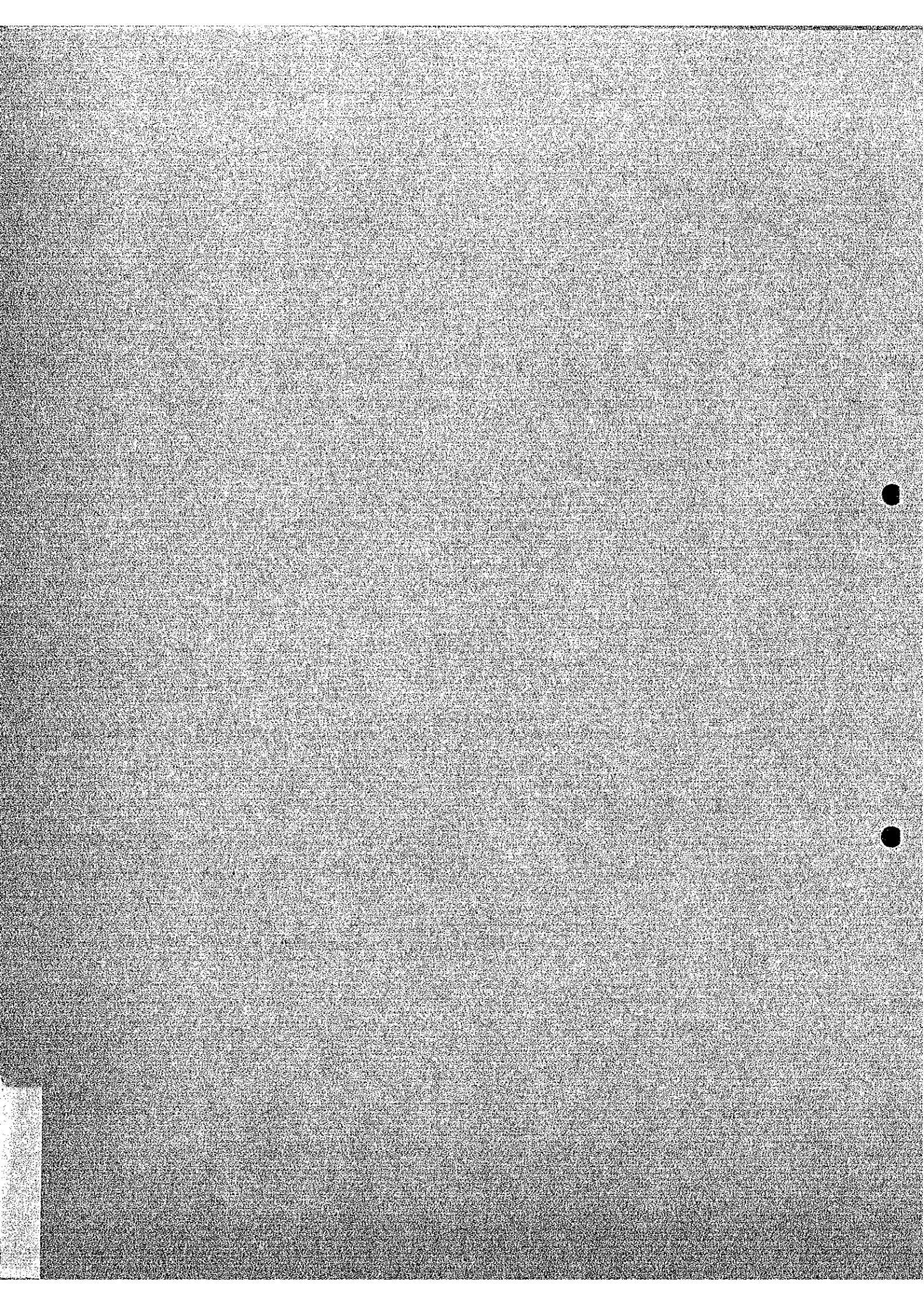


CHAPTER 11

RECOMMENDATIONS



CHAPTER 11 RECOMMENDATIONS

The Republic of the Philippines has planned to construct an integrated steelworks in Mindanao Island as the main source of industrialization and economic development, and has been going through preparations.

In other words, investigations from various points of view have been made up to this point regarding the construction of the steelworks. The pre-feasibility study which the Japanese government has made recently is one of these.

Also production on P.S.C., which is adjacent to the steelworks site, began in May 1977 and its operation is performed on a stable basis.

Manufacturing of refractories and ferro-alloys in the suburbs of Iligan are due to start very soon. Regarding these points, we see that the Philippines has been making steady progress towards construction of steelworks and has been achieving satisfactory results, with which we were greatly impressed.

In this report we made a detailed investigation again on the scale of the steelworks, the varieties of production and the feasibility of the steelworks, according to an estimation of iron and steel demand. The conclusion is that it is possible to construct a modern steelworks turning in high profits with a production mainly of hot coil at 1.5^{mil.t/y} in stage I.

We can imagine that construction and operation of this steelworks will not be easy, but any problems can be overcome by the Philippine government's assistance and understanding.

We would like to state our opinions concerning the general view of this study, in addition to the several facts that the Philippine government should keep in mind from this point on.

11-1 Scale of the steelworks

Deciding the scale of the steelworks is a very important factor when planning construction of integrated steelworks in developing nations.

The scale of steelworks is basically figured by estimation of iron and steel demand, but this demand estimate should command the future direction and it should not be spoken of merely in numbers. Especially when it is the first integrated steelworks in the country careful investigation should be carried out in deciding the scale for the steelworks, taking into consideration the fact that managers taking part in construction and operation, as well as engineers and workers have had very little experience. The Philippine government fully understands these things and decided at the interim debate held in Japan in April of this year, to conduct a feasibility study with a scale of 1.5^{mil.t/y} in stage I. We have been writing in details about the steelworks in this report, and this steelworks of 1.5^{mil.t/y} is reasonably well matched with the demand in the Philippines.

The Philippines is having great interest in expanding the scale of the steelworks in future plans, but at this point the data is too insufficient to forecast the future, so in this report we

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have narrowed investigation down to stage II which has very important connections to stage I.

The first thing to be considered is constructing and operating the steelworks in stage I, after which, experience and achievements will tell how to make accurate judgements in expanding the scale.

11-2 Selecting the facilities for the steelworks

The facilities for steelworks have been improved every year, and their characteristics in both productivity and quality control have been sophisticated.

Among these new facilities, there are some that can only be operated safely by engineers and workers who have plenty of experience. Too much interest in these characteristics often leads to a mistake in selecting facilities. For this steelworks in stage I, facilities that will make safe operation possible should be selected above all else.

Therefore, the items of which we must take care most in the selection of facilities are as follows:

- ① Facilities that have plenty of operational performance and those that are easy to operate and repair.
- ② Facilities that reduce the work load of the workers.
- ③ Facilities that are taken into consideration of energy saving and environmental control.

11-3 Arrangement of infrastructure

(1) Ensuring the site of new steelworks

The limits of the site of new steelworks are already decided by PIE-A 1974, and as construction plans get underway it would be best if these regions could be obtained right away as needed, or retained as government sites beforehand. In other words, when planning a heavy industry requiring a huge site, and implementing the construction of it, planning work is done with the assumption that the site is already prepared.

Countermeasures should be planned beforehand so that these regions can be obtained with no trouble as exclusive regions, and there will be no wasteful expense when the time comes to actually obtain the site.

One idea is to appoint the expected site as a special government region and freeze the inside of that area, or take regulatory measures to stop the increase in the number of people living within the site area and the increase in land prices.

(2) Site investigations to be done beforehand

Having accurate basic data about the site from the investigations made under current conditions before execution of construction of the steelworks will offer great advantages from the viewpoints of shortening the execution designing and the construction process.

Some of the necessary basic data are as follows:

- ① Highly accurate site surveying data
- ② Highly accurate sounding charts of the front sea area
- ③ Geological investigation data within the site

(3) River improvement plans

During development of the steelworks site, the Pagan river, which runs through the site, will have to be filled in. Therefore before the construction of the soil base, this river's upper stream should undergo construction to change the river and its course.

From this field survey, we have confirmed that the B.P.W. (Bureau of Public Works) has completely gone through the pilot channel (width 40m, length approximately 1.5^{km}) from Staa Ana to the Tagoloan river. This, however, is an incomplete channel and it is necessary to fully equip the river with some type of floodgate as soon as possible.

(4) Electric power supply plan

With regard to the development of the industrial region, it is evident that to push forward positively, the electric power supply that the region needs hold the most important "key" to the promotion of development. At the moment, Mindanao Grid, set forward by the N.P.C., will maintain the supply with water power generation from Agus lineage and diesel generation plans.

From the study, we learned that by having hot strip mill plant the new steelworks will need plenty of back-up power, and if this is not sufficient, flicker phenomenon and a long-term voltage fluctuation will occur, influencing the surrounding region.

The N.P.C.'s expansion program is behind schedule at the moment on executing and completing the plan.

According to the expansion program of October 1978, after the new steelworks is in operation in 1985, the whole generation capacity is supposed to reach 1,600^{MW}. This is expected to be sufficient. For this reason, completion as planned is most desirable. It is also desirable to have the dual fired thermal plant, which is planned to be constructed near Carmen on Butuan bay, places as close to the new steelworks, around Tagoloan, as possible.

The service power transmission line capacity from Aplaya substation to the factory should be over 190MVA per circuit at stage II 3.0^{mil.t/y}, if we think that when the generated power

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within the plant stops during production, the entire capacity will be maintained by electricity bought from N.P.C.

(5) Industrial water supply plan

The industrial water that will be supplied for the new steel-works is planned to be taken from the upper stream of the Tagoloan river (Malitbog), with water naturally falling down to the site. As it has already been studied in the pre-feasibility study, the Tagoloan river's plentiful water and its good water quality has what is required as a supply source, and what is wanted for the plan. But in order to realize the present plan early preparation and aggressive execution by the government is essential.

(6) Countermeasures for the regional residents

Accompanied by the development of industrial regions, the town planning of the surrounding areas, though it is an indirect problem, will require countermeasures that can not be omitted. In other words, even at the period of stage I in the new steelworks plan an increase of over 20,000 residents is expected including the families of employees of the steelworks. If we count the residents working for related industries in this area, it is estimated that the number will reach two to three times this number. Countermeasures for this must be made and designed by the PIE-A.

11-4 Preliminary education and training of engineers and workers

An integrated steelworks with a BF-BOF system handles molten iron, molten steel and metals at high temperatures, also all equipment must be operated stably. The iron and steel industry differs basically from process industries (chemical plants, etc.) in that the proper judgement and actions of engineers and workers are of paramount importance to maintain the stabilized operation of all equipment. Even if the most advanced automatic facilities are introduced, the judgement and actions of engineers and workers are the decisive factors. It should be borne in mind that smooth operation can not be achieved without right judgement and quick actions of engineers and workers. Moreover, engineers must be fully versed in operations to be done in the plants and must be good leaders of workers. They should be given education and training well in advance in parallel with those for managers who will take upon themselves the responsibility of managing the new steelworks in the future. If necessary, they should be given chances to be trained abroad. Even if cooperation from foreign countries is to be asked for, it is desirable that these engineers and managers participate in the planning of the construction and operation of the new steelworks with their own initiative.

To secure young workers with a good aptitude enough to fill all jobs required at the new steelworks, it is desirable to promote systematic basic education relating to industries at junior and senior high schools and to establish national training centers (of the same or higher level than

technical high schools) for employees of the new steelworks in the vicinity of the works.

11-5 Government promotion measures such as grant of various incentives

We have made various studies concerning the economic efficiency of this project using imported steel product prices estimated at the time of March 1979 (landed price that customs duty, sales tax, etc. are added to C&F price) on the basis of selling prices of products manufactured by the new steelworks. As the result of it, we have reached to an expectation that the integrated steelworks operation — 1.5^{mill.t} level runs roughly successfully as a substitute for imported steel products. As shown in the study, however, it is hardly said that the profitability is good and the management base is stabilized even though the steelworks are given advantages which are granted to a pioneer industry due to Investment Incentive Act and can exist as a substitute for imported steel products. Besides, Presidential decree 1352 was issued in April, 1978, which restricts benefits of exemption according to I.I. Act. As seen in the simulation study, as the result of this restriction, the profitability of the steelworks becomes worse; especially the management foundation on funds aspects is weakened for this reason, it is understandable that the government promotion measures are necessary. As the study itself is based on various preconditions, these conditions are expected to vary with the international economic fluctuations. Therefore, in order to securely realize the integrated steelworks project, the Philippine government shall in advance thoroughly consider the following points and make preparation for solving them as soon as possible.

- 1) Presidential Decree 1352 shall be not applied to the new steelworks.
- 2) Privilege more than Investment Incentive Act, tax incentive, shall be granted. For example, a complete exemption from various taxation shall be applied for a long term.
- 3) For the process industry, a maintenance of operation level is a primary condition to obtain a profitability. Therefore, measures that expand and stabilize the market for products of the new steelworks shall be carried out. For instance, restrictions such as approval of import or protective duties are applied to competitors' products.
- 4) Stabilized procurement of a large quantity of the imported raw materials (especially coal and iron ore) is particularly important for the profitability of the steelworks. Import policies based on a long term forecast shall be established.
- 5) A huge amount of loan in foreign currencies is necessary for the construction of the new steelworks. The government shall guarantee the foreign currency loan and procure it with better conditions.
- 6) Industries relative to the new steelworks shall be included into the new steelworks project and given the same promotion measures. This enables a domestic production for imported materials and supplies and enables to expect the effects such as enlargement of

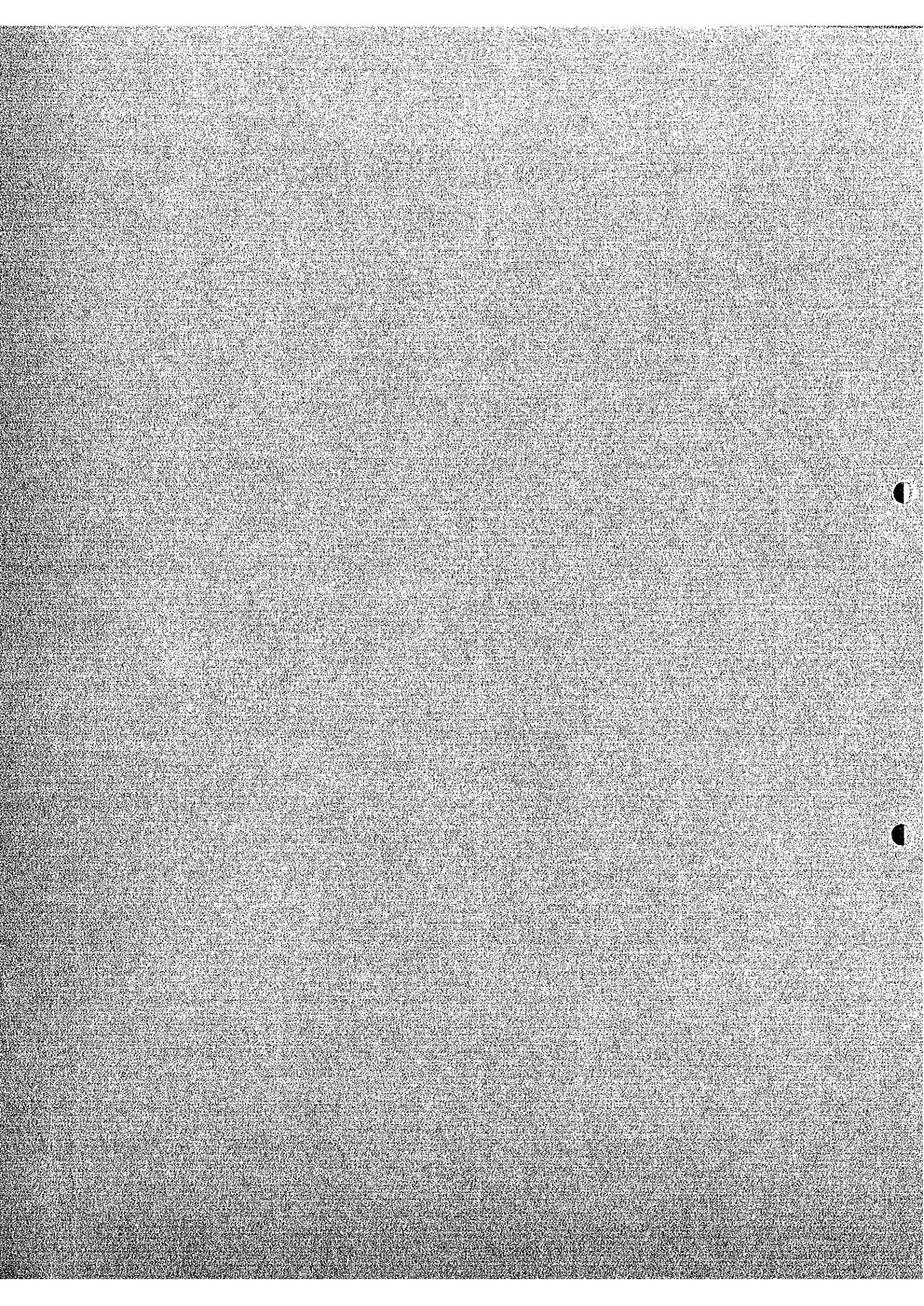
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production, increase of employment, etc. Further, the new steelworks becomes a leading industry to advance the whole industrial structure in the Philippines.

- 7) Relative infrastructures (including not only those connected to the production but also social facilities for inhabitants) shall be sufficiently prepared so as to be utilized free of charge.

CHAPTER 12

DEMAND FORECAST DETAIL



CHAPTER 12. DEMAND FORECAST DETAIL

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CHAPTER 12

12-1 Methods and concepts of demand forecast

This forecast for steel demand in the Philippines is based on a macro- and micro-forecast. Final forecast figures were derived by matching the results of the two forecasts.

No doubt, future trends in steel demand depend heavily on economic developments and government policies. Therefore, forecasting future economic structures is very important. At the same time, accurate performance data should be collected on various factors.

Most of actual performance data were furnished by the Philippine Counterpart, to which some were added in Japan.

Future economic structure was considered on the basis of the National Economic and Development Authority's (NEDA) "Five-Year Philippine Development Plan 1978—1982: Including Ten-Year Development Plan 1978—1987" issued in September 1977. By updating this material prediction of economic structures for 1985 and 1990 was made by extrapolation.

Concerning the micro-analysis, opinion was divided on the trends in individual industrial sectors. Also with a developing country like the Philippines, it involves much risk to anticipate the same industrial trends for the future as in the past. Therefore, several bold assumptions were adopted.

The micro-analysis was performed mainly to grasp qualitative product-by-product demand trends. Quantitative trends were derived by matching the results of both the micro- and macro-analyses.

Demand forecast, whether oriented to correlation analysis or industrial trend analysis, always depends on many assumptions. So it inevitably involves some variations. It should be understood that this demand forecast also is not quite free from such variations, despite our efforts for elimination.

12-2 Macro-forecast

12-2-1 Economic structure of the Philippines

To simplify models, gross national product (GNP) and gross domestic capital formation (GDCF), shown in *Table 12-2-1*, were studied in the macro-analysis.

Averaged over the 18-year period between 1960 and 1978, GNP and GDCF respectively increased 5.7 and 8.4 percent annually.

For the past 10 years, the primary and tertiary industries of the Philippines have achieved a real growth of 4 to 5 percent annually. Government spendings and private capital investment, centered in the manufacturing industry, seem to have realized their high growth rate and the increase in GNP.

As the Philippine economy is on its way to development, GDCF will take the leadership, or GDCF will grow at a higher pace than GNP. Seen in this context, the NEDA's GNP and GDCF

figures seem to be too close to each other. But for the purpose of this macro-forecast, the NEDA's figures were used as independent variables.

Table 12-2-1 Trends in GNP and GDCF

Calendar Year	GNP		GDCF	
	Million Pesos	Compared with the previous year	Million Pesos	Compared with the previous year
1960	30,151		5,173	
1961	32,242	6.9	6,001	16.0
1962	34,019	5.5	5,931	-1.2
1963	36,383	6.9	7,037	18.6
1964	37,627	3.4	7,914	12.5
1965	39,520	5.0	8,336	5.3
1966	41,240	4.4	8,405	0.8
1967	43,224	4.8	9,706	15.5
1968	45,540	5.4	10,691	10.1
1969	47,967	5.3	11,231	5.1
1970	50,035	4.3	10,836	-3.5
1971	52,921	5.8	11,226	3.6
1972	55,526	4.9	11,573	3.1
1973	60,881	9.6	12,540	8.4
1974	64,739	6.3	15,651	24.8
1975	68,561	5.9	18,984	21.3
1976	73,172	6.7	20,231	6.6
1977	77,958	6.1	20,363	3.6
1978	82,477	5.8	22,123	8.6
1979	88,663	7.5	23,893	8.0
1980	95,312	7.5	25,828	8.1
1981	102,937	8.0	27,972	8.3
1982	111,172	8.0	30,322	8.4
1983	120,066	8.0	32,899	8.5
1984	129,671	8.0	35,695	8.5
1985	140,045	8.0	38,729	8.5
1986	151,249	8.0	42,021	8.5
1987	163,348	8.0	45,593	8.5
1988	176,416	8.0	49,468	8.5
1989	190,530	8.0	53,673	8.5
1990	205,770	8.0	58,235	8.5

Note 1. Based on 1972 prices.

Note 2. The figures for 1960 through 1976 are taken from the "1978 Philippine Statistical Year-book."

Note 3. The figures for 1977 and 1978 are taken from the data of the National accounts Staff of the NEDA's Statistical Coordination Office in the Times Journal of January 1, 1979.

Note 4. The figures for 1979 through 1987 are based on the growth rates over the preceding years in the NEDA's Philippine Development Plan. The same rates are also applied to 1988 through 1990.

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12-2-2 Actual apparent crude-steel consumption

Actual apparent crude-steel consumption was estimated as shown in *Table 12-2-2*.

Table 12-2-2 Trends in actual apparent crude-steel consumption (in 1,000 t)

Calendar year	Apparent crude-steel consumption	Compared with the previous year (%)	Index (%)	Reference			
				Mean annual growth rate			
1962	488		100.0	7.5%			
1963	578	18.4	118.4				
1964	713	23.4	146.1				
1965	769	7.9	157.6				
1966	829	7.8	169.9				
1967	968	16.8	198.4				
1968	1,021	5.5	209.2			4.2%	
1969	1,034	1.3	211.9				
1970	1,059	2.4	217.0				
1971	1,072	1.2	220.0				
1972	955	-10.9	195.7				
1973	1,068	11.8	218.8			7.6%	0.9%
1974	1,067	-0.1	218.6				
1975	1,281	20.1	262.5				
1976	1,280	-0.1	262.3				
1977	1,376	7.5	282.0				
1978	1,542	12.1	316.0				

The figures for 1962 through 1967 were taken from NSC's data estimated in the fact-finding study of February 1976. The figures for 1968 through 1978 were based on the data supplied from the Philippine Counterpart, partly updated in Japan.

The mean annual growth rate for the 16 years between 1962 and 1978 is estimated at 7.5%. The figure for the 1968—78 decade, covered by the Counterpart's report, is considerably lower at 4.2%. Having this decade, the first five years show a mean annual growth rate of 0.9%, representing a substantial flattening-out. The rate for the second half, 7.6%, comes very close to the 16-year figure.

When reviewing the long-term apparent crude-steel consumption trends, the 5 years between 1968 and 1973 shows up as a slump.

Despite their data source inconsistency, we used the estimated figures for 1967 and earlier because they were indispensable for the long-term macro-forecast.

12-2-3 Macro-demand-forecast

Correlative equations in *Table 12-2-3* were obtained from the GNP and GDCF in *Table 12-2-1* and the apparent crude-steel consumption in *Table 12-2-2*. Reflecting the steel demand slump

Table 12-2-3 Models for estimating apparent crude-steel consumption (in 1,000')

Data Period	Correlative Equation	Independent variables		Apparent crude-steel consumption			Mean growth rate	
				Actual	Forecast		'85/'78 (%)	'90/'85 (%)
					1978	1985		
1962	(Model A) $Y = 0.0168X_1 + 102.95$ ($r = 0.9247$)	GNP		1,542	2,456	3,560	6.9	7.7
	(Model B) $Y = 0.0506X_1 + 372.00$ ($r = 0.9264$)	GDCF		1,542	2,332	3,319	6.1	7.3
1978	(Model C) $Y = 0.0117X_1 + 3,166.37X_2 - 337.51$ ($r = 0.9409$)	GNP	GDCF/GNP	1,542	2,178	2,966	5.1	6.4
1968	(Model D) $Y = 0.0130X_1 + 355.00$ ($r = 0.8850$)	GNP		1,542	2,176	3,030	5.0	6.8
	(Model E) $Y = 0.0374X_1 + 596.57$ ($r = 0.9198$)	GDCF		1,542	2,045	2,775	4.1	6.3
1978	(Model F) $Y = 0.0098X_1 + 2,057.74X_2 + 63.49$ ($r = 0.9008$)	GNP	GDCF/GNP	1,542	2,006	2,662	3.8	5.8

between 1968 and 1973, the models for the 1968—78 decade give low forecast values; correlation coefficients are relatively low, too. By contrast, the models for the 1962—78 period give higher forecast values and correlation coefficients; the longer the covered period, the less the effect of the 5-year demand slump.

Fig. 12-2-1 shows trends in apparent crude-steel consumption, actual and forecast.

The relationship between apparent crude-steel consumption and G.N.P., G.D.C.F. are shown in Fig. 12-2-2 and Fig. 12-2-3, respectively.

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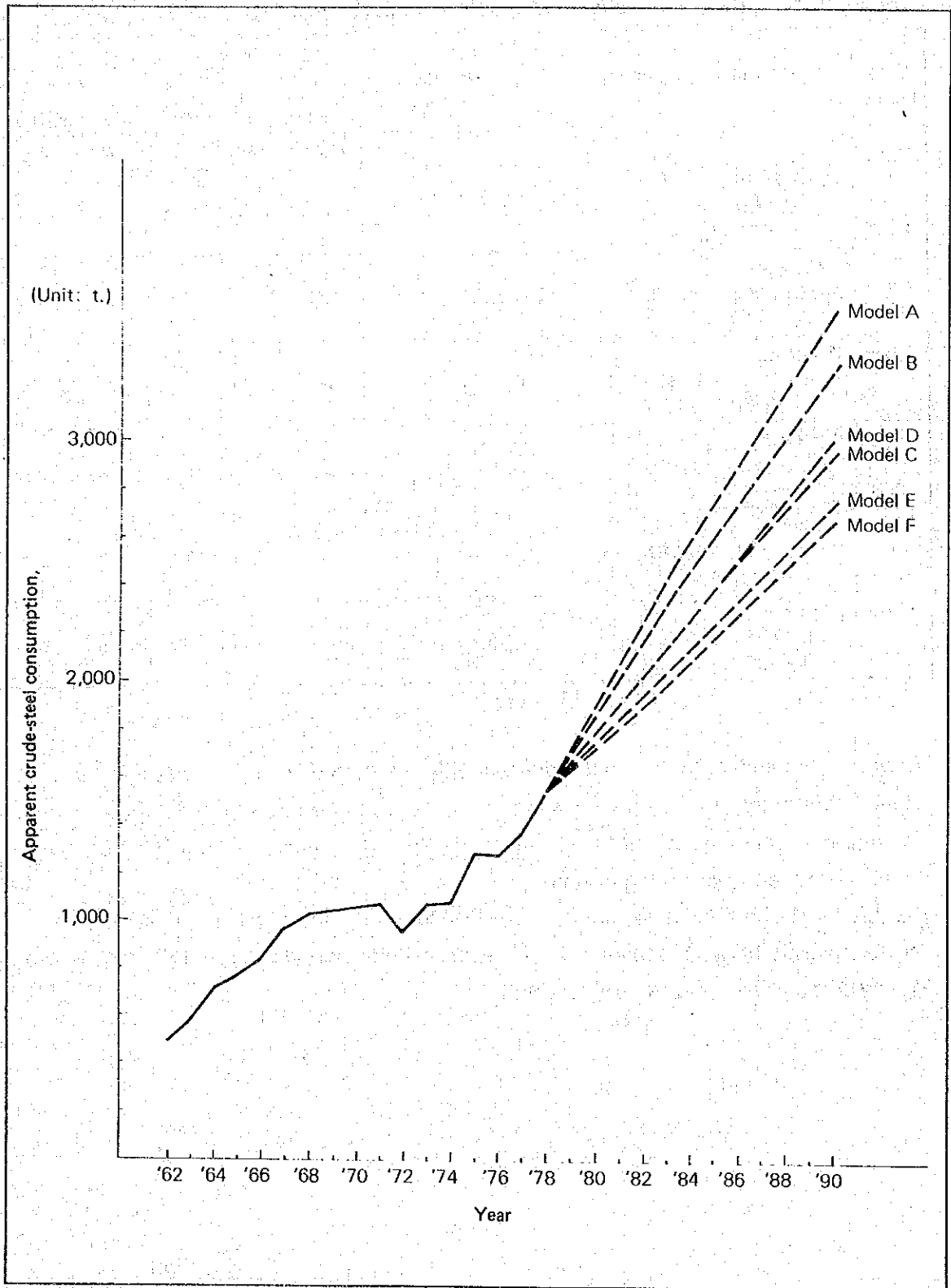


Fig. 12-2-1 Trends in apparent crude-steel consumption, actual and forecast

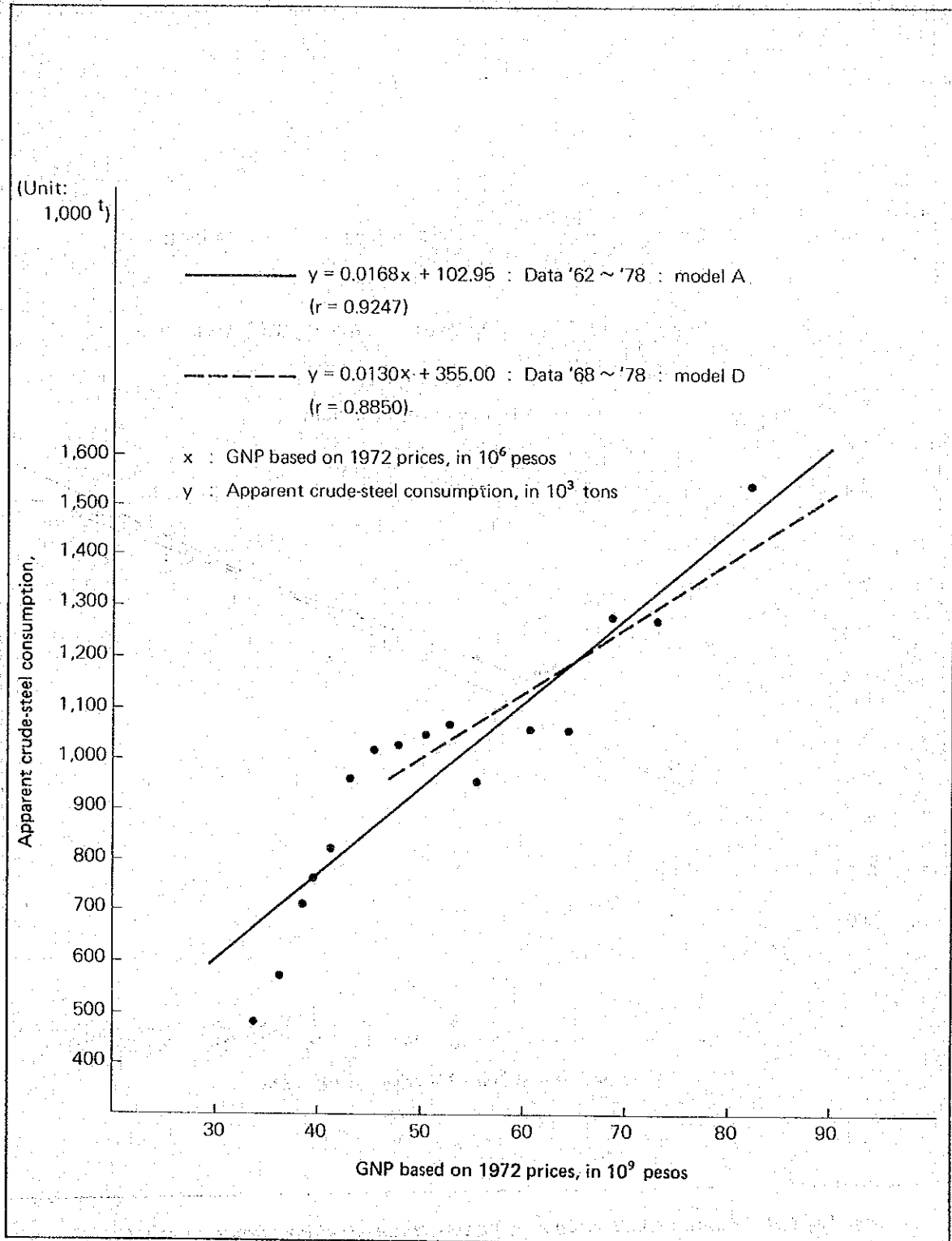


Fig. 12-2-2 Relationship between apparent crude-steel consumption and GNP.

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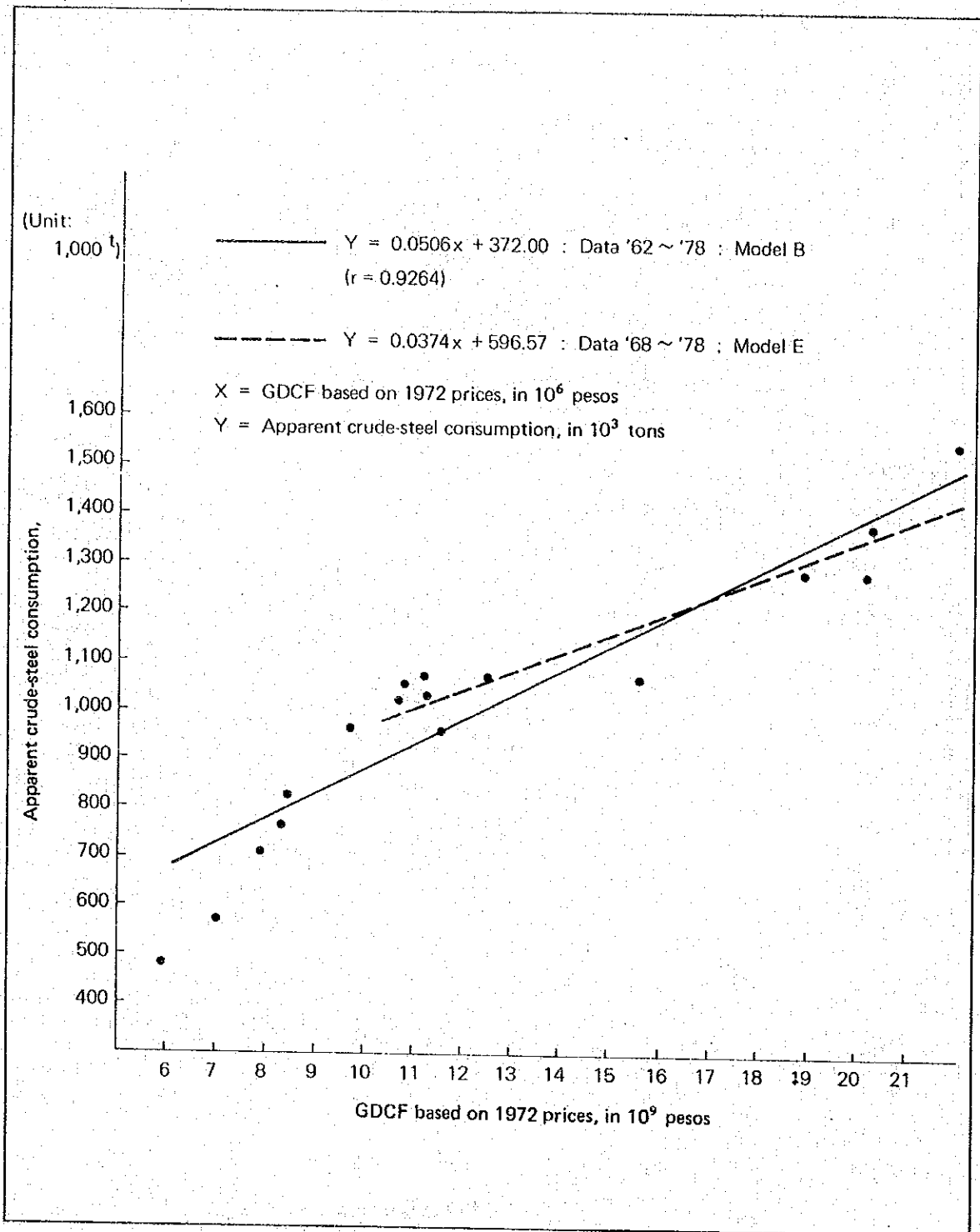


Fig. 12-2-3 Relationship between apparent crude-steel consumption and GDCF.

12-3 Micro-forecast**12-3-1 Trends in apparent consumption and consumption patterns by products****(1) General**

Between 1968 and 1978, apparent rolled-steel consumption increased from 796,000¹ to 1,203,000¹, at an average annual rate of 4.2%. This percentage can be broken down into 4.4% for flat products and 4.0% for non-flat products. Although their tonnages were limited, hot- and cold-rolled strip and sheets grew at a high pace of 23 and 14% annually. Showing high tonnages and above-average growth rates, bars and tin plate moved strongly. Galvanized sheets, wire rods and wire, and shapes decreased. Pipe and tubes stayed substantially even, and plates increased at a rate somewhat below the average. After the oil crisis, apparent consumption of all rolled-steels increased at an annual rate of 9.6%. Especially flat products increased at a remarkable 11.1%, approximately 3 percentage points higher than the 7.9% for non-flats. All items but shapes registered growth rates of 6% or higher. Increases in hot- and cold-rolled sheets and coil, plates and bars were particularly pronounced. As a consequence, the shares of the individual products in total apparent consumption changed materially between 1968 and 1978. Bars increased from 27% to 35.8%, hot-rolled sheets and coil from 1.5% to 7.9%, and cold-rolled sheets and coil from 2.9% to 7.2%. The percentages of tin plates, pipes and tubes, and plates did not change much. Galvanized sheets declined from 18.2% to 10.6%, wire rods and wire from 12.1% to 7.6%, and shapes from 7.0% to 1.6%.

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Table 12-3-1 Trends in apparent consumption by products (in 1,000')

Year Product	'68	'69	'70	'71	'72	'73	'74	'75	'76	'77	'78	Mean growth rate (%)	
												'68-'78	'74-'78
G Sheets	145 (18.2)	169 (20.9)	133 (16.1)	122 (14.6)	112 (15.0)	153 (18.4)	89 (10.7)	85 (8.5)	108 (10.8)	115 (10.8)	127 (10.6)	-	9.3
Tin Plates	98 (12.3)	116 (14.4)	132 (16.0)	95 (11.4)	92 (12.3)	95 (11.4)	117 (14.1)	97 (9.7)	118 (11.9)	145 (13.5)	163 (13.5)	5.2	8.6
CRS/C	23 (2.9)	24 (3.0)	32 (3.9)	83 (9.9)	60 (8.1)	73 (8.8)	58 (7.0)	58 (5.8)	62 (6.2)	46 (4.3)	87 (7.2)	14.2	10.7
HRS/C	12 (1.5)	11 (1.4)	37 (4.5)	65 (7.8)	21 (2.8)	32 (3.8)	47 (5.6)	56 (5.6)	42 (4.2)	87 (8.1)	95 (7.9)	23.0	19.2
Pipes & Tubes	67 (8.4)	56 (6.9)	59 (7.1)	57 (6.8)	59 (7.9)	76 (9.1)	51 (6.1)	83 (6.3)	80 (8.0)	71 (6.6)	72 (6.0)	0.7	9.0
Plates	84 (10.6)	82 (10.2)	74 (8.9)	60 (7.2)	73 (9.8)	70 (8.4)	72 (8.6)	76 (7.6)	82 (8.2)	63 (5.8)	118 (9.3)	3.5	13.1
Bars	215 (27.0)	224 (27.8)	231 (28.0)	245 (29.3)	229 (30.8)	233 (28.0)	287 (34.5)	416 (41.7)	372 (37.3)	418 (39.0)	431 (35.8)	7.2	10.7
Wire Rods & Wire	96 (12.1)	85 (10.5)	104 (12.6)	82 (9.8)	72 (9.7)	80 (9.6)	72 (8.6)	89 (8.9)	93 (9.3)	98 (9.1)	91 (7.6)	-	6.0
Shapes & Sections	56 (7.0)	40 (4.9)	24 (2.9)	27 (3.2)	27 (3.6)	26 (2.5)	40 (4.8)	39 (3.9)	41 (4.1)	31 (2.8)	19 (1.6)	4.2	13.1
Total	796 (100.0)	807 (100.0)	826 (100.0)	836 (100.0)	745 (100.0)	833 (100.0)	833 (100.0)	999 (100.0)	998 (100.0)	1,074 (100.0)	1,203 (100.0)	4.2	13.1

Source: Data furnished by the Philippine Counterpart, partly updated in Japan.
 Figures in parentheses are percent shares in total apparent consumption.

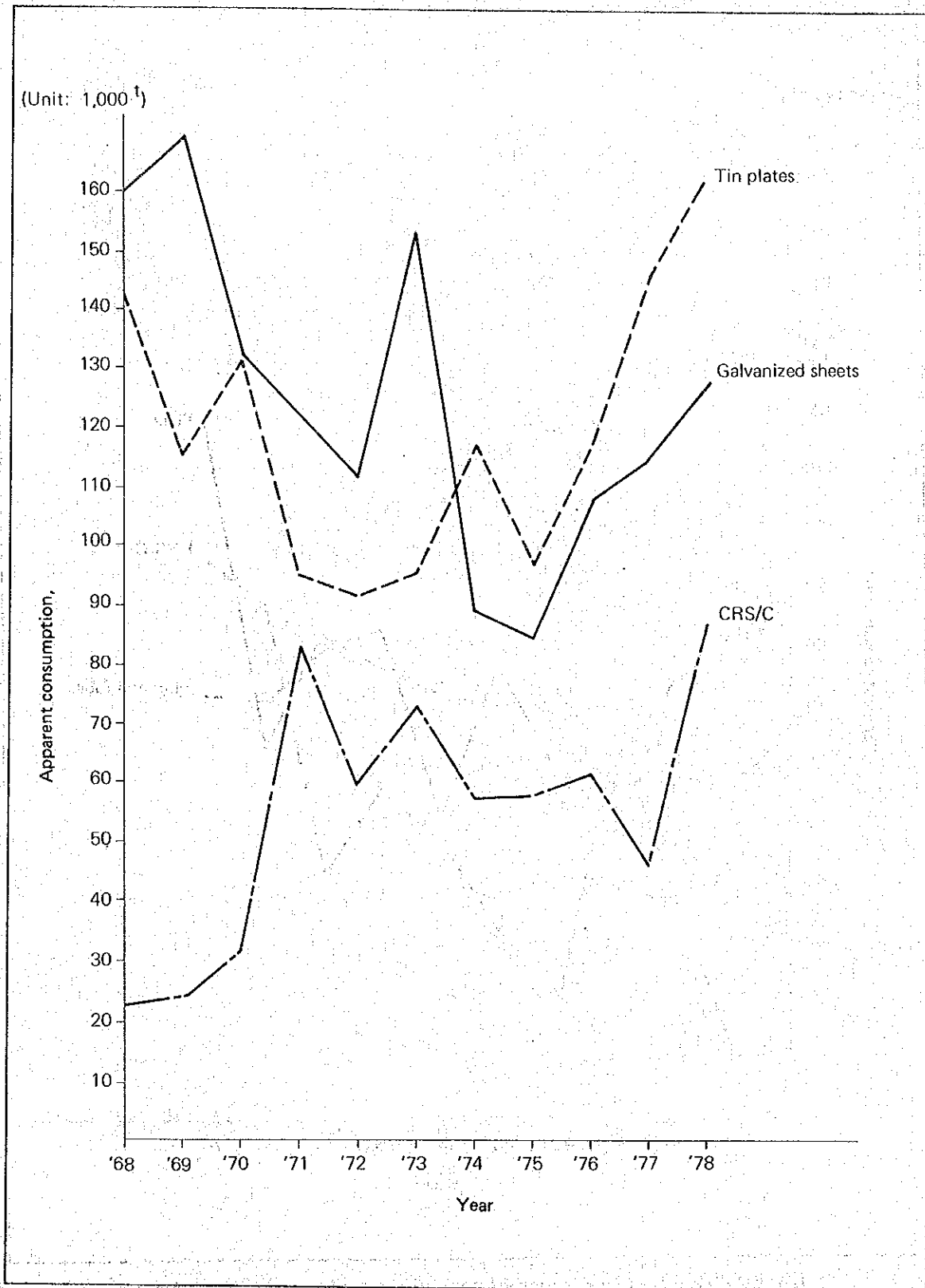


Fig. 12-3-1 Trends in apparent consumption of cold-rolled products

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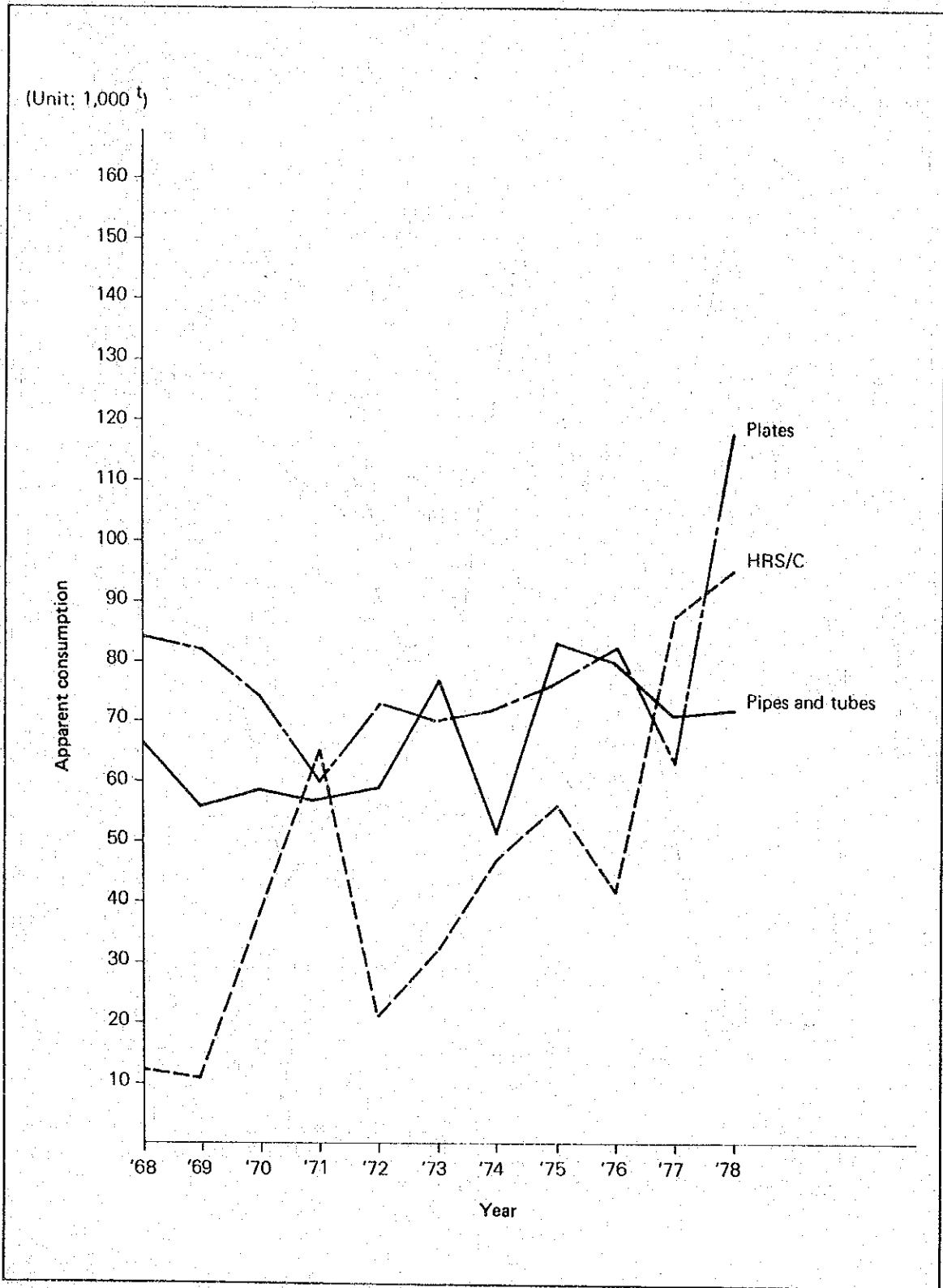


Fig. 12-3-2 Trends in apparent consumption of hot-rolled products

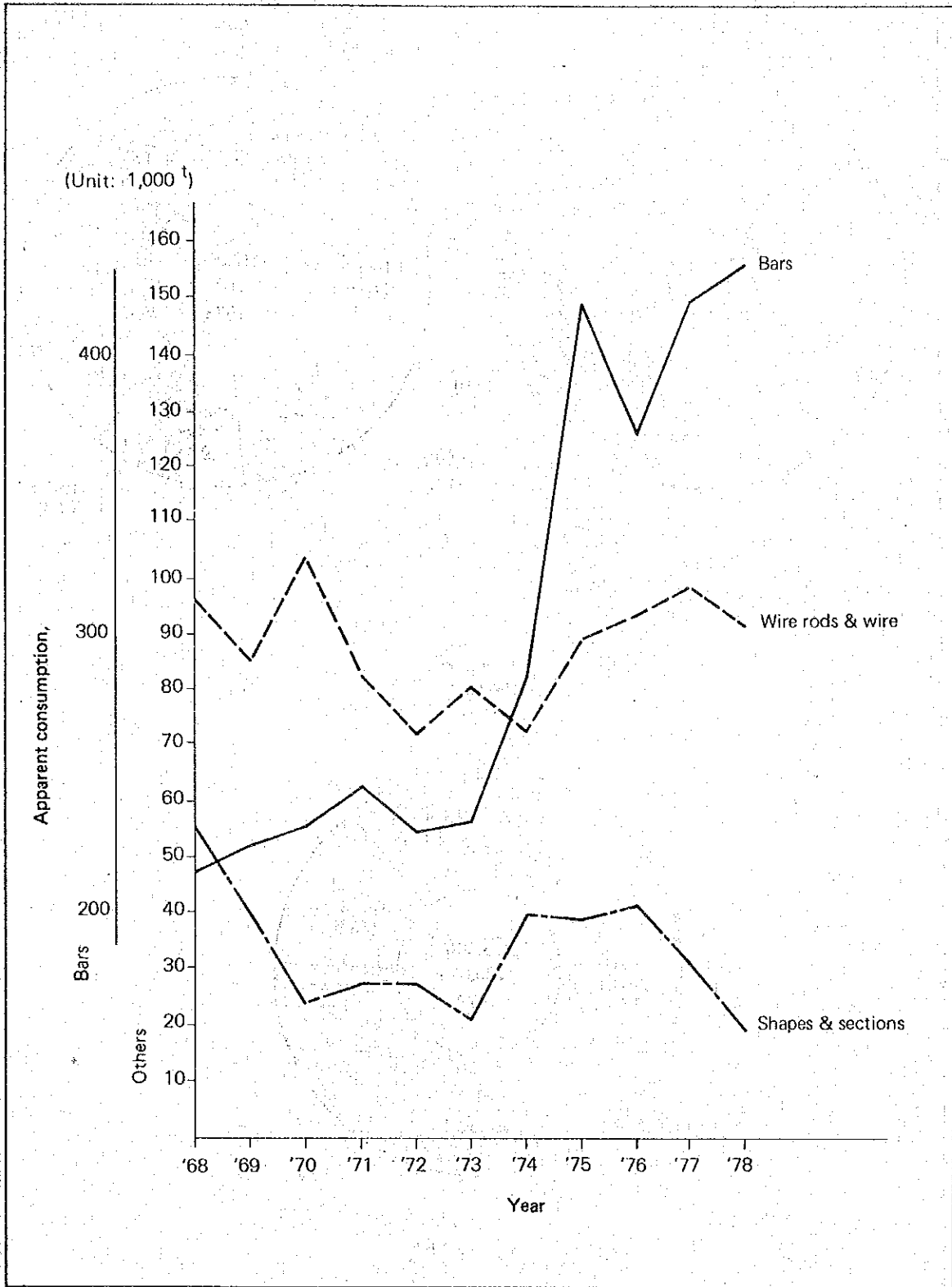


Fig. 12-3-3 Trends in apparent consumption of bars, wire rods and shapes

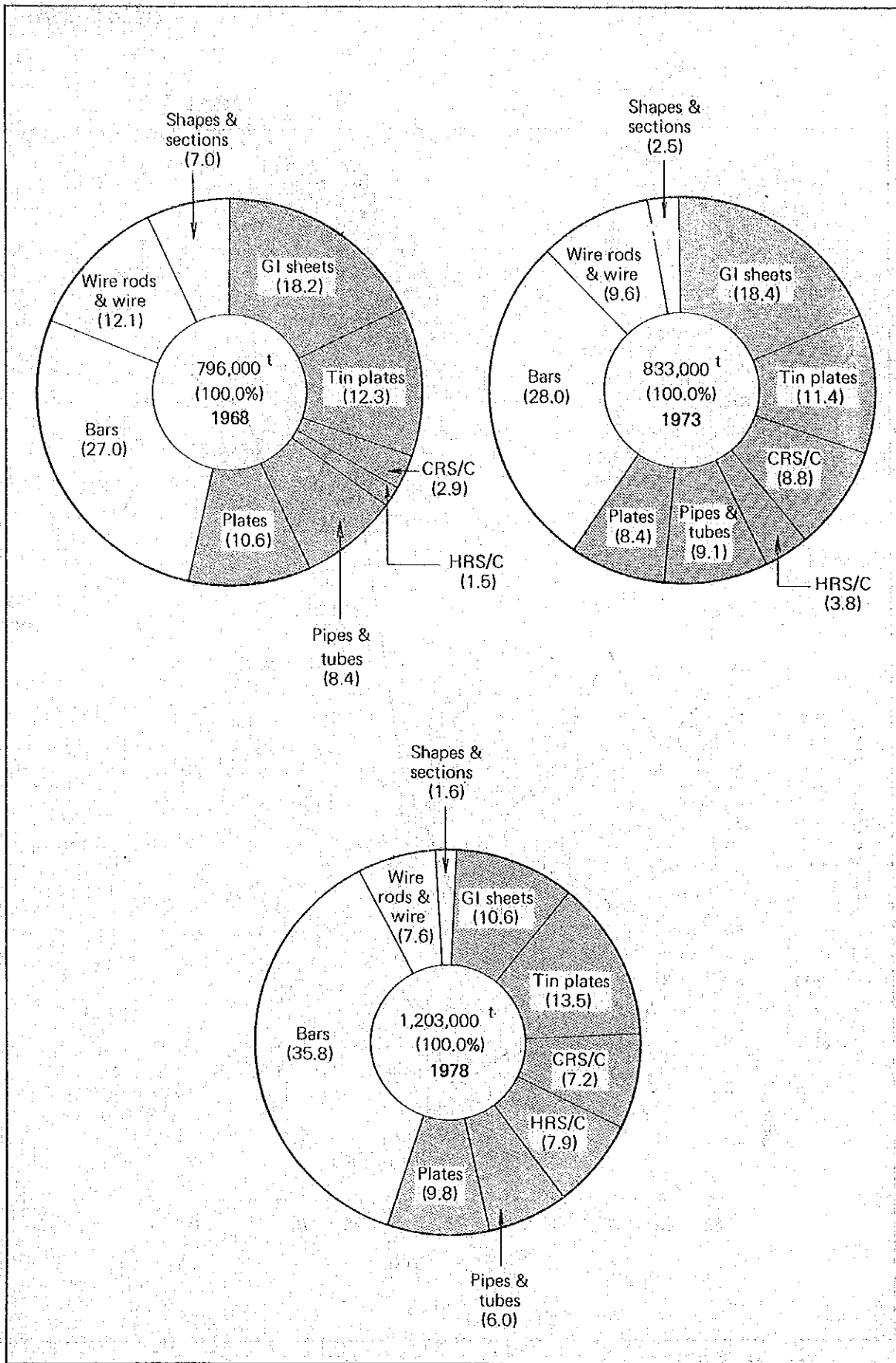


Fig. 12-3-4 Changes in product shares

(2) Product-by-product trends

(a) Galvanized sheets

Table 12-3-2 shows trends in apparent consumption of galvanized sheets and *Fig. 12-3-5* shows the consumption pattern in 1977.

Apparent consumption of galvanized sheets increased until 1969, but continued to decrease thereafter, except in 1973, until it hit bottom in 1975. Despite its recovery since 1976, its 1978 ratio in total consumption was still below 11%, only about half the ratios for 1968 and 1969. About half of galvanized sheets are used for private housing; so their consumption depends heavily on price. This price-consumption relationship is well accounted for by the movements of their domestic price, which remained relatively stable until 1969 but rose thereafter to an approximately four times higher level in 1975. (*Table 12-3-3*) Besides, their domestic price climbed at a higher rate than wholesale prices and per-capita GNP. These price trends slackened apparent consumption. As their price stabilized, apparent consumption firmed up and their ratio in total consumption remained stable during the last 3-year period. The ratio of domestic production (self-supply ratio) is high; it reached 94% in 1968 and remained close to 90% except in 1978.

Table 12-3-2 Trends in apparent consumption of galvanized sheets (t)

Year	(A) Domestic production		(B) Imports		(C) Total		Self-supply ratio (A)/(C) (%)
		Compared with Previous Year (%)		Compared with Previous Year (%)		Compared with Previous Year (%)	
1968	136,859		8,300		145,159		94.3
1969	151,594	10.8	17,900	115.7	169,494	16.8	89.4
1970	127,569	-15.8	5,700	-68.7	133,169	-21.4	95.8
1971	114,000	-10.6	8,300	48.2	122,300	-8.2	93.2
1972	107,571	-5.6	4,600	-44.6	112,171	-8.3	95.9
1973	138,995	29.2	14,500	215.2	153,495	36.8	90.6
1974	83,534	-39.9	5,600	-60.7	89,234	-41.9	93.6
1975	79,248	-0.5	6,200	8.8	85,448	-4.2	92.7
1976	100,244	26.5	7,100	14.5	107,344	25.6	93.4
1977	102,454	2.2	12,900	81.7	115,354	7.5	88.8
1978	104,770	2.3	21,678	68.0	126,448	9.6	82.9

Source: Data furnished by the Philippine Counterpart.

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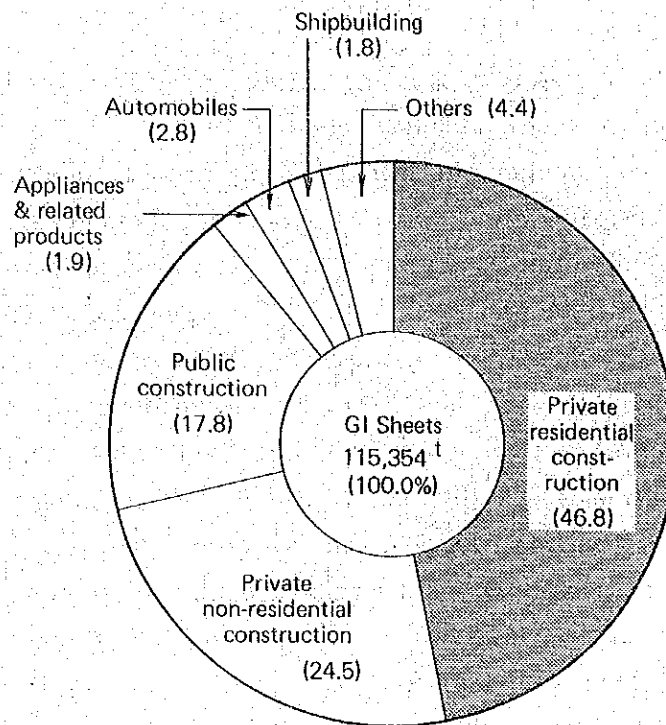


Fig. 12-3-5 Consumption pattern of galvanized sheets in 1977

Table 12-3-3 Domestic galvanized sheet prices, wholesale price indices, and per-capita GNP

Year	Domestic price of galvanized sheet			Wholesale price index		Per capita GNP (on current price)		
	Pesos per ton	Index 1970=100	Compared with previous year	Index 1970=100	Compared with previous year	pesos per ton	Index 1970=100	Compared with previous year
1968	1,033	97.5		79.8		861	75.7	
1969	1,047	98.9	1.4	80.9	1.4	937	82.3	8.8
1970	1,059	100.0	1.1	100.0	23.6	1,138	100.0	21.5
1971	1,711	161.1	61.6	115.7	15.7	1,309	115.0	15.0
1972	1,699	160.4	-0.7	127.4	10.1	1,424	125.1	8.8
1973	2,388	225.5	40.6	158.6	24.5	1,785	156.9	25.4
1974	2,976	281.0	24.6	245.1	54.5	2,420	212.7	35.6
1975	4,083	385.6	37.2	252.2	2.9	2,716	238.7	12.2
1976	3,968	374.7	-2.8	270.4	7.2	3,007	264.2	10.7
1977	4,299	405.9	8.3	293.5	8.5	3,376	296.7	12.3
1978	4,866	459.5	13.2	E-313.6	6.8			

E = estimate

Sources: 1) Data from the Philippine Counterpart.
2) International Financial Statistics.

(b) Tin plates

Table 12-3-4 shows trends in apparent consumption and Fig. 12-3-6 shows the consumption pattern.

Tin plates are used mostly for the manufacture of milk and fruit cans. Some imported tin plates, used for canning fruit for export, affect apparent consumption. The price of imported tin mill black plates also has an effect. The recent increase in the Philippines' export of fruit and juice called for more tin plates imports, which contributed to the growth of apparent consumption. Because of this, and partly due to the typhoon-affected domestic supply capacity, the self-supply ratio fell from the previous level of 50 to 70% to a decade-low of 43% in 1978. Long-term apparent consumption is stable, registering a growth rate close to the mean figure for all products. The share in total apparent consumption also fluctuates little, generally falling within the 11 to 14% range.

Table 12-3-4 Trends in apparent consumption of tin plates (t.)

Year	(A) Domestic production		(B) Imports		(C) Total		Self-supply ratio (A)/(C) (%)
		Compared with Previous Year (%)		Compared with Previous Year (%)		Compared with Previous Year (%)	
1968	49,981		48,500		98,481		50.8
1969	67,601	35.3	47,900	-1.2	115,501	17.3	58.5
1970	92,285	36.5	39,800	-16.9	132,085	14.4	69.9
1971	55,000	-40.4	40,000	0.5	95,000	-28.1	57.9
1972	49,499	-10.0	42,700	6.8	92,199	-2.9	53.7
1973	54,000	9.1	40,600	-4.9	94,600	2.6	57.1
1974	80,068	48.3	36,600	-9.9	116,668	23.3	68.6
1975	61,822	-22.8	35,100	-4.1	96,922	-16.9	63.8
1976	68,877	11.4	49,600	41.3	118,477	22.2	58.0
1977	87,836	27.6	56,900	14.7	144,736	22.2	60.7
1978	69,942	-20.4	92,817	63.1	162,759	12.5	43.0

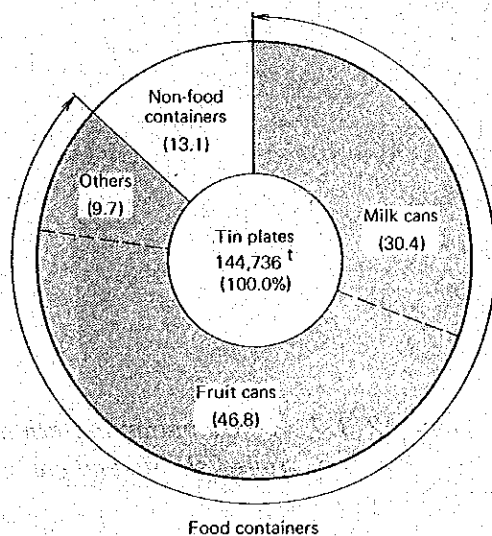


Fig. 12-3-6 Consumption pattern of tin plates in 1977

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(c) Cold-rolled sheets and coil

Table 12-3-5 shows trends in apparent consumption and Fig. 12-3-7 shows the consumption pattern.

From 1968 to 1978, apparent consumption of cold-rolled sheets and coil increased remarkably, especially in 1978, though there were several ups and downs during the 1971-77 period. Large consumers were the automotive and electric and other domestic appliance industries. Despite their growing production, however, statistical apparent consumption was unstable and low, because of their preference for imported high-quality materials and use of pre-pressed parts. The 1978 share in overall apparent consumption was 7.2%, somewhat lower than the level for the earlier 1970s. Assisted by the increased domestic production of automobiles and home electrical appliances, domestic production increased steadily.

Table 12-3-5 Trends in apparent consumption of cold-rolled sheets and coil (t.)

Year	(A) Domestic production		(B) Imports		(C) Total		Self-supply ratio (A)/(C) (%)
		Compared with Previous Year (%)		Compared with Previous Year (%)		Compared with Previous Year (%)	
1968					22,665		
1969					24,179	6.7	
1970	17,711		14,300		32,011	32.4	55.3
1971	24,500	38.3	58,600	309.8	83,100	159.6	29.5
1972	6,000	-75.5	54,200	-0.8	60,200	-27.6	10.0
1973	33,659	461.1	39,100	-27.9	72,759	20.9	46.3
1974	28,538	-15.2	29,100	-25.6	57,638	-20.8	49.5
1975	22,471	-21.3	35,500	22.0	57,971	0.6	38.8
1976	38,531	71.5	23,000	-35.2	61,531	6.1	62.6
1977	28,200	-26.8	17,932	-22.0	46,132	-25.0	61.1
1978	45,738	62.2	41,468	131.3	87,206	89.0	52.4

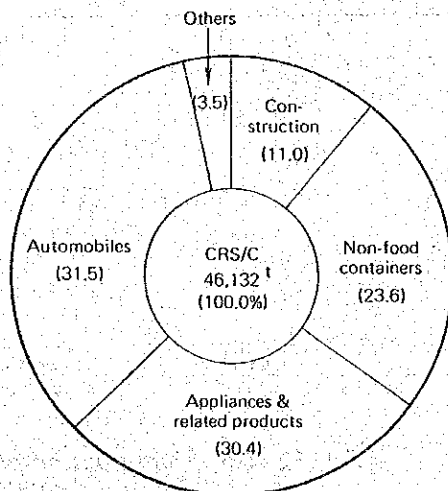


Fig. 12-3-7 Consumption pattern of cold-rolled sheets and coil in 1977

(d) Hot-rolled sheets and coil.

Table 12-3-6 shows trends in apparent consumption and Fig. 12-3-8 shows the consumption pattern.

Approximately half of hot-rolled sheets and coil were consumed for construction; the remainder by the automotive and shipbuilding industries. Reflecting the buoyant development in these sectors, hot-rolled sheets and coil, registered the highest increase rate. The 1978 share in overall apparent consumption also came very close to the all-time high. But their low self-supply ratio, 22.4% for 1978, called for heavy reliance on imports.

Table 12-3-6 Trends in apparent consumption of hot-rolled sheets and coil (t.)

Year	(A) Domestic production		(B) Imports		(C) Total		Self-supply ratio (A)/(C) (%)
		Compared with Previous Year (%)		Compared with Previous Year (%)		Compared with Previous Year (%)	
1968					11,800		
1969					11,000	-6.8	
1970				a7,100	37,100	237.3	
1971					65,000	75.2	
1972	927		20,300		21,227	-67.3	4.4
1973	15,000	1,518.1	17,300	-14.8	32,300	52.1	46.4
1974	19,574	30.5	27,700	60.1	47,274	46.4	41.4
1975	27,834	42.2	28,481	2.8	56,315	19.1	49.4
1976	12,931	-53.5	29,300	2.9	42,231	-25.0	30.6
1977	11,603	-10.3	75,454	157.5	87,057	106.1	13.3
1978	21,340	83.4	74,049	-1.9	95,389	9.6	22.4

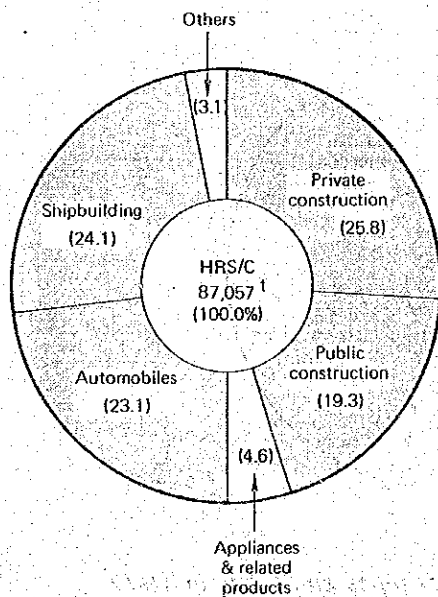


Fig. 12-3-8 Consumption pattern of hot-rolled sheets and coil in 1977