THE WORLD STEEL INDUSTRY - PRESENT STATE AND FUTURE PROSPECTS

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Introduction

Steel commentators usually begin an address by explaining that the present time is not a good one to review the prospects of the steel industry. It is, of course, a truism; it never is a good time, and only a historical perspective is likely to be satisfactory. Even the present must be viewed with circumspection. We now look upon the 1960s and early 1970s as an almost golden age in the affairs of the world steel industry but at that time, no doubt, it did not appear to be so. Thus, the present cannot be placed in perspective until sometime in the future. Looking into the future requires even more caution; the future could follow the trends of the past or some unforeseen perturbation could occur and radically change the direction to be followed. Some forecasts can be self-defeating (often deliberately so), such as when a predicted shortage of a raw material triggers an increase in the supply of that material or vice versa.

Having now defended my position, and before dealing with the present state and prospects of the world steel industry, let us set the scene by looking briefly at the past.

Historical Perspective

World apparent steel consumption grew from some 335 million metric tons (mmt) in 1960 to nearly 751 mmt in 1979. These gross figures, however, mask the disparate regional consumptions and how they changed over the period. Growth of world apparent steel consumption, based on trend growth rates, in the period 1960-1969 was 6.4 percent per year. In this decade the industrialised countries, the developing countries, and the centrally planned economies all had essentially the same growth in apparent steel consumption. However, in the decade 1970-1979, world apparent steel consumption growth was only 2.4 percent per year. Instead of the uniform pattern of growth of the previous decade, the 1970s showed a marked divergence in regional apparent steel consumption; the industrialised countries had a small negative trend annual growth rate whilst the developing countries' consumption grew at more than 10 percent per year.

The Western World apparent crude steel consumption peaked in 1973 and, in crude steel terms, had yet to surpass this peak; the decline in consumption being entirely within the industrialised countries of the West. This is graphically illustrated if the 1973-1979 apparent steel consumption is indexed (Figure 1). World steel consumption dropped below the 1973 level in the period 1975-1977, because of the drop in consumption in the industrialised countries; in 1979 this was still some 10 percent below its peak. Consumption

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in the centrally planned economies* increased steadily from 1973-1978 but, interestingly enough, decreased slightly in 1979; their progress in 1980 will be monitored with interest. The developing countries have increased their consumption substantially in the period 1973-1979, reaching a level of some 60 percent higher at the end of the period.

The other side of the consumption coin is, of course, production. In much the same way that the pattern of consumption is changing, that of production is following suit. There is a natural desire amongst developing countries to produce their own steel and there has been a significant expansion in crude steel production capacity in these countries. Formerly, the developing countries were a significant export market for the industrialised countries' steel products and, while they will be net importers of steel for some considerable time to come, they will increasingly produce a greater proportion of their domestic demand.

The sharp reduction in consumption in 1975, and the relatively slow recovery in the industrialised countries of the Western World has proven to be a traumatic experience for these countries. The considerable excess production capacity then available, particularly in Western Europe and Japan, coupled with soaring costs for labour and raw materials, have led to intense competition on the international steel market. The depressed prices which resulted have been insufficient to cover full costs and in some countries, governments have had to intervene to prevent bankruptcies of national steel industries. Even in some of the more successful steel-producing industrialised countries, profits have been insufficient to cover necessary investment for maintaining present capacity or the installation of modern plant to improve productivity and pollution control. This has led to some "restructuring" (the closure of old, inefficient plant) within the steel industry, especially that of Western Europe and the United States.

High growth rates in steel consumption for the industrialised countries were to be expected in the post-war construction phase, and it is a statistical truism that these growth rates would inevitably decline to some overall rate related to manufacturing industry (Figure 2). The trend in growth rates for apparent steel consumption in the industrialised countries had been falling steadily from 1960 to the early 1970s. Fluctuations in general economic activity normally lead to amplified swings in steel demand, so that the post-1974 recession brought a dramatic drop in apparent steel consumption, which in the industrialised countries fell by more than 20 percent between 1973 and 1975.

It has been observed that as economies reach high levels of GNP per capita, the specific consumption of steel per unit of GNP starts to decline. The underlying theory is that at these high levels, changes occur in the pattern of activities of the economy with more emphasis being placed on services, administration and leisure trades and less on the traditional heavy steel-using activities. There is also the substitution of steel by other materials such as plastics, aluminium and glass, an impact which is greater in the industrialised than in the developing countries. Another continuing influence on steel consumption is exerted by technological progress in steel production and steel use, which leads to a reduction of tonnages consumed per unit of output. These three factors are, of course, perennial and will have some impact on steel consumption whatever the economic conditions.

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* Eastern Bloc countries plus People's Republics of China and Korea

Historically, for the industrialised countries, there has been a strong correlation between the growth rates of steel consumption, GNP, industrial production and investment activity. After 1973, this close relationship weakened and steel consumption grew at a much slower pace than the others. Significantly, growth in investment activity and industrial production also lagged behind that of GNP. In the industrialised countries a large proportion of steel consumption is investment related and, therefore, any change in investment activity has a sizable impact upon steel consumption. The surplus capacity which was present in most industrialised countries after 1973/74 and the slow recovery from the recession have resulted in a reduced level of investment activity. It also appears that in a number of industrialised countries there has been a shift in investment expenditure from expansion of industrial capacities towards investment for replacement and productivity improvement within an existing capacity structure. This shift is considered to be less steel intensive, especially that for productivity improvement which often consists of considerable expenditures on sophisticated equipment with low steel intensities. This movement in the industrialised countries is contrasted by the situation in the developing countries where up to three-quarters of steel use is investment related and most of this is aimed at steel-intensive growth in industrial plant.

The consumption-related steel demand in the industrialised countries is also showing signs of weakness. As the real disposable income of consumers is squeezed, spending on consumer durables declines. In the automobile sector, for example, demand has slackened leading to predictions of demand saturation; it is perhaps premature to draw this conclusion. However, one trend that will be blatantly obvious is the move towards smaller and lighter automobiles; this change is being brought about by the rapid increase in petroleum prices. The inevitable effects on steel consumption growth will be negative and there should be some interesting changes in the qualities of steel demanded.

There has been a tendency to place the cause of the severe mid-1970s recession almost entirely on the OPEC decision to increase the price of oil. Such an oil price increase was both inflationary in the cost sense and deflationary in the demand sense inasmuch as purchasing power was removed from the oil-importing economies. Governments also acted to curb inflation by using restrictive monetary policies, thereby further deflating the economy. The commodity price boom was coincident with the oil shock and, superficially, these events would appear to have been the causes of the recession.

While it is undoubtedly true that these price increases played a major role in bringing about the recession, there were other underlying, long-term factors which prepared the ground for such a severe decrease in economic activity.

One of such factors which has probably had a significant impact on general economic growth in the industrialised countries is the rate of profitability of manufacturing industries and, more specifically, the steel industry in these countries. There has been a perceptible fall in the gross rates of return during the period 1960-1978. The reasons for this downward trend are thought to be rapidly rising labour and raw materials costs in a period in which markets were slow-growing or stagnant and the intensification of competition, both national and international, have constrained industries in raising prices. This has meant decreased economic activity because of lower investment and increased unemployment; governments have often reacted to unemployment by legislating for greater employee protection which has made it even more difficult for industries to adapt to market conditions.

The more far-reaching effect is that governments are compelled to intervene

with subsidies or protectionism in order to guarantee jobs and prevent bankruptcies. Low profitability will mean, over a period of time, that the economic system will become essentially government-financed and, thus, controlled. Governments are then tempted to restrain domestic price increases for the short-term benefit of a domestic anti-inflation programme; the benefit is, of course, illusory since this will inevitably deny manufacturing industry a necessary level of return, thereby giving the government even more control. The other logical conclusion is that investment shifts to countries with a higher return on capital, which in many cases will mean the developing countries. This is part of the fundamental development of the capitalist system.

The flexibility and efficiency of markets have been decreasing at a time when the comparative advantages amongst nations and sectors are changing more rapidly than before; new industrial countries emerge as competitors on world markets, exchange rate differentials alter drastically, and changes in energy prices change relative profitabilities between various production sectors and countries.

Present State and Prospects

The present situation in the world steel industry is rather gloomy. The slow but distinct improvement in output which occurred in the period 1975-1979 has suffered a setback this year. As always it is necessary to examine the regional performances since this has varied considerably.

During the first eight months of 1980, the Western World countries which report their monthly crude steel output to IISI produced 308 million metric tons, which is 5.5 percent down on the equivalent output in 1979; the 29 reporting countries cover 98 percent of Western World steel production (Table I). The really striking change in 1980 is the production in the United States, down some 19 million metric tons, a massive 22.1 percent below 1979. The United States economy entered a recession in the first quarter of 1980; interest rates soared to 20 percent by April, and employment, retail sales and industrial output fell steeply. The general feeling is that the economy has bottomed out and a recovery is now looked for, with concomitant improvement in steel demand.

The EEC shows little change from last year, down 3.3 percent. Within the Community, the eight-month total for the United Kingdom is 48 percent below that of last year, primarily due to the strike in the first quarter of the year. This drop is offset by substantial increases in production from Italy and France. However, EEC steel production in August was more than 12 percent down on the same month last year, and the rest of this year is expected to be significantly below the same period in 1979. Japan is producing roughly on par with last year, and the "Others" total masks the continuing progress of the Developing countries. The oil price increases at the end of 1979 and the beginning of this year have resulted in a slow-down in economic growth and the short-term outlook for these countries is not encouraging.

The estimated annual steel production for the Western World in 1980 is 466 million metric tons, down some 6.4 percent over 1979 (Table II). There is a sharp divergence between the Industrialised and Developing countries. Steel production in the Industrialised countries is estimated at 8.1 percent below the 1979 figure, due primarily to the drop in output of the United States. In contrast, the Developing countries are expected to increase their steel production by 7.1 percent this year.

The regional outlook for apparent steel consumption in the Western World in 1980 is similar to that of steel production (Table III). The United States shows a very sharp decrease over 1979 with an 18.9 percent fall; the EEC consumption is expected to be down some 4.6 percent, Japan and the other Industrialised countries register small gains, and the Developing countries are expected to increase consumption by 3.2 percent. Overall the 1980 Western World apparent steel consumption is expected to be 5.5 percent below that of 1979.

Interestingly, for the Developing countries the increase in steel consumption in 1980 is less than that estimated for production, reflecting a greater proportion of consumption being supplied domestically.

The increase in apparent steel consumption for the Developing countries is not occurring at a uniform pace (Table IV). Latin America shows the fastest growth in this group, mainly through increases in Brazil, Mexico and Venezuela. South East Asia, which excludes Japan, the People's Republic of China and Korea, is expected to increase apparent steel consumption by only 2.9 percent; former high-fliers Taiwan and the Republic of Korea are expecting little or no growth in 1980. Similarly, no growth is expected in Africa, excluding South Africa, and a downturn is estimated for steel consumption in the Middle East.

Looking at the total world, including the centrally planned economies, it is estimated that apparent steel consumption will be some 3.7 percent lower this year than in 1979 (Table V). For the centrally planned economies, no growth in steel consumption is expected in 1980 and, in fact, this is the third year in which apparent steel consumption has remained static. Information on the centrally planned economies is limited, but this stagnant apparent steel consumption is now thought to be an expression of long-term economic development problems rather than the earlier hypothesis of inadequate resource availability.

Turning to the outlook for world steel consumption in 1981 (Table VI), the forecast is that this will reach 739 million metric tons, which is an increase of 2.2 percent but will still be below the recent peak of 1979. Steel consumption in the Western World is forecast to grow at 2.4 percent, and again there is the marked divergence between the Industrialised and Developing countries with 1.4 and 6.3 percent respectively. The Eastern Bloc countries are forecast to grow on par with the total Western World but no growth is forecast in 1981 for China and North Korea. The crude steel output target in China was lowered in 1980 to 33 million metric tons and steel imports into China were running at a lower level during the first half of 1980; it would seem prudent, therefore, to forecast no growth in steel consumption in 1981.

It is interesting to examine the Western World Industrialised countries in a little more detail. As we have seen, steel consumption is forecast to grow overall by 1.4 percent to 371 million metric tons, but this figure masks considerable divergence within this group (Table VII). The United States economy is expected to rebound from the present recession and steel consumption will increase by over 10 percent to 128 million metric tons; this is still 15 million metric tons below the 1979 level. Steel consumption in the European Economic Community and Japan is forecast to decline in 1981 by 4.6 and 3.8 percent respectively.

Energy prices are obviously an important factor in any outlook to the future. Oil prices softened briefly, but this is proving to be only a temporary relief. The attempts by OPEC to "stabilise" oil prices by linking them in some way to Western World inflation is fraught with difficulties, but if

successful would ameliorate the disruptive effects of sudden massive oil price increases.

The huge increases in the price of crude oil only a few months ago are now beginning to have the expected contractionary effect on some Western World economies. The United States and the United Kingdom are presently in a recession and the other major economies of the Industrialised countries, although not in recession according to strict economic definition, are now witnessing a downturn in industrial production. As we have seen, this is a more sensitive indicator than gross national product, and one with a marked effect on steel consumption. While the United States is expecting to move out of recession early next year, collectively the European countries are expecting a worsening of the present situation.

The longer-term outlook for the world steel industry to the middle of the decade is one of overall slow growth. The Industrialised countries of the Western World are expected to experience little growth in steel consumption, in the order of 2-3 percent per year. The centrally planned economies are presently suffering economic setbacks and are likely to do so in the future; the outlook for steel consumption is similar to that for the Industrialised countries. The Developing countries are expected to increase their steel consumption at a relatively rapid rate, compared to the other groups, probably about 6-7 percent per year; this is, however, somewhat slower than the rate achieved over the last decade.

As with all forecasts, one of the major factors is the mood of the moment, and this affects short-term forecasts relatively more than those made for some period in the distant future. Forecasts made during the last major boom period of 1973/1974, prior to the first OPEC oil shock, have now proved to be wildly optimistic. Present day forecasts made in the midst of a recession in steel consumption may prove in the future to have been too pessimistic.

Future Trends in the Western World Steel Industry

The world steel industry is undergoing continuing structural change. For any viable industry this change is a necessary and expected mode of behaviour. Old, inefficient processes or even producers are phased out and replaced by more efficient and less costly facilities. This metamorphosis has occurred with the replacement of Open Hearth by Basic Oxygen furnaces and is occurring now with the replacement of ingot by continuous casting. The gradual increase in the proportion of Electric Arc furnace steel is a reaction to such external stimuli as increased energy and capital costs. Direct reduction is beginning to make its presence felt in regions where raw materials supplies are suitable for this process. On a world scale, the more established steel producing areas such as Europe, Japan and North America are now having to cope with vigorous competition from countries such as Taiwan, South Korea and Brazil. The steel industries of the developed Western World will gradually move towards the more sophisticated steel products and away from the basic end of the industry. This is, of course, an overall trend and there will be many exceptions because of particular local conditions.

This inherent flexibility of the Western World steel industry will enable it to overcome its present crisis. Rationalization of production facilities, involving the closure of inefficient plant, is now taking place in Western Europe and North America; in Japan the necessary surgery has been completed sometime ago. The total crude steel production capacity of the industrialised countries will show little or no growth over the next five years; investment

is now aimed at improving productivity and product quality.

I have mentioned briefly the shift in consumption and production of steel toward the Developing countries. From now until at least the second half of the decade, the bulk of the additional steel capacity to be added in the Western World will be in the Developing countries. By 1985, a net addition of 50 million metric tons of capacity is to be added over the 1980 level; this includes new greenfield plants, expansion of present facilities and contractions in capacity; the latter item is more difficult to estimate because of its sensitivity.

Of the estimated 50 million metric tons to be added, more than 75 percent will be in the Developing countries, bringing their capacity to almost 100 million metric tons by 1985; by then the Industrialised countries will have a capacity of 550 million metric tons. The respective capacities for the Developing and Industrialised countries in 1974 were 35 and 500 million metric tons. Practically all the additional capacity to be added in the Industrialised countries in the period 1974-1985 is already in place; some closures of obsolete capacity, however, are still to be resolved (Table VIII).

Most of the additional capacity in the Developing countries will be in Latin America, primarily Brazil, Mexico, Venezuela and Argentina, and in South East Asia, primarily Taiwan, South Korea, Indonesia and India. Africa, excluding South Africa, is expected to have little additional capacity by 1985, and the plans for steel production capacity in the Middle East have been severely curtailed.

Despite this marked shift in crude steel capacity installation to the Developing countries, by 1985 the proportion of production capacity in the Developing countries to the Western World total will only be a little over 15 percent; the proportion in 1974 was 6.5 percent. This projected growth is not as vigorous as was previously expected; severe debt problems, inadequate infrastructure, and management and resource constraints have led to the scaling down of projects, slippage in completion dates, postponements, and even outright cancellations.

Overall, the growth in capacity expansion over the next five years will be less than the growth in steel demand and the present imbalance between supply and demand will be alleviated somewhat. The demand for steel in the developing countries will still out-distance domestic supply and they will continue to be net importers from the industrialised countries.

This pinpoints an increasing difficulty within the steel industry. One of the major problems that we are now encountering when using crude steel statistics is the increasingly distorted ratio, historically speaking, of crude to finished steel. This has been brought about by the increased yield of finished steel per unit of crude steel, due mainly to the introduction of continuous casting and superior plant controls. This was vividly demonstrated in Japan where, in 1979, output of rolled products was equal to the peak year of 1973 but, in doing so, used 7 percent less crude steel. Until the early 1970s, the growth in crude steel production mirrored that of finished steel output; however, since 1971/72, the improved yield has had an increasingly significant effect on finished steel output, and there is now a waxing divergence between the growth rates of crude steel and finished steel production, with the latter being the greater.

The growth of continuously cast steel as a share of crude steel output for the Western World has increased from 11.9 percent in 1973 to 32.5 percent in 1979 (Table IX). Japan continuously cast 52 percent of its crude steel

in 1979; the United States 16.7 percent; and the EEC (9) was almost on par with the Western World average with 30.9 percent. This impressive growth is expected to continue in the future and by 1990 some 50 percent of Western World crude steel output will be continuously cast. The rate of introduction of continuous casting has been faster than expected; not only have the newer steelworks installed this technology but other factors, such as the restructuring of the steel industry in certain areas and increasing energy costs, have accelerated the acceptance of continuous casting. More pessimistically, it is also a reflection of lower-than-forecast steel output.

Apart from these yield considerations there has been a noticeable shift in the quality of steels produced. This trend towards higher quality steels is graphically illustrated for Japan and the United States (Figure 3); using annual production of ordinary carbon and special steels in 1973 as a base of 100, by 1979 the indices of output for special steels were 111 and 137, respectively, for the United States and Japan, and for ordinary carbon steels were 88 and 96 respectively. In terms of percentage shares of crude steel output, for the United States special steels were 12 percent and 14.7 percent of output in 1973 and 1979 respectively; for Japan, special steels were 9 percent and 12.3 percent of output (Table X).

The world "steel" is a generic term and not just a single homogeneous product; it covers a complete family of products ranging from ordinary carbon steels through to the whole gamut of special steels. The outstanding advantage of steel is its versatility; its properties can be enhanced or changed by the addition of alloying elements and by relatively simple heat treatment.

Historically there has been a clearcut distinction between the production facilities for special steels and those for ordinary steels. It is, however, increasingly possible to produce quality steels using the classical BF-BOF route. The introduction of ladle metallurgy and secondary refining has given the integrated steelmaker greater flexibility and control, permitting the high-volume production of special and high-quality steels. Steel is increasingly desulphurised outside the steel furnace. Ladle desulphurisation involves the injection of calcium-bearing materials into the ladle of molten steel. Such processes are generally thought of in combination with electric-arc steelmaking but they are now being used with BOFs. The quantity of non-metallic impurities in steel can be significantly reduced, with sulphur down to less than one-third of normal content, resulting in the production of steels with good impact strength and capable of accepting severe deformation during forming. High-strength, low alloy (HSLA) steels, for example can now be produced with better formability than traditional HSLA steels. Secondary steelmaking, along with the movement towards the external desulphurisation of hot metal, is part of an overall trend towards the disaggregation of the various iron and steelmaking processes. This is expected to continue in the future, leading to enhanced product specification and the saving of valuable raw materials because of higher yields.

The energy crisis has brought, and will continue to bring about substantial changes in relative prices. The pattern of consumption under this new price structure no longer corresponds to the pattern of production which grew up under the old structure. This will inevitably lead to changes in product design and material substitution where possible.

The rising real costs of all forms of energy are undoubtedly making an impact on the type of steels which are now being demanded by the consumer and will be increasingly so in the future. The automotive industry, to give one example, is moving towards more fuel-efficient vehicles; this is especially true in the United States where this movement has been legislated for. This is obviously going to change the basic design of these vehicles and,

apart from reducing the frictional drag effects and increasing the efficiency of the engine, the major impact will be on vehicle weight to reduce energy consumption. This can be brought about by reducing the size of the vehicle, which is more applicable to the United States, and this decreases the unit demand for steel. The other major prong of this impact is expected to be the demand for the thin-gauge, high-strength steels which will have equivalent strength to present-day, ordinary carbon steels but will be considerably lighter per unit area. Apart from lower fuel consumption, increased resistance of the vehicle body to corrosion would be a bonus.

The types of steels envisaged for use by the automotive industry are the high-strength low alloy (HSLA) and the so-called dual phase steels. These steels typically contain very small amounts of alloying elements, such as chromium, molybdenum, niobium, phosphorus and vanadium, which confer various beneficial properties on the steels. Dual phase steels, which can be produced by controlled cooling and continuous annealing of the steel, need not necessarily contain alloying elements. The steels are generally stronger than ordinary carbon steels but still retain the good formability, ductility and weldability required for fabrication. Thinner gauge steel necessarily means that the steels would require greater corrosion resistance and it has been found that the presence of small amounts of alloying materials in these steels has been very effective in increasing resistance to atmospheric corrosion; dual phase steels without small amounts of alloying elements are unlikely to show much more resistance to such attack than ordinary carbon steels. Historically, protection from corrosion has been provided by paint but current developments for the mass production market include protection by zinc on one or both sides of the steel.

The versatility of steel as a structural and fabricating material has been commented upon earlier. The other main advantage of steel compared to competitive materials is its cheapness. The choice of which material to use depends upon some optimum mix of material specification and cost.

High-strength low alloy and dual phase steels will certainly be more costly than ordinary carbon steels, and a potential stumbling block to this shift to higher-quality steels in automobiles could be the natural reluctance of consumers to pay increased "capital" costs even though it can be demonstrated that the operating costs are sufficiently lower to offset this higher initial outlay. Consumers can have a time horizon which may be less than the span required to recoup the extra cost.

This dichotomy facing the steel industry and its consumers of, on the one hand, the desire to use higher quality steels, and, on the other, to minimise costs, will lead in the future to a closer tailoring of the product material to the product use. The future challenge for the steel and supporting industries is to increase the qualities of the steels produced and to keep the costs of these steels highly competitive.

In the field of automotives, steel will undoubtedly face increased challenges from materials such as aluminium and polymers. The strength and cost of steel are major advantages, but these are offset by weight and corrosion. An interesting aspect of this competitive materials question for automotive bodies is the total energy consumption involved, both direct and indirect. This would include the energy requirements for operating an automobile or producing a component and, for example, the fossil fuels used in electricity and oxygen generation. In a recent study* for the steel industry which

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* Life Cycle Energy Requirements for Selected Sheet Materials Applicable to Manufacture of Automobile Components : Report to AISI, August 1979

focussed on the substitution of one material for another on a given sized automobile, it was concluded that, from a life-cycle energy requirement point of view over the lifetime of a car (165,000 km), no overall energy saving was made by using aluminium instead of steel components in the automobile. Although fuel economy can be achieved by operating a lighter car with aluminium components, the energy required to extract aluminium from bauxite and fabricate aluminium components is so much greater than a similar steel component that it takes the lifetime of the automobile just to reach an equivalent energy consumption for both types of material.

Because of the increasing importance of what might be called secondary steelmaking, IISI has embarked upon a programme to look at supply, and usage of non-ferrous raw materials in the steel industry. We have just completed a study on manganese*, and we have now commenced a study on chromium which should be completed sometime next year.

Some of the conclusions drawn in the recent manganese study are as follows :

- The primary factor which determines the level of manganese ferro-alloy additions to crude steel is the type of steel required, e.g. steel sheet has a low manganese content whereas structural and special steels have a higher content. Hence, changes in the product pattern of finished steel output could have an influence on specific manganese consumption. Industrialised countries have a higher share of flat products but this is unlikely to increase since the growth in demand for automobiles is waning; the lower specific manganese consumption in these products being offset to some extent by the increasing share of special steels production in these countries. Most of the growth of steel consumption and production is expected to occur in the developing countries and a proportionally greater share of this growth will be structural steels with a higher specific manganese consumption.

- Historically, the manganese ferro-alloy industry has grown up close to its major consumer, the steel industry; the major ferro-alloy producers were to be found in Europe, the United States and Japan. However, there has been a trend towards the ore producers increasing their production of manganese ferro-alloys, thereby improving the value-added of their product. This trend can be expected to continue in the future, especially among those ore-producing countries with adequate supplies of energy, for example, South Africa, Australia and Mexico.

  The industrialised countries' domestic manganese ferro-alloy production capacity is unlikely to grow in the future, but most are expected to maintain at least a core capacity for strategic, political and commercial reasons. It can be argued that the industrialised countries are strategically vulnerable in relying on manganese ore imports and would be no worse off relying totally on imports of manganese ferro-alloys, although this would not be logistically possible. However, there are, at present, several ore-producing countries with no ferro-alloy production capacity and for this reason alone it is worth maintaining capacity in the industrialised countries.

These comments on the location of ferro-alloy production capacity, although directed towards manganese, probably apply to several other types of ferro-alloys. It can also, of course, be argued that the gradual increase in the share of steel production capacity in the developing countries is a manifestation of the same process.

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* Manganese and the Iron and the Iron and Steel Industry, Brussels 1980

The future of the ferro-alloy industry is inextricably linked to that of the steel industry. It is increasingly important that we work together in harmony to face the demands from steel users and the challenges from competing materials. We must produce the quality of product required at a price that is both remunerative to our industries and competitive on the world market.

TABLE I

IISI MEMBERS' COUNTRIES (29)
STEEL PRODUCTION, First 8 months

million metric tons

	1980	1979	% change 1980/1979
EEC	89	92	– 3.3
USA	67	86	– 22.1
Japan	76	74	+ 2.7
Others	76	74	+ 2.7
Total	308	326	– 5.5

TABLE II

WESTERN WORLD STEEL PRODUCTION
Estimate for 1980, comparison with 1979

million metric tons

	1980	1979	% change 1980/1979
Industrialised countries	406	442	- 8.1
Developing countries	60	56	+ 7.1
Total	466	498	- 6.4

TABLE III

WESTERN WORLD APPARENT STEEL CONSUMPTION, Estimate for 1980, comparison with 1979

million metric tons

	1980	1979	% change 1980/1979
USA	116	143	-18.9
EEC	108	113	- 4.6
Japan	80	79	+ 1.3
Other industrialised countries	62	61	+ 1.6
Developing countries	96	93	+ 3.2
Total	462	489	- 5.5

TABLE IV

DEVELOPING COUNTRIES APPARENT STEEL CONSUMPTION, Estimate for 1980, comparison with 1979

million metric tons

	1980	1979	% change 1980/1979
Latin America	38	35	+ 8.6
Asia (except Japan, China and N.Korea)	36	35	+ 2.9
Middle East	13	14	− 7.1
Africa (except S.Africa)	9	9	—
Total	96	93	+ 3.2

TABLE V

WORLD APPARENT STEEL CONSUMPTION
Estimate for 1980, comparison with 1979

million metric tons

	1980	1979	% change 1980/1979
Western World	462	489	- 5.5
COMECON	213	213	—
China and N.Korea	48	49	- 2.0
Total World	723	751	- 3.7

TABLE VI

WORLD APPARENT STEEL CONSUMPTION
Forecast for 1981, comparison with 1980 estimate

million metric tons

	1981	1980	% change 1981/1980
Western World :			
Industrialised countries	371	366	+1.4
Developing countries	102	96	+6.3
Total	473	462	+2.4
COMECON	218	213	+2.3
China and N.Korea	48	48	—
Total World	739	723	+2.2

TABLE VII

INDUSTRIALISED COUNTRIES APPARENT STEEL CONSUMPTION, Forecast for 1981, comparison with 1980 estimate

million metric tons

	1981	1980	% change 1981/1980
EEC	103	108	- 4.6
Other Western Europe	34	34	—
USA	128	116	+10.3
Japan	77	80	- 3.8
Others	29	28	+ 3.6
Total	371	366	+ 1.4

WESTERN WORLD CRUDE STEEL CAPACITY

million metric tons

	1974	1985
Industrialised countries	500	550
Developing countries	35	100
Western World	535	650

CONTINUOUS CASTING SHARE IN CRUDE STEEL OUTPUT

percentages

	1973	1979
EEC	9.4	30.9
USA	6.8	16.7
Japan	20.7	52.0
Western World	11.9	32.5

TABLE X

SHARE OF SPECIAL STEELS IN CRUDE STEEL OUTPUT, USA and Japan

percentages

	1973	1979
USA	12.0	14.7
Japan	9.0	12.3

FIGURE 1

APPARENT STEEL CONSUMPTION INDEX BY REGION, 1973 = 100

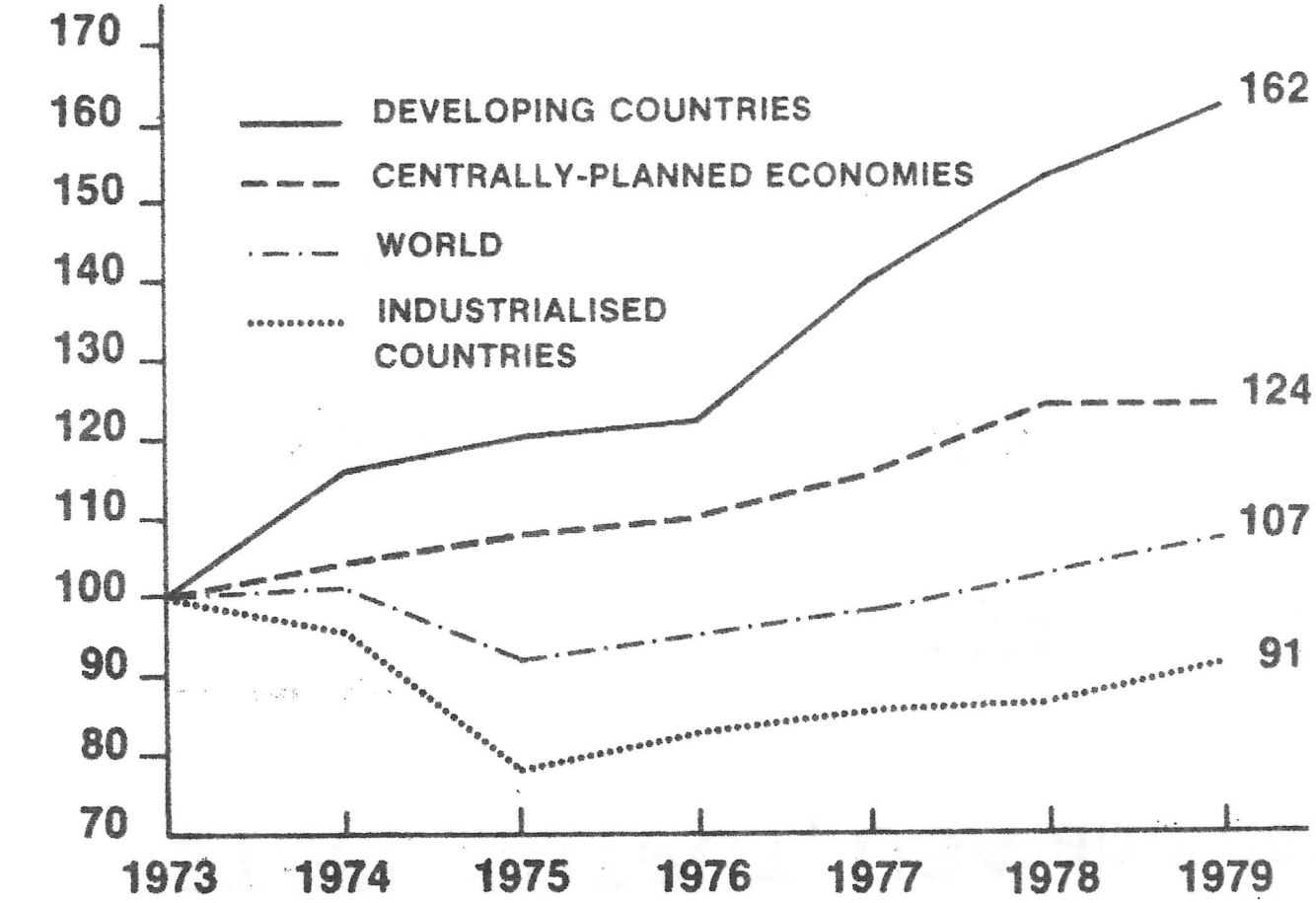


FIGURE 2

APPARENT STEEL CONSUMPTION
Industrialised countries' annual growth

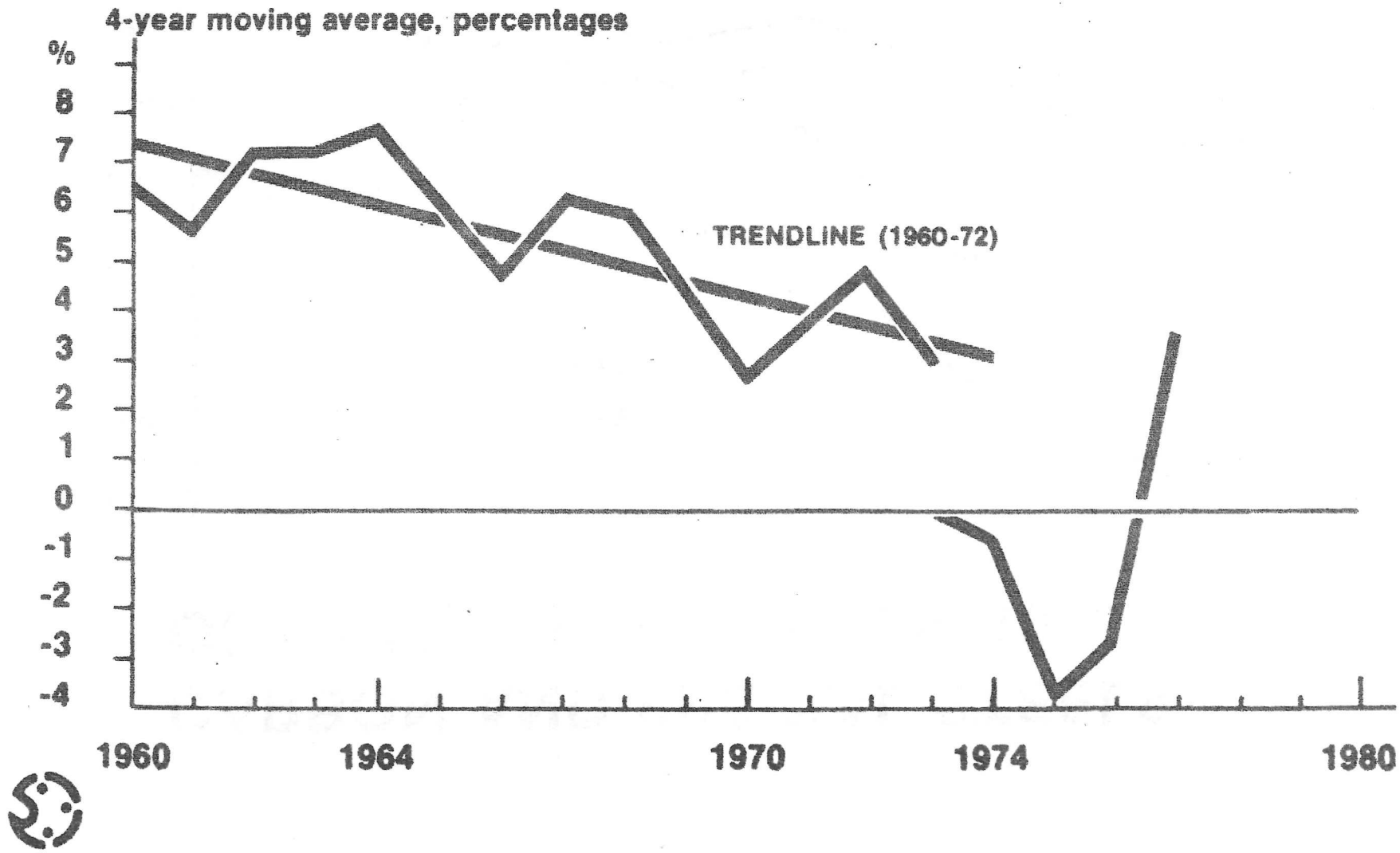
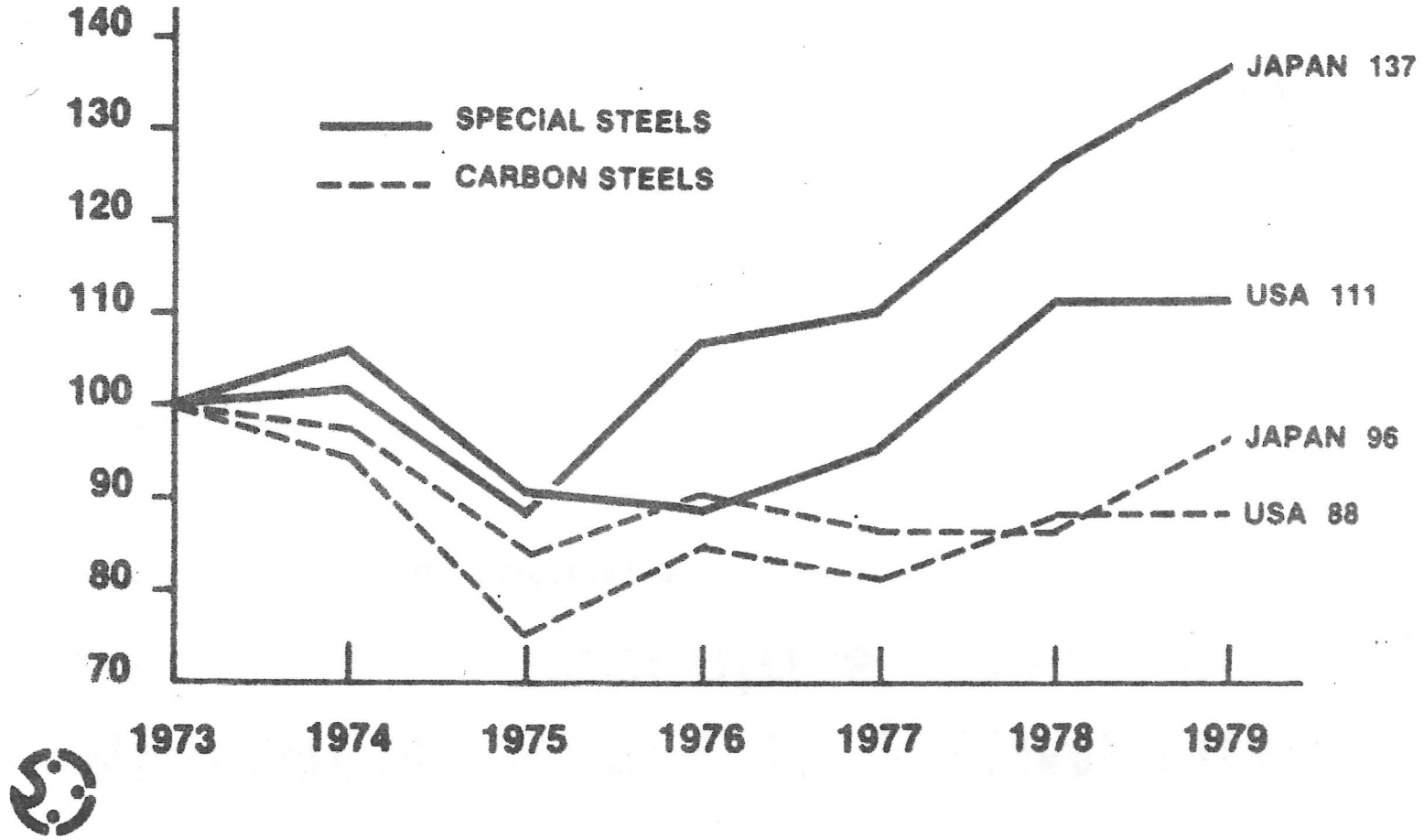


FIGURE 3

CARBON AND SPECIAL STEELS OUTPUT, USA and Japan, 1973=100



DISCUSSION

Mr. M. Jaujou*

Mr. Holschuh vient de nous dire que la demande d'acier devrait croître au minimum de 2 % par an jusqu'en 1990. D'une part, on constate que les investissements dans les mines de fer se sont considérablement ralentis depuis 1975. Ceci peut vouloir dire que, à partir de 1985 et probablement vers 1987, il y aura certaines tensions sur la demande de quelques qualités de minerai de fer. Alors, j'aimerais savoir s'il est d'accord avec cette opinion, première question. Deuxième question : Quelle influence cela aura-t-il sur les ferro-alliages et, peut-être - je ne suis pas spécialiste de la question - Quelle incidence cela aura-t-il sur le fer contenu dans certains ferro-alliages ?

Mr. L.J. Holschuh:

As to the first part of your question, we have reached the same conclusion that at some point in the mid 1980's it is likely that a strain on iron ore supplies will develop. Investment in new mines has been insufficient for the reasons that we all know and the participation of the steel industry in such investment has been hesitant because of limited funds, and you know how expensive it is to open a new mine. For these reasons we have also come to the same conclusion that we must expect some problems by the mid 1980's.

As to the second part of your question, I am afraid that I cannot answer it, although your Chairman seems to think that I have almost god-like omniscient capabilities. Your question is beyond my field of experience. I am not in a position to answer this, I am sorry.

Mr. R. Björklund**

May I ask you a question in connection with your answer to the question about the availability of ores. I think that in the last Metal Bulletin, which has appeared here during this Conference, there is a graph showing the steel trend. I just glanced at it, but there is one significant peak, which is very, very pronounced. I think that it appears in the mid 70's or 1974 and then it just goes all the way down. Now, in spite of the mood of the moment feelings, may I ask you: Do you see any possibilities that in a foreseeable future something like that will happen again and will end up in a shortage of steel?

Mr. L.J. Hoschuh:

If I understand your question right, you are wondering whether I would add yet another answer to the question "At what moment will there be a worldwide steel shortage?" I tried to deal with this question last week at our Annual Conference in Madrid. I do not like to speculate on this matter and those who do certainly have their own reasons, which often have little to do with the facts. I believe that such speculation on shortage or glut is highly dangerous. It can prevent necessary plant closures or lead to the building of capacities that will never be used or will become available too late. But I shall try to give some further comments on the graph in the Metal Bulletin to which your Chairman has referred. The graph is actually taken from my remarks in Madrid.

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If the development of steel consumption gets us back to the historical trend line (1960-79), the Western World would require a crude steel output of 500 million tons or so. As we are now expecting that by 1985 capacity will be of the order of 600 - 650 million tons, there is not likely to be a shortage. Only in the rather unlikely event that the extreme peak of 1973 and 1974 repeated itself, with steel consumption at 15 per cent above trend, would the Western World in 1985 require a crude steel production of 670 million tons, 20 million tons more than the maximum output we now foresee. I think you would agree with me that this is unfortunately very unlikely.