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Background Working Document on

Global Scenario of World Steel Industry Growth
particularly up to 1985^{*/}

prepared by the UNIDO Secretariat

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Explanatory notes

For the purpose of this document the following definitions have been used:

Developed countries (D.C.) :

Eastern developed countries: CMEA countries in the eastern Europe

Western developed countries: Australia, Canada, New Zealand, South Africa, USA and Western European countries (including Cyprus, Malta, Turkey and Yugoslavia)

Developing countries (Dy.C.): Countries other than developed countries as defined above. They were divided into the following groups for the sake of convenience:

AFRICA : Sub-Saharan African countries

ARAB : Arab countries

AMERICA: Central and South American countries

NE ASIA: Market economy countries in ASIA and the Pacific other than CPE ASIA defined below

CPE ASIA: Centrally planned economy countries of Asia; namely China, Korea DPR, Mongolia and Vietnam

EUROPE : Cyprus, Israel, Malta, Turkey, Yugoslavia

References to "tons" (t) are to metric tons.

References to "Mt" are to million metric tons.

References to "Dollars" (\$) are to United States dollars.

Unless otherwise specified, all figures of steelmaking capacity, steel production and consumption refer to crude steel (ingots and continuously cast semi) equivalent.

Process routes are defined as follows:

BF-BOF: Integrated works which produce pig iron in blast furnaces (BF) or electric smelting furnaces (ESF) and process it into steel in basic oxygen furnace (BOF or LD) Bessemer converters (BC) or open hearth furnace (OHF). Majority of the works are based on BF-BOF or OHF routes. BF include charcoal blast furnaces (CBF).

DR-BF: Integrated works based on direct reduction processes (DR) and electric arc furnaces (EAF)

BF: Semi integrated works based on scrap melting in BF or OHF. Majority of the works are based on BF process.

Chapter 1 Steelmaking capacity: Past, Present and Future

1.1. The past evolution of the steel production and consumption in the developing countries.

1. The past evolution of the steel production in the developing countries is shown in Table 1 by regions, along with that of the developed countries. It is seen from Table 1 that:

- (i) Developing countries as a whole have increased the steel production rapidly during last ten years and the production reached the level of 76 Mt in 1977 which was 40 Mt higher than that in 1967.
- (ii) The annual growth rates of the production in the period of 1967 - 1977 were 7.6 % and 2.7 % in developing and developed countries respectively, when calculated from the production ratios 1977/1967.
- (iii) The recent somewhat severe set back in steel production in the western developed countries has not been observed in the developing countries.
- (iv) The share of the developing countries in the world steel production has steadily improved from 7.4 % in 1967 to 11.3 % in 1977.
- (v) All the regions have shown the development. Although the steel production in AFRICA and ARAB regions is still low, it is increasing at a high growth rate.

2. Table 2 shows the increase of the steel production of the groups of countries as classified by the 1977 production level.

Table 1 - The past evolution of the steel production in the developing countries (Mt)

Regions	years				Growth Rate (%/y) 77/67
	1967	1974	1977	1978	
Developing countries	36.60	63.8	75.9	91	7.57
AFRICA	0.23	0.62	0.65		10.95
ARAB	0.48	0.86	1.20		9.60
AMERICA	9.79	17.74	21.82		8.34
NE ASIA	7.33	11.05	16.53		8.47
CFE ASIA	15.89	29.10	30.95		6.89
EUROPE	2.91	4.42	4.76		5.04
Developed countries	450.8	644.1	598.4	622	2.65
World total (rounded)	497	709	674	713	3.09
Share of developing countries (%)	7.4	9.0	11.3	12.8	-

Table 2 - The increase of the steel production of the groups of countries as classified by the 1977 production levels

Group of countries	Steel production (share in total Dg.C.)			Ratio 1977/1967	Ratio 1978/1967
	1967	1977	1978		
<u>Group A</u> (10-28 Mt in 1977)					
China, Brazil, India	Mt 24.7	48.9	55	1.98	2.2
	Share (67.5%)	(64%)	(58%)		
<u>Group B</u> (1-6 Mt in 1977)					
Mexico, Korea R,	Mt 8.9	20.2	23.3	2.27	2.6
Yugoslavia, Korea DPR	Share (24.5%)	(27%)	(24.5%)		
Turkey, Argentina					
<u>Group C</u> (less 1 Mt in 1977)					
	Mt 3.0	5.8	9	2.27	3.0
Other developing countries	Share (8%)	(9%)	(9.4%)		

Estimated capacity figures for the years 1985, 1990 and 2000 were obtained as follows:

- For 1985: Existing capacity plus capacity increase envisaged from the announced project capacity analysis as outlined above.
- For 1990: Rough estimates based on 1985 capacity, announced project capacity, and potential of countries for the steel industry development.
- For 2000: Very rough guess mainly based on potential of countries for the steel industry development, partly based on announced macro steel development programmes.

Table 1a shows the summary of estimated capacity by region in 1985, 1990 and 2000 which does not take into account the project realization ratio.

Table 1a Estimated steelmaking capacity in the developing countries (not adjusted by the project realization ratio).

Region	Estimated steelmaking capacity (in Mt)			
	1977	1985	1990	2000
AFRICA	0.88	4.5	7	15
ARAB	2.37	10.4	20	44
AMERICA	31.03	59.2	87	154
NE ASIA	21.50	45.3	66	128
CPE ASIA	37.0	65.5	96	176
EUROPE	6.90	17.7	24	43
Total	100	203 ^{a/}	300	560

^{a/} Because of rounding of figures for estimated capacity at country levels, the figure does not exactly coincide that of Table 1.

2. The estimated capacity in 1985 and 1990 shown in Table 4 has been mainly calculated on the basis of the announced projects as mentioned above. Announced projects were classified by probable commissioning data (before and after 1985), without critical techno-economic evaluation of each project. Therefore, it is necessary to take into account the project realization ratio for the estimated capacity increase for 1977-1985 and 1977-1990. For the year 2000 capacity, this is assessed mainly on the potential of country but not on announced project capacity. Therefore it is not necessary to base it on the project realization ratio. As a rough guess based on past experiences, the project realization ratio of 75% would be appropriate. Applying this ratio to 1977 - 1985 and 1977-1990 capacity increase in Table 1a and leaving 2000 capacity as it is, one can obtain a probable steelmaking capacity of developing countries in future years as shown in Table 1b. Assuming the capacity utilization ratio of 77, 79 and 83% for the years 1985, 1990 and 2000, the steel production was calculated and shown in the Table 1b.

Table 1b - Probable steelmaking capacity and steel production in the developing countries (adjusted by the project realization ratio), including CPE Asia

	1977	1985	1990	2000	Growth rate % 1977/2000
Capacity (Mt)	100	177	250	560	7.8
Capacity utilization ratio (%)	76	77	79	83	-
Steel Production (Mt) in rounded figure	76	140	200	470	8.0

Table 2 also indicates that the steel production in the developing countries has expanded substantially. The top three developing countries have increased the production by 24 Mt. Next six countries have expanded their production at a higher rate as a whole than the top three countries. These nine countries produced 91% of steel of developing countries (it was 92% in 1967). However, it is noteworthy that rest of the countries have developed their steel industry considerably in the last decade, although the production is still less than 7 Mt as a whole.

3. This fact that the rest of countries are expanding their steel industry is well supported by the figures shown in Table 3. Total number of countries which have steelmaking countries, has increased by 20 in 10 years and reached at the level of 50. Particularly, the number of countries producing between 0.1 to 1.0 Mt increased very much. Although data for small steelmaking countries are not certain, it is clear that those countries are rapidly increasing their steel capacity.

4. This is a quite encouraging trend for the future development of the steel industry in the developing countries, since the development of steel industry is a rather slow process, the existence of even a small plant plays important role for future development in acquiring knowledge of steelmaking, and these countries will emerge as significant steel producing countries in a long run.

5. However, it should be noted that the total number of steelmaking countries is still 50 to 70 whilst other developing countries are still remaining as "zero steel producing countries."

Table 3 Number of countries as classified by steelmaking capacity (1967 and 1977).

Capacity (Mt)	No. of countries	
	1967	1977
Over 5	2	4
1 to 5	5	8
0.1 to 0.99	8	19
less 0.1	ca. 15	ca. 19
Total	30	50

6. One of the main driving forces for the development of the steel industry in the developing countries in the recent past has been the increasing domestic consumption in many of these countries. In countries whose economy has expanded dynamically, "steel calls for steel" phenomenon has been observed, namely the more they produced steel, the faster the consumption grew. A few selected examples are shown in Figure 1.

7. The steel consumption - production balance in developing countries excluding CPE ASIA is shown in Figure 2. It is clearly shown that consumption has grown at the rate which surpasses the production growth. The net deficit of these developing countries has widened to 35 Mt in 1977 from 15 Mt in 1967. This indicates that steel consuming industries have developed at the same or higher rate as the steel industry. This high rate of growth in steel consumption is understood as an indication of the economic "Take-off" of the many developing nations. As well known, the nations at the economic Take-off stage and right after Take-off require high rates of steel consumption growth.

8. Consumption of steel shown in Figure 2 has the following features:

- (i) steady growth of consumption from 1967-1972
- (ii) sharp increase in consumption during 1973-1974
- (iii) completely flattened consumption during 1973-1974.

While there may be many ways of interpreting these features, one way would be as follows:

- (i) flattening of consumption after 1974, is a combined effect of
(a) worsened economic situation of most of developing countries other than CPEC countries after sudden jump of oil prices at the end of 1973, (b) too much of import of steel during 1973-1974 which exceeded the "steel absorption capacity" of developing countries, and (c) inflated steel prices after 1974.
- (ii) 1973-1974 sharp increase was the results of (a) dynamic economic activities and resultant "steel boom" world wide in 1972-1973, (b) rushed orders for steel in 1973 in the fear of lack in steel supply

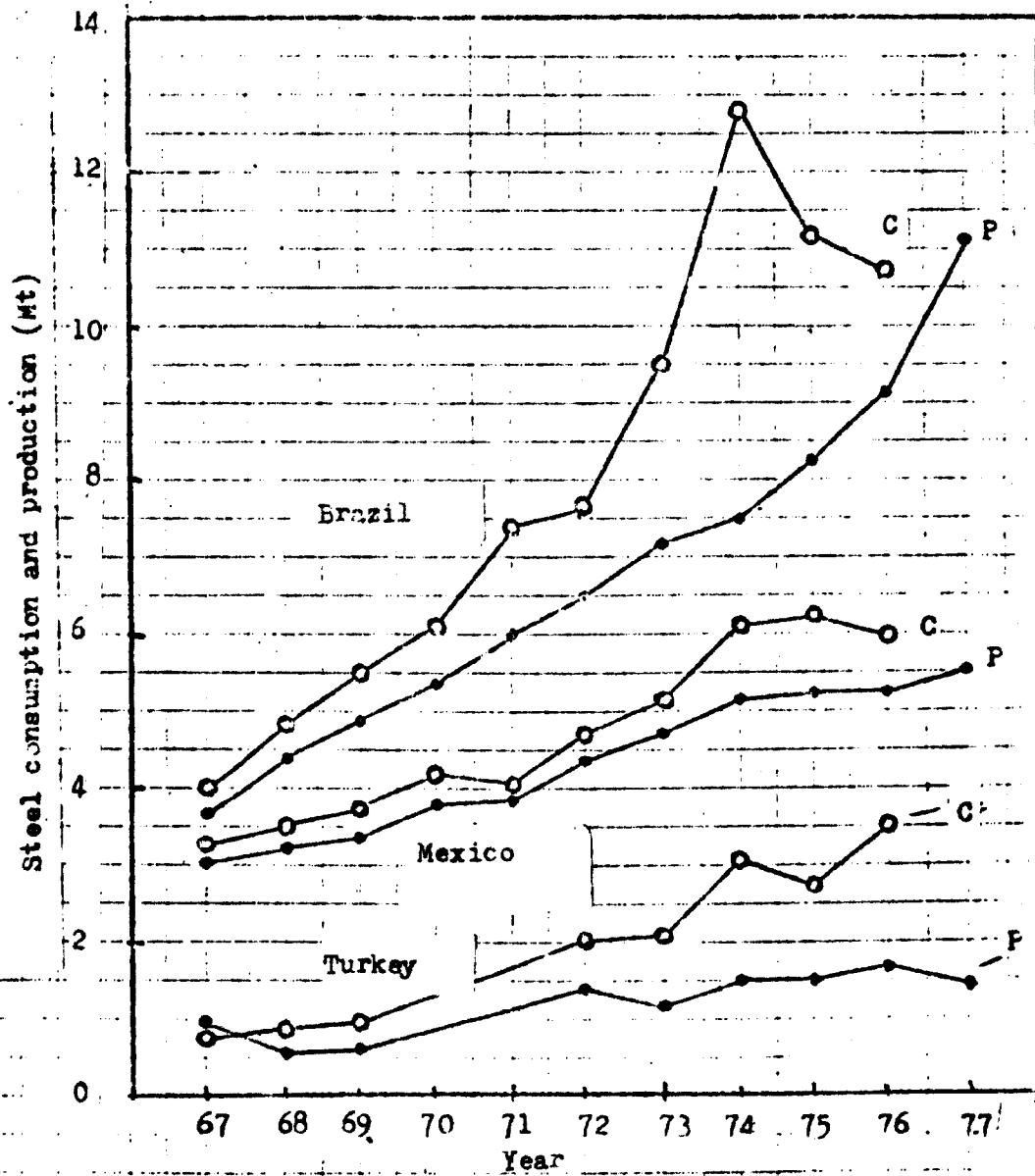


Figure 1: A few selected examples of steel consumption - production relationship

C - Consumption
P - Production

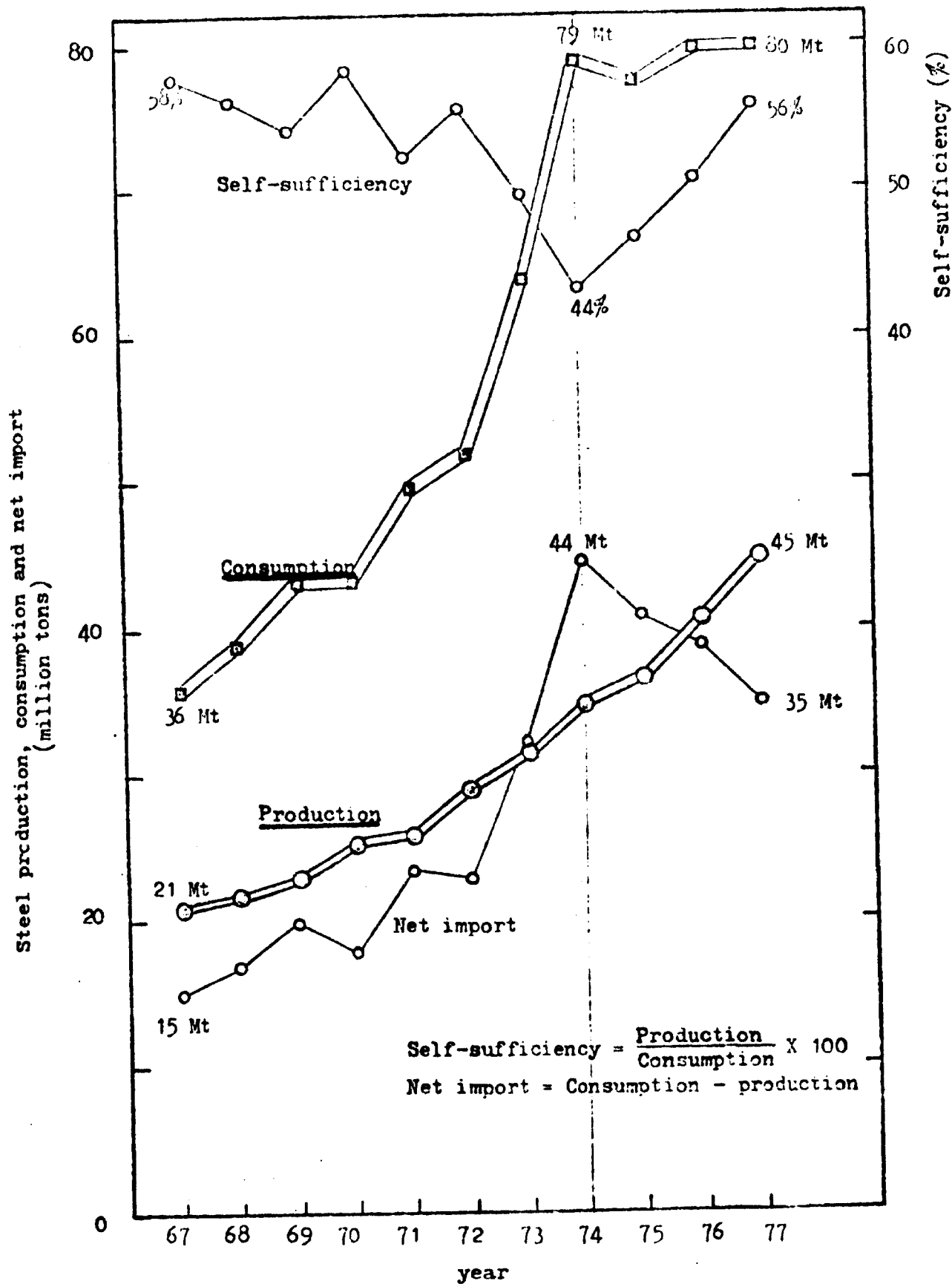


Figure 2 - Steel production-consumption balance in developing countries excluding China and N. Korea.
 (Centrally planned economy countries in Asia)
 Data source: Various issues of steel market, ECE (1977: partly data, partly estimation)

of which a larger part was delivered to developing countries in 1974, and (c) sharp increase in steel consumption of OPEC countries during 1974.

(iii) 1967-1972 growth was a normal pattern of growth in steel consumption which is in line with the steel consumption capacity in the developing countries as a whole.

9. Since the consumption of steel requires many down stream manufacturing building and construction industries as well as infrastructure such as steel hauler and transporting facilities, the concept of the "steel consumption capacity" can be well understood. The normal growth rate of this capacity in developing countries as a whole seems to be the order of 3 % (calculated from 1967-1972 consumption growth).

10. If it is so, the consumption of steel might grow again from 1979 onwards when the extrapolated consumption from 1967-1972 curve reaches the current consumption growth, provided that the general slump of economy and inflated steel prices do not hinder too much the need for steel of developing countries.

Table 4 Existing steelmaking capacities in developing countries (1977).

Region	No of countries		Total steelmaking capacity
	with steelmaking cap.	with integrated works* cap.	
AFRICA	9	(1)	0.880.88
ARAB	8	(3)	2.37
AMERICA	15	(7)	31.03
NE ASIA	11	(4)	21.50
CPE ASIA	3	(2)	37
EUROPE	4	(2)	6.90
Total	50	(19)	100*

* Inclusive figures

11. Of 100 Mt capacity, 90 Mt exist in AMERICA and ASIA. Although the number of countries which have steelmaking capacity in AFRICA and ARAB amounts to 15, capacities of most of countries (except Egypt, Algeria and Rhodesia) are very small.

12. When CPE ASIA countries are excluded, steelmaking capacity is distributed by process route as follows:

Total capacity	BF-BOP	DR-EF	Scrap based EF
62.68 Mt	45.42 Mt	2.99 Mt	14.27 Mt
(100 %)	(72.5 %)	(4.8 %)	(22.8 %)

It is seen from here that BF-BOP (including OH, TC, etc.) integrated steel works count for almost three quarters of the total capacity. Although DR-EF integrated steel works contributes only 5% in 1977, its contribution will grow rapidly in future as discussed later. Scrap based EF route (including OH) occupies significant portion in AFRICA and ARAB where large scale integrated works have not been fully developed. In other regions, this route is less significant but contributes substantially to raise the steelmaking capacity. Particularly it should be noted that 31 countries are wholly dependent on this route for their steelmaking.

13. The numbers of integrated works based on BF-BOP (OH,TC) and DR-EF route are 44 and 6 respectively. Of 44 BF-BOP integrated works, only 8 have a capacity of more than 2 Mt and the average capacity is only 1 Mt. This characterized prevailing small scale works in developed countries (for detailed size distribution refer to Table 9). Furthermore it is noted that a few of BF-BOP integrated works are modern type and many OH and TE are still playing important role.

14. Comparison of the steelmaking capacity discussed in this section and the steel production in previous sections has been made in Table 5, which shows capacity utilization ratios. Even if we consider the fact that such new

capacity is coming into operation each year and further that it takes long time to operate the steel works at the rated capacity, it is stressed that the capacity utilization ratio shown in Table 6 is low and needs further improvement. At least 85 % utilization ratio should be aimed for, when we consider the various implication of the low utilization ratio and tremendous amount of import of steels from developed countries.

Table 5 Capacity utilization ratio of existing steelmaking facilities in developing countries(1977)

<u>Region</u>	<u>Utilization ratio</u>
AFRICA*	74 %
ARAB*	51 %
AMERICA	70 %
NE ASIA	77 %
CPE ASIA*	84 %
EUROPE	69 %
<hr/>	
Average	76 %

* Because of uncertainty in exact capacity data, these figures remain as indicative ones.

1.3 Future steel making capacity

15. Referring to announced steel projects in developing countries, the total capacity amounts to 223 Mt which is more than twice the existing steel capacity (100 Mt). This figure includes both expansion and greenfield site projects, also conceptual to under construction projects. All the projects were examined in the light of the current status of projects and of the projects, and classified into two categories, namely (a) projects probably completed by 1985 and (b) projects might be realized after 1985. Since it is not possible in the classification to make judicious techno-economic assessment of each project, rather generous assessment was made for the projects to be completed by 1985. In reality, it is highly probable that many projects will be delayed by a few years. It is believed that the project realization ratio of those classified as probably completed by 1985 might be order of 70 % as discussed later.

16. Regional distribution of the capacity of projects is shown in Table 6. The project capacity probably completed by 1985 is 106 Mt out of total of 223 Mt. Of 106 Mt, AMERICA and ASIA (both NE ASIA and CPE ASIA) occupy 84 Mt (79 % of total). Also substantive increase in capacity is envisaged for EUROPE and ARAB

17. Process routes of the projects probably completed by 1985 are shown in Table 7 which exclude CPE ASIA where the data are uncertain. Compare to the existing capacity of DR-BF route (3 Mt), quite dynamic expansion of this

Table 6 - Project capacity identified by region and classified by the timing of project realization (Mt)

Region	Project capacity probably completed by 1985	Project capacity might be realized after 1985	Total project capacity
AFRICA	2.92	4.55	4.47
ARAB	7.94	22.65	30.59
AMERICA	28.52	29.18	57.70
NE ASIA	25.53	23.50	49.03
CPE ASIA	30	7	37
EUROPE	11.35	29.50	40.85
Total	106	116	223

Table 7 - Project capacity by process routes for the project probably completed by 1985 (excluding CPE ASIA)

Region	Project capacities (Mt)		
	BF-BDF	DR-EF	Scrap based EF
AFRICA	1.00	1.86	0.06
ARABZ	3.25	3.59	1.12
AMERICA	18.67	7.97	1188
NE ASIA	14.55	6.50	4.48
EUROPE	9.70	0.14	1.51
Total	47.17	20.04	9.05
	(62 %)	(26 %)	(12 %)

Process route is envisaged during 1984 - 1985, although BF-BDF route will still occupy major part of capacity increase (62 %). It is noteworthy that DR-EF route may play more important role than BF-BDF route in AFRICA and ARAB where the markets are generally small and natural gas is abundant.

18. When these capacity increases are added to the existing capacities, the shares of each process route will be as follows in 1985:

<u>BF-BDF</u>	<u>DR-EF</u>	<u>Scrap based EF</u>
66.6 %	16.6 %	16.7 %

19. As for the classification of projects by expansion of existing works or greenfield site, Table 9 shows that 63 % of capacity increase envisaged by 1985 will be based on the expansion of existing works. This is very significant and encouraging because expansion projects are generally much easier to carry out and much less in investment costs than greenfield site projects. In this regard, AFRICA and ARAB where new site projects are significant have to overcome many difficulties in order to realize the projects.

Table 8 - Project capacity as classified by expansion and greenfield project (excluding CPE ASIA).

Region	Project capacity probably completed by 1985	
	by expansion project	by greenfield project
AFRICA	0.03	2.89
ARAB	2.42	5.52
AMERICA	17.70	10.82
NE ASIA	16.49	9.04
EUROPE	11.34	0.01
Total	47.98 (63 %)	28.28 (37 %)

20. The size distributions of existing (1977) and future (1985) integrated steelworks were examined and presented in Table 9. The table is self-explanatory; but the following points worth to mention:

- (i) A distinct trend for larger plants is seen both for BF-LD and DR-EF routes; the number of BF-BOF integrated works of more than 2 Mt capacity will increase to 17 from 8 existing; a number of over 1 Mt capacity DR-EF plants will emerge.
- (ii) 10 new BF-BOF works and 23 DR-EF works will be constructed by 1985, and the total number of integrated works will increase to 83 compared to the present of 50.
- (iii) Of 54 integrated BF-BOF works, only one will have a capacity of more than 5 Mt which is generally consider the minimum economic size for the newly built integrated works.
- (iv) Average size of plants will increase considerably by 1985, but still remains at 1.7 Mt for BF-BOF route (1.0 Mt in 1977) when number of very small (less 1 Mt) works of which majority are charcoal based works.

21. The points above raise the question of appropriate size of works for developing countries. The size should, generally speaking, be decided by the consideration of (a) market potential (b) economy of scale (c) technology level (d) management skill (e) availability and quality of raw materials (f) capability to procure finance, (g) infrastructure level and (h) sometimes regional development of the country. The trend shown above, that the sizes of works will gradually increase toward 1985, is a welcoming and encouraging one for the developing world in the sense of not only economy of the industry but also as a proof for gradual level up to technical as well as management

22. Since there are many factors to be considered in deciding the optimum plant sizes as mentioned above, a detailed techno-economic study has to be made project by project, with a thorough prospect in mind with regard to long term and ultimate future expansion. Also very careful assessment of management of the project and the plant should be made because the financial implication of the delay in construction and the low capacity utilization ratio is very significant factor which pushes up the capital investment resources required as also production cost. Highly ambitious projects for a modern large scale steelworks and mechanized automated sophisticated equipment should be, generally speaking, implemented on later phases/stages for countries with little experience in the steel industry

Table 9 - Size, distribution of integrated steelworks in developing countries except centrally planned ASIA (1977 and 1985)

<u>Capacity (Mt)</u>	1977			1985		
	<u>HP-LD</u>	<u>DR-EP</u>	<u>Total</u>	<u>HP-LD</u>	<u>DR-EP</u>	<u>Total</u>
less 0.5	17	5	22	16	13	29
0.5 - 0.99	9		9	4	10	14
1.0 - 1.49	5	1	6	9	2	11
1.5 - 1.99	5		5	8	1	9
2.0 - 2.49	3		3	5		5
2.5 - 2.99	4		4	1	1	2
3.0 - 3.49				3	1	4
3.5 - 3.99	1		1	2	1	3
4.0 - 4.49				2		2
4.5 - 4.99				3		3
5						
6						
7						
8				1		1
Total Number	44	6	50	54	29	83
Total Capacity (Mt)	45.42	2.99	48.41	92.59	23.03	115.62
Average Capacity	1.03	0.50	0.97	1.71	0.79	1.39

1.4. Steel production of developing countries and their share in the world in the future years

23. The future steel production level of developing countries would be decided by the project realization ratio of projects which reviewed in previous sections and capacity utilization ratio. Although announced projects were already classified into two categories in previous section, it is still necessary to consider project realization ratio even for the projects which classified as probably completed by 1985, and 1990. The reasons are that rather generous classification was made as already mentioned, for individual project, and that it often happens that even advanced stage projects are delayed a few years by number of reasons.

24. Here it is rather critically assumed that the project realization ratio for the projects classified as probably completed projects by 1985 and 1990 in Table 6, would be of the order of 75%. For the year 2000, it is assumed that the capacity estimated could be realized, because the capacity estimates for the year 2000 were made on the basis of various socio-economic considerations for each country and not merely on announced project basis. Of course, the capacity in 2000 represents approximations and in reality some countries would far surpass the estimated one whilst others would not reach the estimated level.

25. As for capacity utilization ratio, it is assumed that the current capacity utilisation ratio of some 76 % would improve rather slowly, namely 77, 79 and 83 % for the year 1985, 1990 and 2000 respectively. The reasons for this rather pessimistic view are a) lead time required to achieve full capacity utilisation for new plants, b) many countries are going to have the steel industry at the first time and c) very long time required to acquire the requisite management, maintenance and operation skill.

26. The future steel production, then, will be as shown in Table 10.

Table 10-Steel production and capacity in developing countries, adjusted by Project Realization Ratio including CPE Asia

	1967	1977	1985	1990	2000	Growth rate (%/y)		
						1977/67	1985/77	2000/77
Capacity (Mt)	49	100	180	250	560	7.4	7.6	7.8
Capacity utilization ratio (%)	75	76	77	79	83	-	-	-
Production (Mt)	36.6	75.9	138.6	197.5	464.8	7.6	7.8	8.0
Rounded production (Mt)		76	140	200	470			

Developing countries' steel production would grow further towards the end of the century at almost same or a little higher rate than the last one decade, and many reach 140 Mt by 1985 and 470 Mt by 2000. The figure of 470 Mt in 2000 seems to be lower side when one considers consumption figures discussed in the next section and this should be regarded as the minimum level desired.

27. These figures are somewhat lower than those discussed at the First Consultation Meeting on the Iron and Steel Industry (it was expected at that time that developing countries steel production might increase to 150 Mt by 1985 and 525 Mt by 2000), reflecting continuing slump of the steel industry and economy general of the developed western world and the resulting effects on the steel growth of developing countries.

28. What will be the share of developing countries in the future in the world steel production? Since it is extremely difficult to make forecast with any certainty under present status of the economy and steel industry of the world, only the orders of magnitude will be discussed based on the simplest assumptions.

29. First growth rates of consumption were assumed as shown in Table 11.

The basis for this assumptions is:

- (i) The demand for the steel products in developing countries will continue to be high because of their absolute needs for steel in order to promote their overall economic development. Developing countries with applicable steel consumption per capita at present are on the stage of "economic take off" and where the steel demand is the highest. Many countries with less consumption per capita would start taking off in a decade or two.
- (ii) As seen before, however, the consumption of steels in developing countries as a whole has not increased during the last 3 years or so. Therefore, the growth rate for coming years cannot keep the same rate of 8 to 9%/year for the last ten years and will decrease slightly. There is a possibility that the decrease will be substantial if the current depressed economic conditions in the western developed countries continue over the future years.
- (iii) The consumption of western developed countries will grow at a very moderate rate even if full recovery is made from the current economic slump. The structural changes in the steel consumption patterns seem to have taken place in those countries. The growth rate will further decrease on the long run.
- (iv) The eastern developed countries have shown steady consumption increase for many years. However, the general trend is that the growth rates are decreasing in recent years (74/73: 6.6%, 75/74: 3.2%, 76/75: 3.0%, 77/76: 2.6%).

Table 11 - Assumed steel consumption growth rate per annum

	Actual	Assumed	
	1976/1967	1985/1976	2000/1985
Developing countries	8.25 %	7.5 %	7.0 %
Western developed	1.73	2.7	2.0
Eastern developed	4.75	3.2	2.5

Consumption of the steel in the future years, is shown in Table 12. The developing countries could consume about a quarter of the world steel by 1985/1990 and more than one third by 2000.

Table 12 - Consumption of the steel in the future years, calculated

	1967	1976	1985	1990	2000
Developing countries (Mt)	54.5	111	213	298	587
(share in the world)	(11%)	(17%)	(23%)	(27%)	(37%)
Developed countries (Mt)	442	562	726	808	1003
Western (Mt)	309	361	459	506	617
Eastern (Mt)	132	201	267	302	386
World Total (Mt)	496	673	939	1106	1590
(rounded figure)			(950)	(1100)	(1550)

a/ Because 1977 consumption figures are still uncertain 1976 figures are used as basis.

1. Production figures are calculated and shown in Table 13 on the following assumptions:

- (i) Developing countries, steel production is projected in Table 10.
- (ii) Eastern developed countries as a whole would be self-sufficient in relation to their steel consumption.
- (iii) Western developed countries would produce steel to satisfy their internal/domestic markets and for export to developing countries that are deficient in steel production and cannot meet their domestic market requirements.

Table 13- Production of steel in the past and future years (rounded figures)

	1967	1977	1985	1990	2000	Growth rate/yr		
						77/67	85/77	2000/77
Developing countries (share in the world)	36.6 (7.4%)	76 (11.3%)	140 (17%)	200 (19%)	470 (30%)	7.6	7.8	8.0
Developed countries	460.8	598.4	810	900	1080	2.7		
Western	325.4	394.2	520	600	690	1.9		
Eastern	135.4	204.2	270	300	390	4.23		
World Total	497.4	674.4	950	1100	1550	3.1	4.0	3.7

32. The share of developing countries in the world steel production could increase to 30% by 2000 from the current figures. This share of 30% should be regarded as the minimum target for the developing countries on the basis of the Lima Declaration, taking into account the significance of the steel production for the overall industrial development and economic growth in the developing countries. Particularly when we look into the steel import required (consumption minus domestic production) in the future years as shown in Table 14, one might conclude that more dynamic expansion of the steel industry in the developing countries is urgently required.

Table 14 -The steel import required by developing countries in future years.

	1967	1977	1985	1990	2000
Consumption (Mt)	54.5	115	213	298	587
Production (Mt)	36.6	76	140	200	470
Import required (Mt)	17.9	39.1	73	98	117
Self sufficiency	67 %	66 %	65 %	67 %	80 %

33. Self-sufficiency in supply (production divided by consumption) will hardly improve by 1985 and reach to only 80% by 2000. The absolute amount of steel to be imported by the developing countries will increase steadily and reach more than 100 Mt in 2000. The question arises, if it is realistically possible for developing countries as a whole, to import these tonnages of steel with their extremely limited foreign currency resources. In this connexion, the slow down in the steel consumption in the recent years (1974-1977) should be regarded as a significant alarm signal. One might draw a very gloomy picture for the development of the steel industry in the developing countries which is quite different from the one shown above. Factors affecting the expansion of the iron and steel industry in the developing countries are outlined below:

34. The steel market and steel industry in the developing countries in the future will undoubtedly play very significant part in the world.

35. The effects and consequence of the recent slow down of global economic growth and in particular of the slump and structural changes taking place in the steel industry of the western developed countries, could hamper the sound development of the developing countries' steel industry very much, if

a) economic strength of some developing countries becomes so weak that they can no more sustain their dynamic economic growth including the growth of steel and related industries;

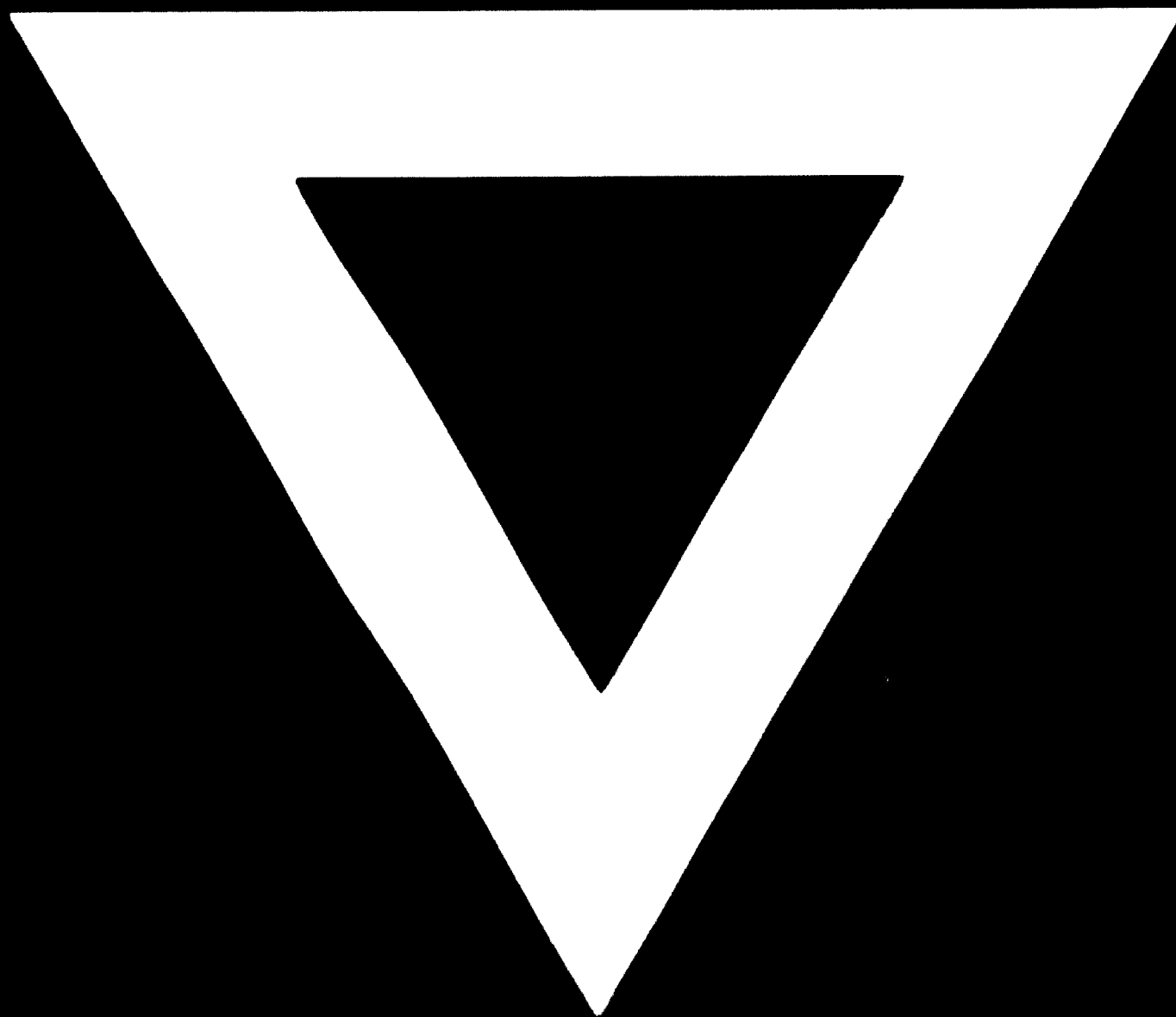
b) financial assistance and involvement of some developed countries are not fully forthcoming for the growth of the steel industry in the developing countries for various reasons;

c) technical assistance and supply of advanced technology and technical know-how and capital equipment are restricted due to various reasons;

d) protectionistic attitudes develop in some developed countries with established over-capacity in the steel industry over and above the domestic needs to the extent that even small exports from the developing countries to the developed countries are seriously restricted.



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