards, The level of inspection skill, Boundary samples	1.3	3
12. Handling of defective products	• Notices regarding defective units, Classification of storage spaces	1.5	3
13. Inspection equipment	• Manner of handling, Inspection marks	1.5	3
14. Management method	• Control charts, Posting of notices of defect and other ratios	1.2	3
Plant management			
15. Factory layout	• The level of adopting assembly line, The level of continuous operation	2	3
16. Maintenance of equipment	• Soil on equipment, Proper pipe laying and wiring	1.7	3
17. Maintenance of building	• Uneven floor, Broken windows, Coloring, Rain-cover, Roof leakage	1.8	3
Labor management			
Working environment			
18. Proper arrangement	• Establishment and indication of aisles, Manner of placing jigs and fixtures	1.7	3
19. Clothing	• Uniform and regulation cap, Work shoes, Name tag	1.2	3
20. Lighting	• Lighting levels, Lighting method	1.7	3
21. Ventilation	• Dust, Foul odors, Windows, Ventilating fans	1.3	3
22. Rest area	• Existence of space for a rest area	1.2	3
Safety & sanitation			
23. Safety	• Posting of danger signs, Use of safety equipment, Posters promoting safety in operations	1.3	3
24. Sanitation	• Cleaning of building and aisles, existence of a sashhand stand	1.2	3
Morale			
25. Motivation	• Existence of a bulletin board, Existence of a quality control bulletin board, Posting of a company slogan	1	3

Source: Factory survey

[6] Procurement of raw materials

The material used for extrusion of aluminium is mostly 6063 alloy. Extrusion companies may be roughly divided into those which produce the alloys in-house and those which procure them from the outside. The class A company engages in integral production, melting aluminium ingots to produce slabs and processing the extruded shapes. The ingots are procured domestically or imported, but there is no difference in the quality of the two. On the other hand, the class B companies use slabs they produce themselves for the medium and low quality extruded shapes for the domestic market, but use imported alloy for products where a high quality is demanded. Aluminium alloy is an international commodity and there has been no particularly great problem in procurement.

3) Aluminium plate work

Aluminium plate is worked to produce products of an enhanced added value. Aluminium household utensils, aluminium roofing, aluminium impact tubes, and aluminium foil products are produced in Indonesia, some of which is exported overseas. The aluminium plate which serves as the material for these aluminium worked products is fairly much completely produced in Indonesia. The domestically produced aluminium plate used as the raw material is inferior quality wise compared with overseas equivalents, but is superior in terms of price. On the other hand, final products for the domestic market by nature stress price over quality, and the final manufacturers consider price to be the most important, assuming the minimum quality is ensured, when purchasing aluminium plate material, so there is no strong dissatisfaction with the quality of domestically produced aluminium plate. Plate of good quality imported from abroad, however, is assessed with a high import duty, so only very small quantities are imported.

In this way, the raw materials are inferior to those of the advanced overseas nations in terms of quality and the manufacturing processes themselves use old-fashioned machinery and equipment and are extremely labor intensive, so the final products are of a second class level only acceptable in the Indonesian domestic market.

Below, the current state of and problems in corporate management and production technology of the aluminium plate working industry will be explained from the viewpoint of four final products: household utensils, roofing, foil, and impact tubes.

[1] Manufacturing process

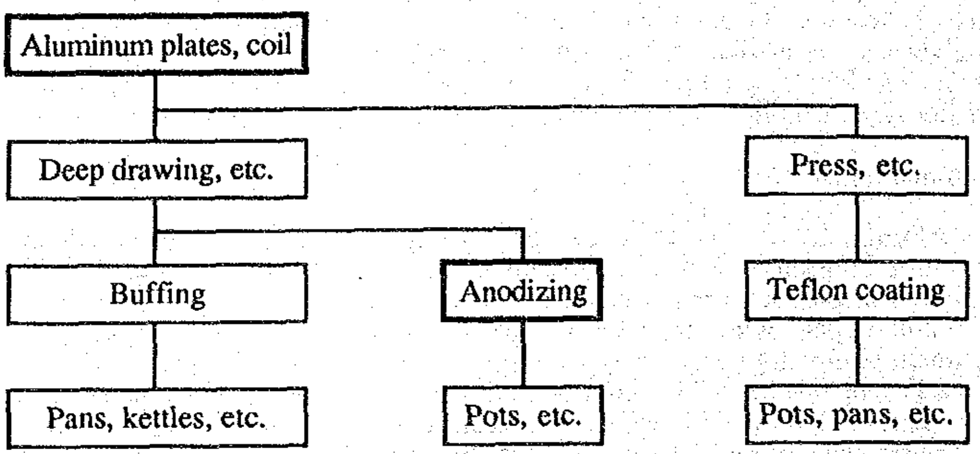
(a) Aluminium household utensils

Almost all the companies surveyed were equipped with only press and other machine working processes and did not have facilities for anodizing treatment etc. They performed only buffing as final finishing and produced aluminium pots, kettles, and other products. As the reasons these companies had only simple, old-fashioned processes, mention may be made of the facts that the domestic market does not care about the quality of the products themselves and there is a cheap, abundant labor force which can take the place of expensive, up-to-date facilities, but one of the biggest reasons is also the quality of the plate materials. The domestically produced aluminium plate materials are inferior in quality and cannot be given an anodizing finish. Only one company has an anodizing finishing process, but its production capacity is a small 20 tons a month or so.

Some utensil manufacturers are introducing Teflon treatment processes, which would give even more added value than a standard anodizing finishing process. Teflon treatment is performed under license from Dupont of the U.S. The coating facilities and technology are introduced at the same time. Only two companies are able to perform this Teflon treatment in Indonesia at the present time, and of these one is relying on imports of aluminium alloy plate from abroad to secure high quality materials. Almost all of the finished products, frying pans and pots with the Teflon coating, are exported to Japan and other advanced overseas nations.

The flow of production of aluminium household is as follows:

Fig. 3-3-20: Flow of Aluminium Household Utensil Production



The production processes enclosed by broad lines in the production flow chart shown in Fig.3-3-20 are the major problem areas at many manufacturers and the problems can be summarized as follows:

a) Aluminium plate/coil: The quality of the aluminium plate and coil available in Indonesia as a material to produce aluminium household utensils is not good in most cases. In addition, these materials are often treated roughly and damaged and stained materials are processed into final products.

b) Anodizing treatment: Anodizing treatment cannot be properly performed when the surface of the semi-finished products is stained. The film of the treatment is often thin and uneven. Most of the aluminium household utensils to be sold in Indonesia are not surface treated.

(b) Aluminium plate roofing

Aluminium plate roofing is lighter and more easily formable than steel plate roofing and results in a cooler interior due to its heat reflecting nature. Further, it looks good and is light, so there is the advantage that the steel framework becomes simpler. This roofing is therefore spreading in use in Indonesia. Particularly frequent use is made of it for roofs of factory buildings.

As shown in Fig.3-3-21 below, the manufacturing process for coil for aluminium plate roofing is very simple in that only a single roll forming machine is required. The major problem areas in production are enclosed in broad lines in the flow chart. There is only one company in the country which is producing the coil material and supply is always tight. In addition, high import duties pose a significant obstacle to imports of high quality plate.

Fig. 3-3-21: Flow of Aluminium Plate Roofing Production

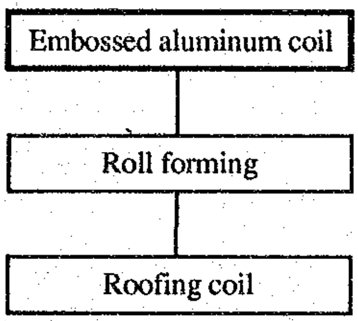
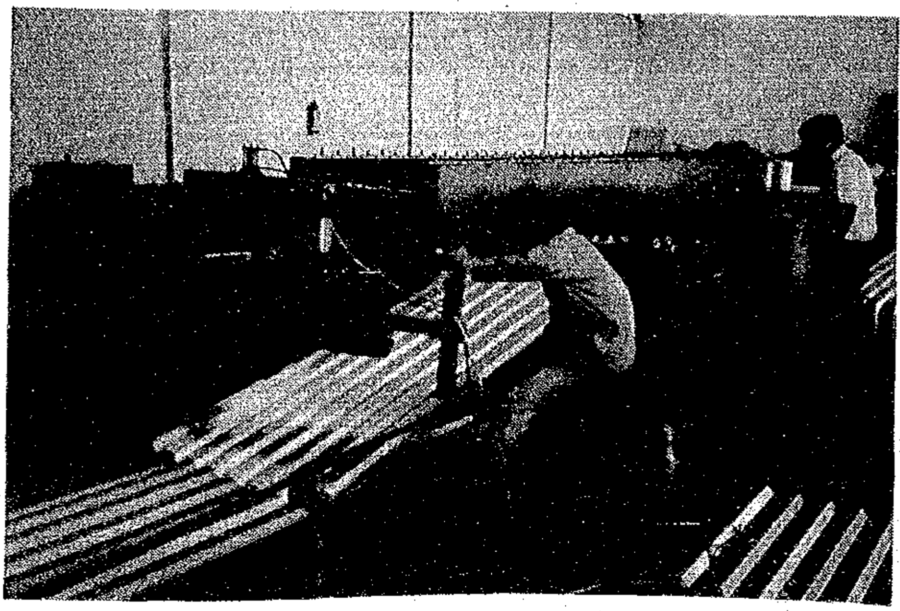
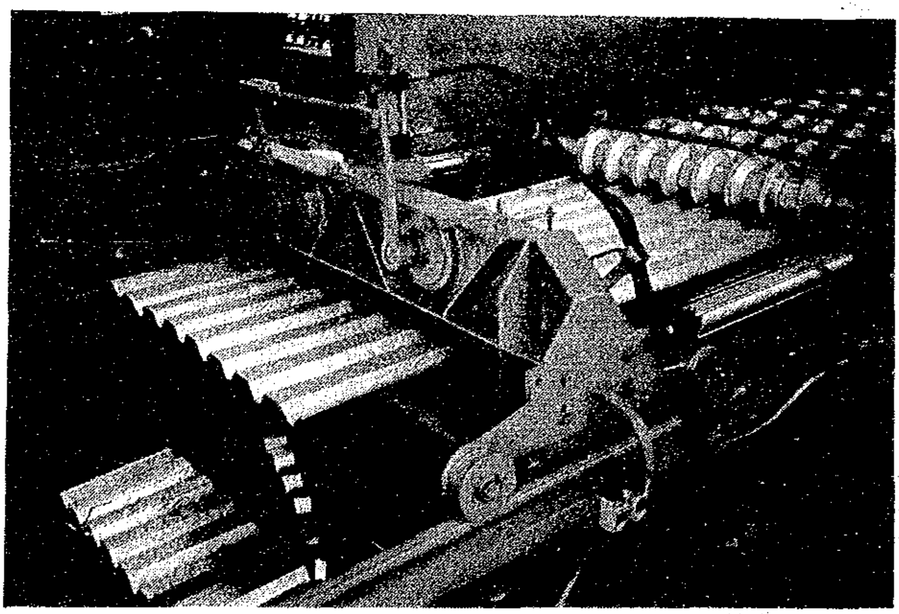


Photo 3-3-6: Production of Aluminium Plate Roofing



(Because of the short supply of domestic raw materials, production cannot meet demand)



(Production of roofing is simple and can be done with one roll forming machine)

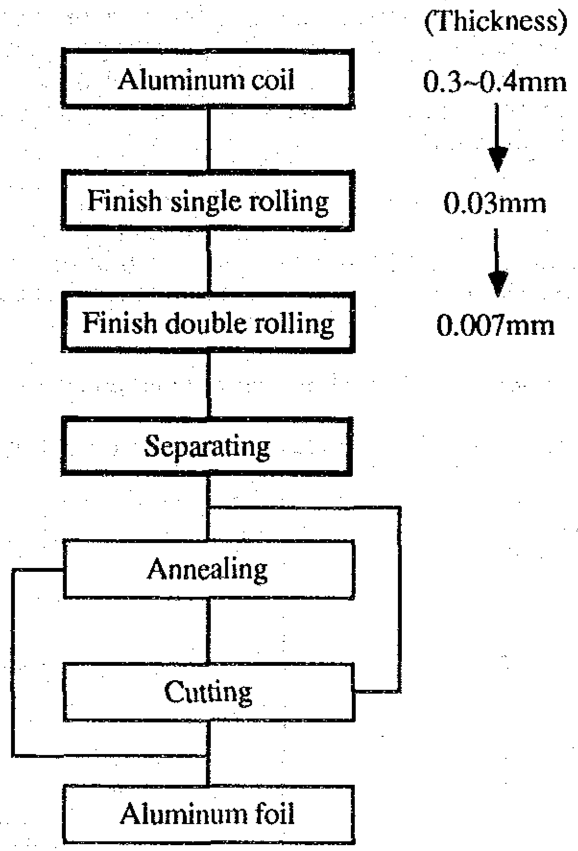
(c) Aluminium foil

Foil of a thickness of 7 microns is produced by successively rough rolling and finish rolling a coil of a thickness of 0.3 to 0.4 mm. With the usual four stage rolling mill, however, the rollable limit is said to be about 10 microns, therefore to obtain foil of a smaller thickness, two sheets of material are rolled together at the final rolling pass. This superimposed rolled aluminium foil is separated at the next process. After this, the majority of the foil is annealed to remove the rolling oil deposited on the surface and is then used in the annealed state.

Only one company is producing foil in Indonesia. The foil thickness is limited to 7 microns. Further, laminates of foil with plastic, paper, etc. are not being produced due to technical limitations and the small size of domestic demand.

The flow of production of aluminium foil is illustrated as follows.

Fig. 3-3-22: Flow of Aluminium Foil Production



The production process enclosed by broad lines in the above production flow chart are the major problem areas at many manufactures and the problems can be summarized as follows:

a) Aluminium coil: Aluminium coil as a raw material for aluminium foil is not fully deoxygenated or dehydrogenated and may contain some oxide. Therefore, the purity of the aluminium coil is low and the thickness of the coil is not well controlled, leading to the tendency for pinholes to appear when it is rolled thin.

b) Rolling mill/separator : Production facilities at the factory are old and thus the thickness of the finished foil in a stipulated measurement cannot be well controlled.

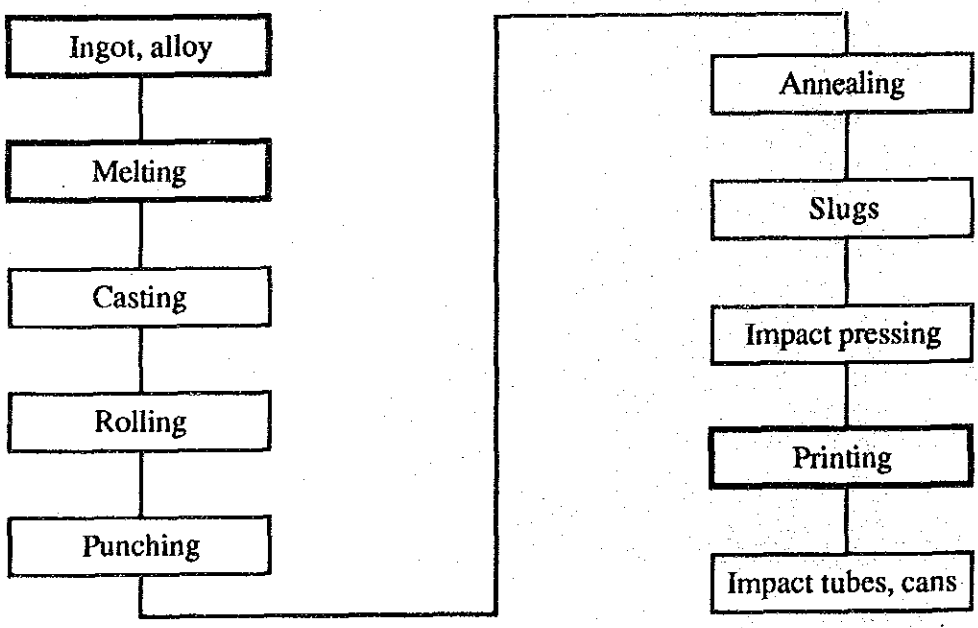
(d) Aluminium impact tubes and cans

Aluminium impact tubes are being produced by two types of manufacturers: ones which produce tubes and cans integrally from aluminium ingots and ones which purchase slugs and produce impact tubes and cans. A breakdown of the products shows that aluminium cans are mainly used for aerosol cans for cosmetics and tubes for drug containers or toothpaste containers.

Due to the domestic Indonesian market and the size of impact presses, the production facilities on hand, cans of up to a diameter of 50 mm can be produced domestically. The plastic laminated tubes so widely used in the advanced countries are still not in use in Indonesia. In tube products, the mainstream is still aluminium impact tubes.

The flow of production of aluminium impact tubes and cans is as follows:

Fig. 3-3-23: Flow of Aluminium Impact Tube and Can Production



The production processes enclosed by broad lines in the production flow chart shown above are the main problem areas in the production of aluminium impact tubes and cans and the problems can be summarized as follows:

a) Aluminium ingot/melting: Low quality aluminium ingot is used without appropriate control of its chemical composition, resulting in low quality slugs. The low quality slugs subsequently bring about a low yield of final products.

b) Printing: Due to problems related to the printing process such as the inaccuracy of production facilities, rough printing patterns, and low quality printing inks, printing on the surface of tubes and cans is sometimes smudged. In addition, due to insufficient visual inspection, products with smudged printing are shipped to the market.

Photo 3-3-7: Samples of Aluminium Impact Tubes

(Old machines cause hairline scratches on the surface and smudge the printing)

(Plastic laminated tubes have not been introduced in Indonesia)

[2] Technical level

(a) Aluminium household utensils

There is a greater demand for aluminium household utensils in Indonesia than in other Southeast Asian countries. The reason, first of all, is the sheer size of the population, but mention may also be made of the facts that the people have long been familiar with aluminium containers due to the aluminium cups etc. used for collecting latex, there are numerous manufacturers supplying cheap utensils which can be purchased even by low income households, and these cheap aluminium utensils have a lifetime of about one year and thus are considered disposable products. At the present time it is estimated that there are about 10 manufacturers which are producing aluminium household utensils. The main seven companies can be ranked as classes A, B, and C as follows by their overall technical level:

	Monthly production	Source of materials	Production of high class products (Teflon, anodizing)	Utensils other than aluminium
Class A				
Company A	800 MT	Company affiliate	260 MT	Stainless steel/ plastic
Company B	150 MT	In-house, other companies, imports	50 MT	Stainless steel/ iron enamel
Class B				
Company C	150 MT	In-house	—	
Company D	180 MT	In-house	—	Plastic
Company E	310 MT	Other companies	—	Stainless steel
Class C				
Company F	100 MT	In-house	—	—
Company G	50 MT	Other companies	—	—
Total	1,740 MT/month		310 MT	

Source: Current field survey

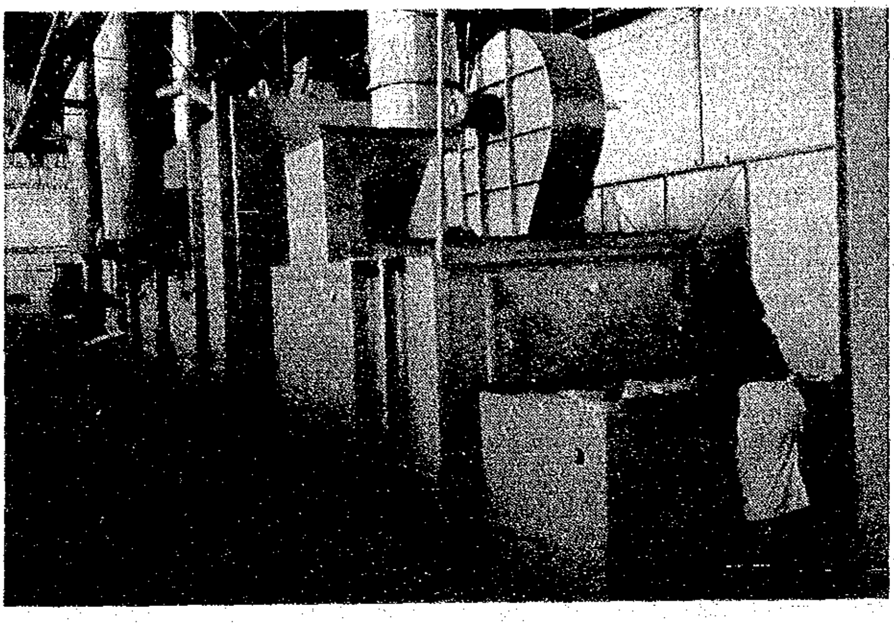
The features and technical level of the companies belonging to each class are summarized below:

Class A: a) The companies produce inexpensive utensils for the domestic Indonesian market and at the same time produce high class utensils using Teflon coatings and anodizing for export. In particular, they are exerting effort in exports to Japan. They are also handling OEM production for supermarkets and for utensil manufacturers.

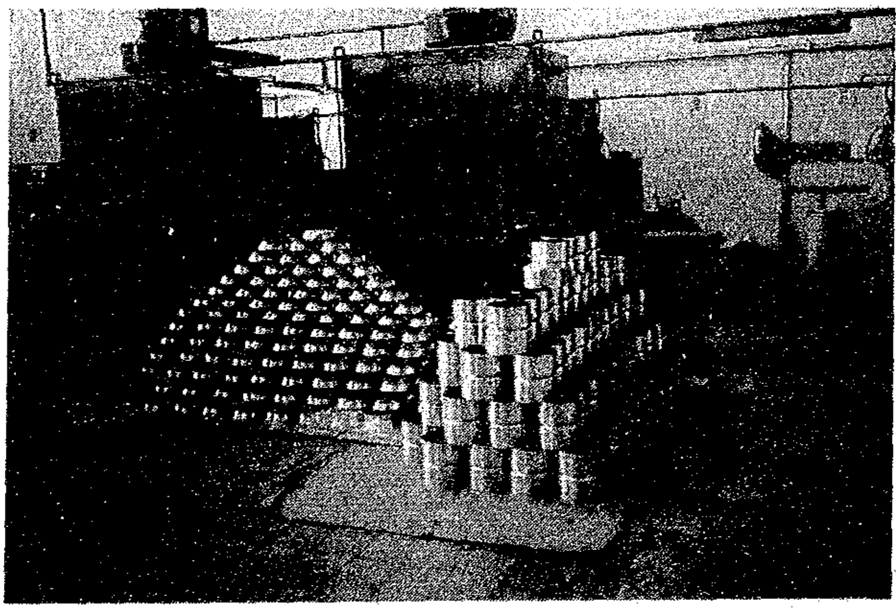
b) Facility wise, they have various types of presses for utensils, anodizing treatment facilities, and Teflon coating facilities and lines. These manufacturing facilities are being operated by their own technical staffs.

c) The companies use aluminium plate made themselves or made by domestic rolling companies, but the quality is poor and it is estimated that the yield in the manufacture of high class items for export is considerably poor. On the other hand, quality is seldom considered a problem for domestic consumption and sufficient profits are being made, it is believed.

Photo 3-3-8: Teflon Treatment by Modern Facilities



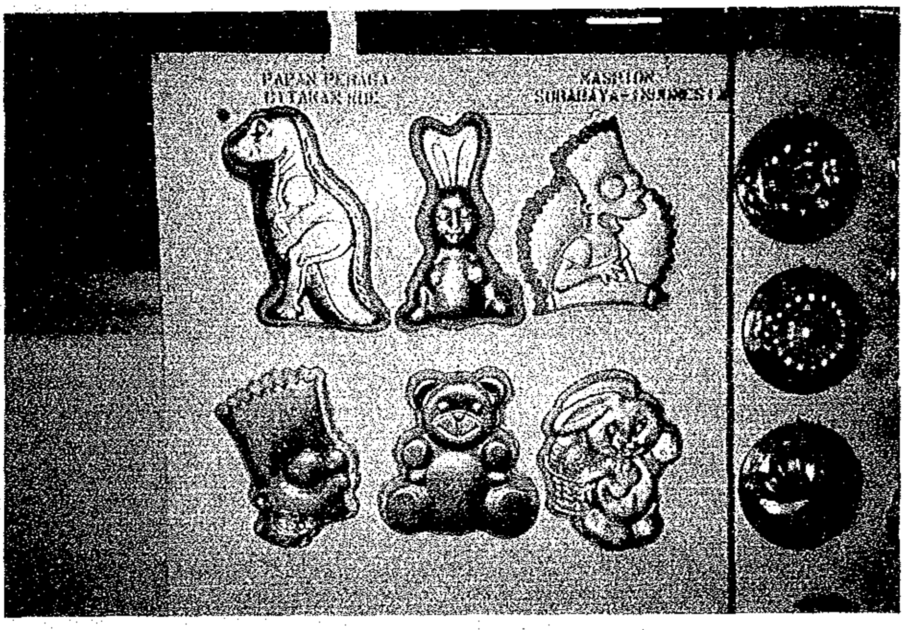
(Most Teflon treated products are exported)



(The Teflon treatment line is clean and well organized)

Photo 3-3-9: Examples of High Value-Added Products

(Pans to be exported to Japan)



(Patterns for pancakes)

Class B:

a) Two of the three companies belonging to this class use their own plate manufactured by old-fashioned pull over rolling machines, while the other company is using plate supplied by a domestic rolling company for producing its utensils. All of the three companies are producing large amounts of "inexpensive and inferior" products for domestic consumption.

b) The various types of presses for making the utensils are old-fashioned ones of Chinese or Taiwanese market. The production relies on human labor and in labor intensive.

c) There is insufficient technical staff and a lack of the technical expertise for producing high class items for the overseas markets.

Photo 3-3-10: Production of Aluminium Household Utensils

(Old production facilities requires large labor forces)

(The quality of products fluctuates because most of the production is done manually by unskilled labor)