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SURVEY OF THE DEVELOPMENT OF
THE SPANISH STEEL INDUSTRY^{1/}

by

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SUMMARY

1. INTRODUCTION

Spain has traditionally been considered an agricultural country, with very little industrialization. This conclusion is easily reached through the examination of the magnitude of the steel figures. Steel production, and more precisely, total steel consumption and per person, has given unequivocal proof of this fact.

It was not until 1929 that Spain obtained an appreciable industrial expansion. However, after that year, production continuously slowed down again until the 1960's. From then on the country, once its industrial tendency was clearly defined, has experienced a spectacular development.

In this paper we will present an overall view of the development of the Spanish Steel Industry in the last 30 years, especially during the last 10 years, in which period a virtual explosion has occurred in its industrial development. After some superficial historical comments, we will describe the present status, background and characteristics of the principal integrated steel Companies in Spain, together with the general problems and future perspectives of the steel sector, that reaches a higher rank in the steel industry of the world every year.

2. DEVELOPMENT OF THE SPANISH STEEL INDUSTRY

For a better understanding of this development we will make separate comments on steel consumption, production, and finally the Foreign Market, which serves as the compensator of the other two items.

At this point we give a brief description of the most outstanding features of the growth experienced by the Spanish Steel Industry as follows: the creation of EMPRESA NACIONAL SIDERURGICA, S.A. (ENSIDESA), which was put into operation in 1957; the founding of UNION DE SIDERURGICAS ASTURIANAS, S.A. (UNINSA) in 1961; the establishment of the I PLAN DE DESARROLLO ECONOMICO Y SOCIAL for the period 1964-67; the approval of the PROGRAMA SIDERURGICO NACIONAL in 1964; and the signing of the Acci3n Concertada between the Spanish Government and the private companies of ALTOS HORNOS DE VIZCAYA, S.A. (1965) and UNINSA (1966).

The results obtained can only be described as spectacular. The steel production increased from 3.1 million tons in 1964 to over 9.5 million tons in 1972.

In 1971, after many years of a clearly defined tendency to importations, a balance between exports and imports of steel products was obtained. In 1972, a slight increase in exports is noted.

3. STRUCTURE OF THE SPANISH STEEL INDUSTRY

The steel companies associated with UNESID (Unión de Empresas y Entidades Siderúrgicas) are made up of some 205 plants.

Schematically, the steel industry's structure is very simple. There are three large integrated steel plants producing 98 % of the iron and, approximately, 65 % of total steel. On the other hand, there are a few more than 50 non-integrated steel plants - including 2 small integrated plants - which practically complete 100 % of the iron and steel.

We will describe briefly the background and development of the three existing large integrated steel plants (ALTOS HORNOS DE VIZCAYA, ENSIDESA, and UNINSA). The balance of the plants mentioned are "Mini-Plants" and Rerollers, and approximately 30 % of them are dedicated to the production of special steels.

Presently, as a base for their steel production, the three integrated steel plants have LD Shops (the only ones in Spain) complemented with Open Hearth and Electric Furnaces. The importance of the LD process is increasing every year. The production by this process accounted for approximately 53 % of the total steel production in 1972.

Second to LD steel in importance comes Electric Furnace steel. The Electric Furnaces are fundamental to the small- and medium-size plants. Their flexibility also makes them very useful to compensate for imbalances in larger plants.

In the future the percentage of LD steel will be larger due to production increases in the existing facilities, and especially, when the new LD Shop begins operation at Altos Hornos del Mediterráneo, where this process will be used exclusively.

4. POLICY OF THE STEEL INDUSTRY. -

On February 16, 1971, the Spanish Government, through the Minister of Industry's proposal to the Cortes Españolas, established the controlling regulations of the Steel Policy. The regulations can be summarized as follows:

- 1st - To produce a high percentage of the increasing steel demand.
- 2nd - To optimize the operation of the existing steelmaking facilities and also on those that are now in advanced stage of construction.
- 3rd - To promote the concentration of Companies, specially in the field of the Non-Integrated Steel Plants, so as to finally arrive at a total integration of ENSIDESA and UNINSA.
- 4th - To make future investments necessary for the development of production, with special emphasis to be placed on the following points:
 - To make available production facilities of sufficient size and at

an adequate competitive level

- To plan the Fourth Integrated Steel Plant with the main objective of producing steel at competitive prices on a profitable basis.
- 5th - Institute a pricing policy that will put prices on a par with those that exist in other countries.

5. CREATION OF ALTOS HORNOS DEL MEDITERRANEO, S.A.

The Programa Siderúrgico Nacional, as revised in June 1971, predicted steel consumption in the order of 13 and 18 million tons in 1975 and 1980, respectively. The present production capacity of the Spanish steel industry is about 10-11 million tons. It is obvious, therefore, that if the new facilities are not installed, the imbalance between production and consumption is going to increase in the next few years.

In June, 1971, the Government decided it would be advisable and opportune to construct a Fourth Integrated Steel Plant at Sagunto in Valencia, having a production capacity of 6 million tons per year. A request for competitive bidding for construction and operation from the private sector of industry for the new Plant was approved and published by the Government Decree of July 1971.

Fundamentally, the new Integrated Steel Plant will fabricate flat products including hot-and cold-rolled coils, sheets, as well as coated products, as was established by the conditions of the Decree.

Through the initiative of ALTOS HORNOS DE VIZCAYA, S.A., the first private steel enterprise in the country and owner of an integrated steel plant at Sagunto, the company ALTOS HORNOS DEL MEDITERRANEO, S.A. was formed in 1971. The Spanish Government awarded ALTOS HORNOS DEL MEDITERRANEO the concession to construct and operate the Fourth Integrated Steel Plant.

The project submitted by ALTOS HORNOS DEL MEDITERRANEO, in accordance with the bidding conditions established by the Government, consists of three phases. The facilities will be placed in operation on a phase by phase basis until the plant reaches its full planned production of 6 million tons of raw steel per year, which will be transformed into flat products.

6. FINAL CONSIDERATIONS AND FUTURE PROSPECTS

After examination of the aforementioned data, plus special contemplation of the Spanish Steel Industry in 1980, the following observations can be made:

- In the last 12 years, the development of the Spanish Steel Industry has experienced a spectacular increase, multiplying its steel production by 5 times in that period. In 1972 an output of 9.5 million tons was attained.

In the next 10 years, it would not be hazardous to expect to surpass the figure of 20 million tons of steel. This prediction is made in light of the fact that the country's economy is now undergoing full development, with a constant increase in the Gross National Product together with a well defined Steel Policy, notwithstanding the fact that steel consumption per person continues to be comparatively low (276 kgs. of steel per person in 1972).

Spanish Steel Industry occupies the 13th position in the steel industry of the world. In 1972, according to IISI's provisional data, Spain registered the largest increase in steel production, with a rise of 18.6 %, while the world production index showed an increase of 8 %.

The starting up of ALTOS HORNOS DEL MEDITERRANEO's Phase I in Sagunto at the end of 1975, and the termination of Phase III in the first years of the 1980-1990 decade, will make it an Integrated Steel Plant comparable in size to other large plants in the world, with an annual steel production of 6 million tons in a single plant.

It is possible that, before 1980, the formation of the two following important groups will take place:

The ALTOS HORNOS DE VIZCAYA-ALTOS HORNOS DEL MEDITERRANEO Group, with an approximate combined ultimate steel capacity of 9 million tons. The corporate capital would be entirely private.

The ENSIDESA-UNINSA Group, with a combined production capacity of about 7 million tons of steel. The Government would hold a major participation in its corporate capital.

The Spanish Integrated Steel Industry is experiencing, and will continue to experience, a deficit in raw materials, which makes it necessary to import coking coal, iron ore, pellets, and scrap.

The finished products have already reached excellent quality, at competitive costs comparable to those existing in the world markets. In 1972, shipments of steel products to Western and Eastern European Countries, as well as to America, have reached a total of 1.85 million tons. All this is very favourable when the possible integration into the European Common Market is considered.

The present productivity in the Basic Steel Industry is 140 tons of steel per person and slightly higher in the Integrated Steel Plants (about 175 tons per person). The culmination of AHM's Phase III will permit us to amply surpass estimates of a future production of 500 tons per person, and the great technical progress in the existing Integrated Plants should allow us to count on a domestic index of national productivity at an international level.

- **ALTOS HORNOS DEL MEDITERRANEO** constitutes a typical example of international enterprise, with a direct participation of the American steel-making industry by **UNITED STATES STEEL CORP.** amounting to 15 % of its corporate capital.
Since 1964, the aforementioned American corporation has had a 25 % share in **Altos Hornos de Vizcaya's** corporate capital.
 - Total investment programed for **AHM's** three phases will reach a figure of **2,000 million dollars**, at 1973 prices. This is considered the largest industrial investment ever undertaken in Spain.
 - The development of the Spanish Steel Industry has given full employment to a combined total of **80,000 workers** in 1972. At present the average income per capita is **1,300 dollars**, while a prudent and conservative estimate for 1980 indicates an income that may exceed **2,000 dollars per person**.
 - To fulfil these forecasts, the Spanish Steel Industry, better structured, will permit the attainment of an adequate balance, and will without doubt, support the harmonious development of the whole industry of the country.
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1. INTRODUCTION

Spain has traditionally been considered an agricultural country, with very little industrialization. This conclusion is easily reached through the examination of the magnitude of the steel figures. Steel production and, more precisely, total steel consumption and per person has given unequivocal proof of this fact.

It was not until 1929 that Spain obtained an appreciable industrial expansion. However, after that year, production continuously slowed down again until the 1960's. From then on the country, once its industrial tendency was clearly defined, has experienced a spectacular development.

In the following commentary, we will try to show an overall look at this development, from the point of view of the steel industry exclusively. After some superficial historical comments, we will describe in some detail the present status, background and characteristics of the principal integrated steel Companies in Spain, together with the general problems and future perspectives of the steel sector, that reaches a higher rank in the steel industry of the world every year.

2. DEVELOPMENT OF THE SPANISH STEEL INDUSTRY

In its origin, the existence of the steel industry in Spain was the result of the availability of iron ore resources, which have been well-known since time immemorial. In the first years of our era, the Roman Pliny the Elder wrote about Vizcaya's iron ore, stating that its mines were the richest in the world at that time.

Although the history of the Spanish steel industry goes back a very long time, this paper deals only with its development in the last 30 years, giving special emphasis to the last decade, which has been the key to the Spanish industrial development. And later on we will discuss prior aspects of the situation, using 1929 as a reference.

For a better understanding of this development, we will divide our comments on this subject in three parts: Steel Consumption, Production and, finally, the Foreign Market, which serves as a regulator of the other two aforementioned aspects.

2.1. STEEL CONSUMPTION

As a consequence of the lack of industrialization of the Country, steel consumption per person in Spain has been at a standstill for many years, having one of the lowest rates in comparison with other countries. In 1950, consumption reached 30 Kgs. per person, and even in 1960, with an index of 55 Kgs. per person, we continued to occupy one of the last positions among the

PRODUCTION AND CONSUMPTION OF STEEL

(in thousand tons)

Years	Production	Stock Variation in Plants	Waste Exports	Domestic Steel Consumed	Local Exports	Available Stock and Others	Steel Consumption	
							Total	Lbs. per person
1929	1.022	11		1.011	87	5	1.103	47
1943	676	3	24	649	6	15	670	25
1944	657	3	27	633	6	15	654	24
1945	576	8	28	586	2	15	574	21
1946	641	9	6	626	7	15	648	24
1947	608	1	8	601	25	20	644	23
1948	624	5	3	616	23	20	659	24
1949	720	19	-	701	35	20	755	27
1950	815	33	5	777	31	23	831	29
1951	818	30	5	783	36	25	844	30
1952	904	9	6	889	47	30	956	34
1953	897	32	-	920	95	30	1.054	36
1954	1.100	63	-	1.037	160	32	1.229	42
1955	1.213	12	-	1.201	235	32	1.468	50
1956	1.242	3	-	1.246	342	38	1.526	52
1957	1.316	56	-	1.402	294	30	1.726	58
1958	1.560	90	-	1.470	258	42	1.770	69
1959	1.823	319	20	1.484	282	44	1.790	59
1960	1.919	31	493	1.395	240	42	1.677	55
1961	2.339	148	267	2.220	230	58	2.508	83
1962	2.311	137	76	2.098	725	40	2.863	92
1963	2.765	70	119	2.576	913	60	3.559	114
1964	3.150	61	102	3.109	1.213	65	4.387	139
1965	3.515	417	12	3.086	2.799	62	5.947	187
1966	3.847	34	42	3.771	2.259	120	6.144	195
1967	4.512	253	53	4.206	1.734	120	6.060	188
1968	5.083	361	139	5.308	1.379	143	6.827	210
1969	5.982	250	200	6.032	2.397	144	8.513	259
1970	7.394	-1.210	330	5.854	2.835	155	8.544	258
1971	8.025	335	1.186	7.504	1.158	200	7.862	230
1972	9.516	8	1.652	7.672	1.528	300	9.500	276

European countries in comparison with the highest world consumers that, in many cases, reached a figure 9 to 10 times higher than our own.

In the last decade there has been a spectacular increase in this field and in other economic aspects as well, as a consequence of the country's general economic evolution. In only 10 years (1960-1969) the consumption index has increased almost 5 times. In spite of recessions in 1970 and 1971 there has been a steady increase to a point that in 1972 a consumption of 276 Kgs. per person was reached, which is still a very low figure comparatively speaking.

Table 1 shows the development of the total steel consumption in Spain during the last 30 years, taking as a reference the 1929 figure which was a landmark in the history of the Spanish steel industry.

The 30 year period can be defined in three clearly distinct stages as shown in the following decades:

- 1st (Years 1940-1950). - This was a stationary period in which consumption was maintained at a constant level with only slight variations between 600,000 and 800,000 tons/year.
- 2nd (Years 1950-1960). - Stage of moderate increase, in which consumption was doubled.
- 3rd (Years 1960-1970). - Its main feature is a spectacular growth. From a consumption of 1.7 million tons in 1960 we increased to 8.8 million in 1970 (9.8 million in 1972). As in the countries of higher development, this increase has been particularly significant in the flat rolled products consumption, which in 30 years has gone from 30 % of the total steel consumption to the present 50 %. This has been mainly due to the development of the shipbuilding, automobile and domestic appliance industries.

The evolution of steel consumption, as forecasted by the FICUSA-MA SIDERURGICO NACIONAL, and revised in 1971, is shown in Table 2.

TABLE I
TOTAL CONSUMPTION OF STEEL

Years	(in thousand of tons)		
	Basic Steel	Special Steel	Total Steel
1972	9,480	770	10,250
1973	10,270	830	11,100
1974	11,100	900	12,000
1975	11,930	970	12,900
1976	12,860	1,040	13,900
1977	13,785	1,115	14,900
1978	14,710	1,190	15,900
1979	15,680	1,270	16,950
1980	16,650	1,350	18,000

3.2. STEEL PRODUCTION

Steel production in Spain has always followed, though with some delay, the path set by consumption, so that sporadic exports cannot be considered as significant within the whole of the steel activity.

Every country that aspires to a high degree of industrialisation must promote and expand its own steel enterprises as a base for the development of the transforming industry such as automobiles, appliances, etc., etc. This plan, except for a few exceptions, has been followed by a large number of countries as well as Spain. Because of the particular structure of its trade balance, Spain cannot afford to depend on imports in order to improve its development.

Basically, the Spanish steel industry has always been unable to meet its domestic demands. Historically, imports have amply surpassed exports, except for a few chance exceptions. Even though we are trying here to analyse the industrial development in the last 30 years, we will give a few comments on previous years, starting from the beginning of the century to make it easier to comprehend exactly the events that followed.

In 1880 the Spanish steel production amounted to 187,000 tons. From then on the figures increased slowly, but always within moderate levels. It was not until 1934 that a production of 500,000 tons was exceeded.

However, the following years are characterized by a great development of the country's economy in general, and the steel industry

in particular. In 1929 production reached over 1,000,000 tons, which was practically enough to meet domestic consumption demands (92 %). In 1930 this production almost reached a million tons, but from 1931 onward production fell steadily, especially in 1936 and 1937, as the result of Spanish Civil War. In the following years the production was maintained within a changing level, ranging between 500,000 and 800,000 tons.

It was not until 1954 -exactly 25 years later- that we were able to surpass the 1929 record production of over 1,000,000 tons.

In Table 1 and Figure 1, the different phases of the Spanish steel production can be clearly seen

In 1941 the Spanish Government created the Instituto Nacional de Industria for promoting and financing the country's economy as well as the creation and development of a National Industry. However, steel production could not continue at a sustained rate due to the condition of existing old steelmaking facilities. This situation resulted from the fact that it was practically impossible, in those years, to import foreign equipment and spare parts that were needed for steel production as well as necessary raw materials of which there was shortage in Spain.

Beginning with 1949, our foreign trade was gradually reopened on a limited basis. The recovery of the Spanish industry was initiated slowly at the beginning because of the aforementioned difficulties and progressed more rapidly as time passed.

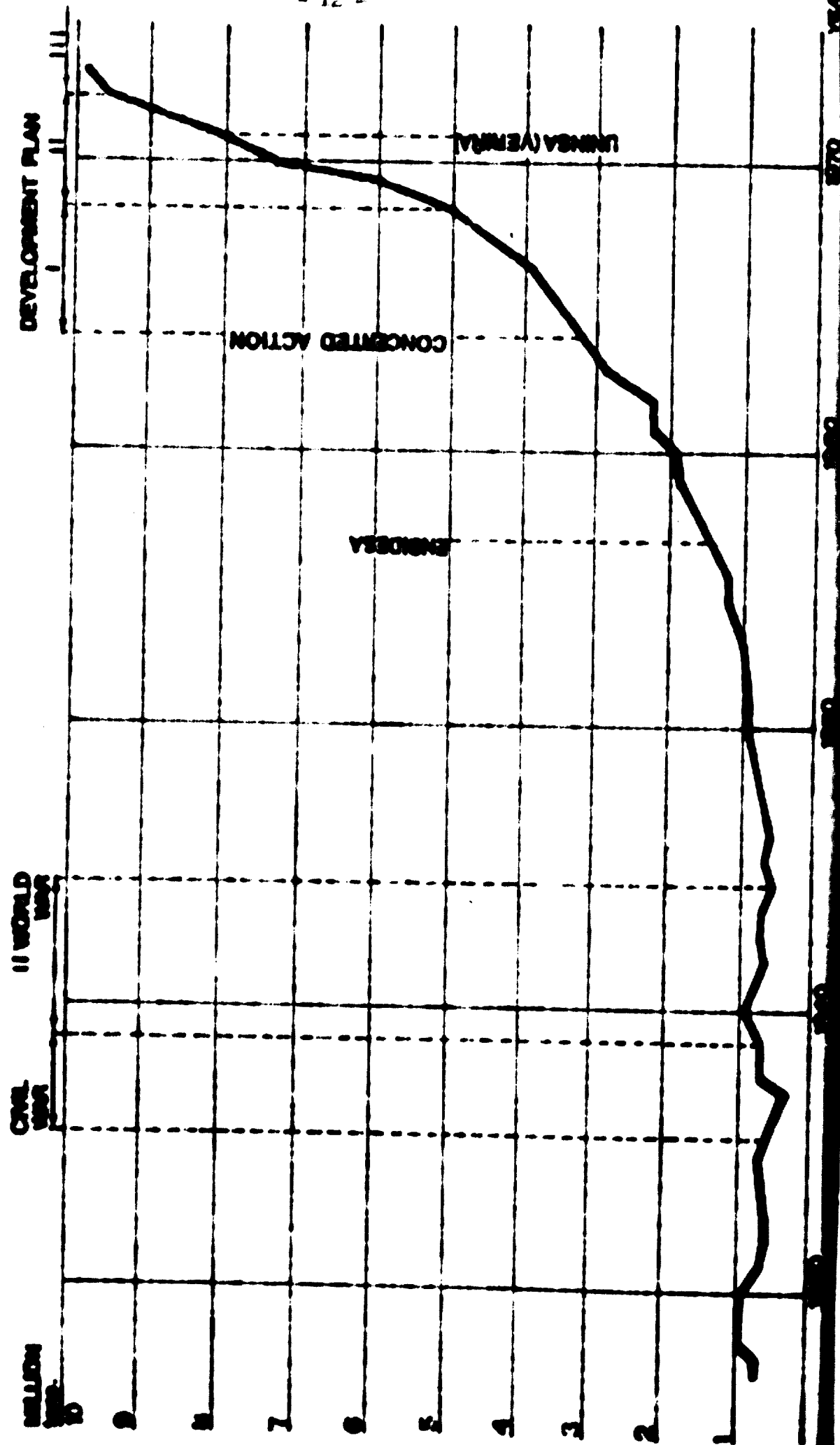
In 1950, the scarcity of steel products and the economic circumstances through which the country was going, made it necessary for the Instituto Nacional de Industria to create Empresa Nacional Siderurgica, S.A. (ENSIDESA) which began construction of a new integrated steel mill in Avilés (Asturias). This plant began operations in 1957. Throughout the decade 1950-1959 and during the first years of the following decade, the steel companies made substantial new investments which permitted them again to reach a production of over a million tons of steel in 1964, and to exceed 2 million tons in 1964.

As a consequence of the extraordinary development of the Spanish economy, especially after 1960, the Government considered it necessary to establish a coordinated program of support to the private steel industry. This program facilitated the achievement of the very important expansion that was required in production capacity.

This new program assumed its place among all the other existing regulatory laws, of which the I Plan de Desarrollo Económico y

DEVELOPMENT OF THE STEEL PRODUCTION

Figure 2



Social (Social and Economic Development Plan I), the Acción Concertada (Concerted Action) and the Programa Siderúrgico Nacional (National Iron and Steel Program) are most outstanding.

In December 1963, the I Plan de Desarrollo for 1964-1967 was approved which covered the whole panorama of activity in the Country. This program, with its sector studies, set forth the rules of participation in the Acción Concertada as a means of accomplishing the general objectives of the I Plan de Desarrollo.

In 1964 the Government established the basis for the Acción Concertada for the Steel Sector. Basically, the Acción Concertada consists of an agreement between private Companies and the Spanish Government. Through this agreement, the private companies undertake to achieve productive, economic and social goals in exchange for a series of credit and official fiscal advantages among other things.

In the same year, 1964, the Programa Siderúrgico Nacional for 1964-1972 was approved. This program is fundamental to the harmonious and coordinated development of the steel sector as well as to the establishment of the promised productions in those industries that are affected by the Acción Concertada.

Of the three most important integrated steel companies existing in Spain, ALTOS HORNOS DE VIZCAYA signed the first "Acta de Concierto" on March 22, 1965. A year later (March 18, 1966) UNINSA also signed the agreement, while ENSIDESA, being a nationalized industry, was automatically bound to all the programs of the Development Plan. Subsequently, a great number of steel enterprises of less importance compared with the three already mentioned, was gradually incorporated into the same program.

The results that were obtained can only be defined as spectacular. Production of steel rose from 3.1 million tons in 1964, to over 9.3 million tons in 1972. We must also take into account the fact that some of these facilities will not reach their optimum utilization until 1976.

The increase attained in the last eight years has been reached as a result of the joint contribution of the three Integrated Enterprises and the Non-Integrated Steel Plants. Both groups have increased their steel production threefold.

Of course, categorically speaking, the Integral Steelmaking influence has been more evident, having gone from 3.1 million tons of steel produced in 1964, to a total production of 6.3 million tons achieved in 1972. This resulted mainly from the success of the LD Shops constructed under the program of the Acción Concertada.

2.3. FOREIGN MARKET

It can be seen from the different production figures and consumption rates already mentioned, that in general terms there has been a constant deficit in steel, with the exception of a few insignificant cases. The foreign market has served as a regulator agent between production and consumption levels.

Following the overall trend indicated for steel consumption over the last few years, there has been a tendency to import flat products (hot and cold-rolled as well as coated products) and semi-finished, necessary to furnish, at times of imbalance, the needs of the producer of flat products who have been gradually placing new facilities in operation.

It is important to note that there has been a constant increase in the export of steel products since 1968.

In 1971 the export-import curve changed its course, and a balance was achieved for the first time. In 1972 the exports of Spanish steel products, supported by the strong increase in production, clearly surpassed the imports (1.86 million tons against 1.53 million tons). This fact is expected to be repeated again in 1973.

The Foreign Market serving once again as the compensator between actual needs and availability.

3. STRUCTURE OF THE SPANISH STEEL INDUSTRY

3.1. STEEL COMPANIES

The total number of Companies that have developed their activity in the steel sector has grown at present to around 250. A great part of these are rerollers whose production has a very small influence on total production.

The steel companies associated with UNESID (Unión de Empresas y Entidades Siderúrgicas) are made up of some 205 plants. Their production represents a 100 % of the hot metal production and more than 98 % of the steel and rolled products made in Spain.

Schematically, the steel industry's structure is very simple. There are three large integrated steel plants producing 98 % of the iron and, approximately, 65 % of total steel. On the other hand, there are a few more than 50 non-integrated steel plants—including 2 small integrated plants—which practically complete 100 % of the iron and steel production.

LOCATION OF THE INTEGRATED STEEL PLANTS IN SPAIN

ENSIDESA UNINSA
AVILES GIJON BILBAO

AHV

AHM

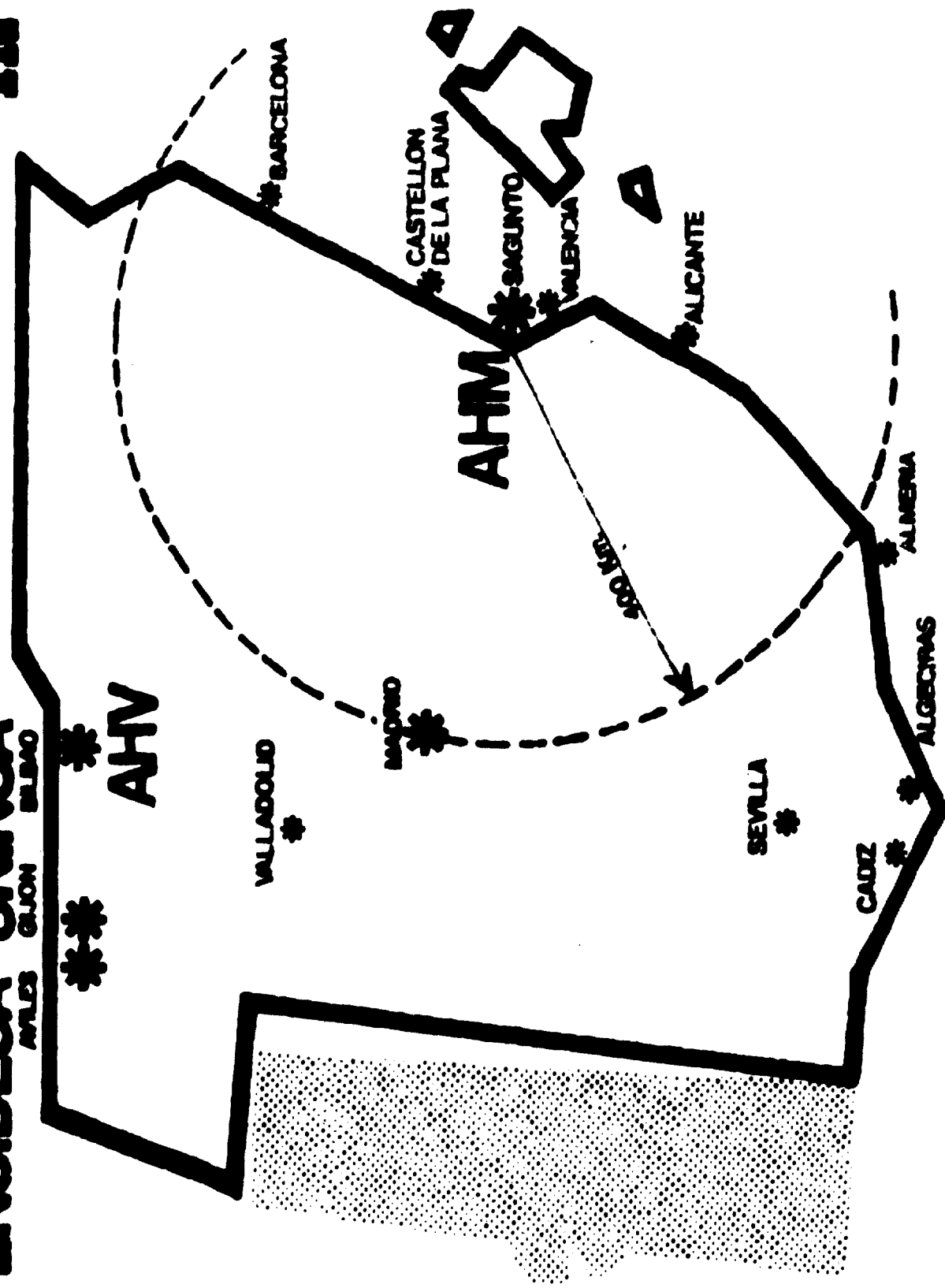


Figure 2

In the following paragraphs we will describe briefly the background and development of the three existing large integrated steel plants (ALTOS HORNOS DE VIZCAYA, ENSIDESA and UNINSA). The balance of the plants mentioned are "Mini-Plants" and Re-rollers, and approximately 30 % of them are dedicated to the production of special steels.

3.1.1. ALTOS HORNOS DE VIZCAYA, S.A. (AHV)

This is the oldest Spanish integrated steel plant. It was created in 1902 by the merger of "Altos Hornos y Fábricas de Hierro y Acero de Bilbao", "Sdad Anna, de Metalurgia y Construcciones Vizcaya" and "Cfa. Anna, Iberia", all of which combined their installations, steelmaking equipment and mining properties.

Following its founding, AHV has been gradually increasing its production capacity, and in 1940 absorbed "Cfa. Siderúrgica del Mediterráneo" at Sagunto.

Its corporate capital is completely private, and beginning 1964, U.S. STEEL CORPORATION participated in the Company with a percentage of 25 %.

In 1964 AHV, within the program of the Acción Concertada, began to carry out a complete plant equipment replacement and modernization program. As a result of this, a production capacity of 2.2 million tons of crude steel per year has been reached.

In 1969 AHV absorbed S.A. BASCONIA.

AHV has plants located in the province of Vizcaya (Baracaldo, Sestao and Echévarri), and in the province of Valencia (Sagunto). The Baracaldo-Sestao and Sagunto plants are integrated. These two plants start with raw materials which are processed into the hot rolled product. The Echévarri plant is exclusively dedicated to the production of cold rolled and coated products.

In addition to the excellent rail and road communications between all these plants, the two integrated plants have their water port with own docks for receiving raw materials and shipping finished products.

The range of products includes rods, structural shapes, rails, heavy plate, hot-rolled strip (coils and plates), cold rolled strip (coils and plates) and coated products (tin-plate and galvanized).

At present, the expansion of the Hot Strip Mill's capacity is being carried out. When this expansion is complete, there will be a transitory deficit of steel and slabs. In the next few years,

we will again be in balance after the installation of a projected new steelmaking shop and continuous caster for slabs.

In 1971 ALTOS HORNOS DE VIZCAYA occupied the fourth place in volume of sales among Spanish companies. The most modern techniques are used in all fields, and at the same time its traditional creative and progressive spirit has been maintained. AHV's latest endeavour is the creation of ALTOS HORNOS DEL MEDITERRANEO, whose background and project plan will be explained in Item 5.

3.1.2. EMPRESA NACIONAL SIDERURGICA, S.A. (ENSIDESA)

This enterprise was created on June 15, 1950, by the Instituto Nacional de Industria (INI), through decree of the Presidency of the Government. INI activities include both construction and operation of its steelmaking facilities.

On July 28 of the same year, it was constituted as a stock company with INI as the major participant. At present, INI's share in ENSIDESA's corporate capital is 91 %. All its installations are located in Avilés (Asturias).

From the starting up of the first facilities in 1957, its output has been increasing steadily, thereby making a great contribution in the effort to meet the increasing domestic demand for steel. Production capacity at present is 3.5 million tons of crude steel per year.

This plant has an excellent layout, including its own sea port in Avilés. In addition, its nearness to Gijón's port (Musel) amplifies considerably its maritime communications capabilities.

Its range of finished products includes structural shapes, rails, heavy plate, hot rolled strip (coils and plates), cold rolled products (coils and plates) as well as coated products (tinplate and galvanized).

ENSIDESA was the largest Spanish producer of steel (2.8 million tons) in 1972. The Avilés Plant, however, has not yet reached the limit of its producing capacities.

In relation to the rest of Europe, ENSIDESA's safety indexes are extraordinarily good and comparable to those obtained in the United States.

3.1.3. UNION DE SIDERURGICAS ASTURIANAS, S.A. (UNINSA)

This Company was created in May, 1961, through merging of three Asturian companies: Fábrica de Hierros, S.A., Sdad. Indus-

trial Asturiana Santa Bárbara, S.A., and Sdad Metalúrgica Duro-Felguera, S.A., to facilitate the construction and operation of a merchant mill on a joint or common basis.

In 1966, UNINSA joint with the Acción Concertada's program for the purpose of constructing and operating an integrated steel plant. The steelmaking properties owned by the three founding plants were incorporated under UNINSA in the same year.

In 1970, INI acquired a major participation that presently represents 68 % of UNINSA's corporate capital.

In 1967, construction of the new integrated steel plant at Verina (Gijón) was initiated. During the construction period the facilities that were operating in 1966 were maintained in production. The first newly constructed facilities began operating in 1971. Since that year, the assembly of the plant has been completed and at present has a production capacity of 2.5 to 3 million tons of crude steel per year.

UNINSA's favourable location in an open plain, near the port of Gijón (Musel) is an outstanding feature of the plant. The proximity to the port facilitates the receipt of raw materials as well as the shipment of the finished products. At the same time, the characteristics and extension of available land have permitted, at a minimum cost in its preparation, a reasonable and spacious plant layout.

Verina's facilities have been planned for the use of the most advanced steelmaking technology. Its range of hot rolled products is composed of commercial shapes, structurals and heavy plate.

At present, UNINSA supplements Verina's production with that attained at its own old steelmaking facilities which are still in operation. The old facilities will be shutdown as soon as the new ones reach their normal production capacity. Some of the new units have recently begun operations and others are still under construction.

3.2. PROCESSES AND PRODUCTS

By the middle of the 1950's basic facilities in operation were practically the same as in 1929, except for a gradual increase in the number of Electric Furnaces.

With the creation of ENSIDESA, the first blast furnaces of modern design were installed in Spain. In the following years the three integrated steel plants have been adopting the most modern techniques and improving the characteristics of their hot metal production facilities.

In the field of the steelmaking, ALTOS HORNOS DE VIZCAYA was one of the world pioneers in the adoption of the L.D process. In 1963 the first

converters began their operations. In 1969 the Bessemer steel shop that was installed in 1885 was shutdown. The shop was unique in Spain, and one of the few existing in the world at that time.

Presently, as a base for their steel production, the three integrated steel plants have LD Shops (the only ones in Spain) complemented with Open Hearth and Electric Furnaces. The importance of the LD process is increasing every year. The production by this process accounted for approximately 53 % of the total steel production in 1972 (See Table 3).

Second to LD steel in importance comes the Electric Furnace steel. The Electric Furnaces are fundamental to the small and medium size plants. Their flexibility also makes them very useful to compensate for imbalances in larger plants.

In the future the percentage of LD steel will be larger due to production increases in the existing facilities, and especially, when the new LD Shop begins operation at Altos Hornos del Mediterráneo where this process will be used exclusively. It is estimated that in the next decade the LD production will represent 75 % of total steel.

Since 1965 the usage of the continuous casting system has been most frequently chosen for the manufacture of semi-finished products. At present, some twenty companies have installed this type of facility. Most of the installations are in small and medium size plants where production is based on the following scheme: Electric Furnace - Continuous Casting of Billets - Rolling of Light Structural and Rods.

ENSIDESA has the largest casting facility with a yearly capacity of 1,000,000 tons of billets. There is a decided growth tendency in this field. The production scheme of Altos Hornos del Mediterráneo will also be based on Continuous Casting for the production of slabs.

Due to the present trend of increased consumption of hot and cold rolled flat products, new facilities as well as new companies are being created for the manufacture and distribution of this type of products.

AHV was the first steel industry to install a Semi-Continuous Hot Strip Mill which began operation in 1966. In 1971, a facility of this type was put into operation by ENSIDESA, which was the second of its kind in Spain. Altos Hornos del Mediterráneo will also install a Hot Strip Mill.

Altos Hornos de Vizcaya initiated the Cold Strip Rolling in 1960, having collaborated with S.A. HASCANIA in the construction of a Cold Mill at Echévarri.

At the present time there are 9 steel Companies with Cold Rolling Facilities, and some 12 more that produce skelp. There are two Spanish plants producing electrolytic tinplate, and three galvanized sheet producers.

Table 3

SPEED PRODUCTION IN SPAIN

DISTRIBUTION BY PROCESSES

Year	Production (in thousand tons.)					Percentage				
	Open hearth	Electric	L.D.	Total	Open H.	Electric	L.D.	Total		
1929	260.0	711.7	50.0	1 021.7	25.5	69.7	4.8	100.0		
1943	173.0	450.0	53.0	676.0	25.6	66.6	7.8	100.0		
1944	170.0	440.0	47.0	657.0	26.0	66.9	7.1	100.0		
1945	149.0	387.0	40.0	576.0	25.8	67.2	7.0	100.0		
1946	165.0	425.0	51.0	641.0	25.7	66.3	8.0	100.0		
1947	156.0	403.0	49.0	608.0	25.7	66.3	8.0	100.0		
1948	138.0	433.0	53.0	624.0	22.1	69.4	8.5	100.0		
1949	148.0	514.0	57.0	720.0	20.7	71.4	7.9	100.0		
1950	187.0	540.0	88.0	815.0	22.9	66.3	10.8	100.0		
1951	170.0	548.0	100.0	818.0	20.9	67.0	12.2	100.0		
1952	197.0	597.0	110.0	904.0	21.8	68.0	12.2	100.0		
1953	179.0	573.0	145.0	897.0	20.0	64.0	16.0	100.0		
1954	237.0	690.0	173.0	1 100.0	21.6	62.7	15.7	100.0		
1955	242.0	769.0	202.0	1 213.0	20.0	63.4	16.6	100.0		
1956	222.0	769.0	252.0	1 243.0	17.9	61.9	20.2	100.0		
1957	282.0	787.0	327.0	1 396.0	17.2	58.4	24.4	100.0		
1958	227.0	956.0	377.0	1 560.0	14.5	61.3	24.2	100.0		
1959	244.0	1 217.0	362.0	1 823.0	13.3	66.7	20.0	100.0		
1960	266.0	1 383.0	270.0	1 919.0	13.9	72.1	14.0	100.0		
1961	270.0	1 671.0	398.0	2 339.0	11.6	71.4	17.0	100.0		
1962	258.0	1 605.0	448.0	2 311.0	11.2	69.5	19.3	100.0		
1963	228.0	1 716.0	720.0	2 765.0	8.2	62.1	26.0	3.7	100.0	
1964	188.0	1 790.0	837.0	3 815.0	6.0	56.8	26.6	10.6	100.0	
1965	232.0	1 610.0	1 082.0	3 515.0	6.6	51.5	30.2	11.7	100.0	
1966	222.0	1 762.0	1 306.0	3 647.0	5.8	45.8	33.9	14.5	100.0	
1967	171.0	1 892.0	1 554.0	3 895.0	4.5	41.9	34.5	19.8	100.0	
1968	133.0	1 879.0	1 815.0	4 827.0	2.8	37.0	35.7	24.7	100.0	
1969	11.0	1 886.0	2 177.0	5 084.0	0.2	31.5	36.4	31.9	100.0	
1970	-	1 951.0	2 605.0	4 556.0	-	26.4	35.2	38.4	100.0	
1971	-	1 664.0	2 881.0	4 545.0	-	20.7	35.9	43.4	100.0	
1972	-	1 351.0	3 112.0	4 463.0	-	14.2	32.7	53.1	100.0	

(Source: "Estadísticas siderúrgicas" - INESID - February 1972)

Fundamentally, ALTOS HORNOS DEL MEDITERRANEO was created to supply flat rolled products, and production equipment for this purpose will be installed.

3.3. EMPLOYMENT

General manning structure of Basic Steel Industry has followed a clearly defined trend in the last few years that has seen an increase in the number of technical personnel, as well as in maintenance and service personnel. At the same time a reduction in the process personnel has been made as a result of modernization and automation of facilities.

A total of 80,000 workers has been attained in the general steel sector, and some 68,000 in the Basic Steel Industry.

Yearly productivity expressed in steel produced per employee has steadily increased, having reached a value of 140 tons in 1972 in the basic steel industry, while the figure for the Integrated Plants was 175 tons. It is expected that this favorable development will continue in the future.

No substantial variation in the volume of hand labor is foreseen in this Sector. The programmed increases in production, due to the starting up of new facilities, will probably not require the creation of new jobs except for ALTOS HORNOS DEL MEDITERRANEO, which will require about 2,000 employees in 1975.

POLICY OF THE STEEL INDUSTRY

On February 16, 1971, the Spanish Government, through the Minister of Industry's proposal to the Cortes Españolas, established the controlling regulations of the Steel Policy. These regulations have been confirmed orally and in writing on many other occasions. The regulations can be summarised as follows:

- 1st - To produce a high percentage of the increasing steel demand but by no means trying to achieve total self-sufficiency.
- 2nd - To optimise the operation of the existing steelmaking facilities and also of those that are now in advanced stage of construction so as to obtain:
 - The maximum advantage of investments already made as well as those that were made as a consequence of those aforementioned.
 - A systematic reduction in production cost.
- 3rd - To promote the concentration of Companies, specially in the field of the Non-integrated Steel Plants, so as to finally arrive at a total integration of ENXIDEMA and UNINSA.
- 4th - To make future investments necessary for the development of production, with special emphasis to be placed on the following points:
 - To make available production facilities of sufficient size and at an adequate competitive level.

- To train technical personnel, so as to improve their knowledge, and to develop a national engineering group to serve the steel industry.
- To plan a Fourth Integrated Steel Plant with the main objective of producing steel at competitive prices on a profitable basis.

9. - Institute a pricing policy that will put prices on a par with those that exist in other countries

5. CREATION OF ALTOS HORNOS DEL MEDITERRANEO, S.A.

5.1. BACKGROUND

The Programa Siderurgico Nacional, as revised in June 1971, predicted steel consumption in the order of 13 and 15 million tons in 1975 and 1980, respectively. The present production capacity of the Spanish steel industry is about 10-11 million tons. It is obvious therefore, that if the new facilities are not installed, the imbalance between production and consumption is going to increase in the next few years.

In June, 1971, the Government decided it would be advisable and opportune to construct a Fourth Integrated Steel Plant at Sagunto in Valencia, having a production capacity of 6 million tons per year. A request for competitive bidding for construction and operation from the private sector of industry for the new Plant was approved and published by the Government Decree of July 1971.

Fundamentally, the new integrated Steel Plant will fabricate flat products, including hot and cold rolled coils, sheets, as well as coated products, as was established by the conditions of the Decree.

ALTOS HORNOS DE VIZCAYA, the first private integrated steel company in the country, owns an integrated Steel Plant in Sagunto, and for a long time has been giving special attention to the subject of the Fourth Integrated Steel Plant in that area. Consequently, from the moment of the competitive bidding request, AHV has dedicated all its human and economic resources to studying the conditions to be met.

As a result of the studies and negotiations the creation of ALTOS HORNOS DEL MEDITERRANEO, S.A. took place at a meeting in Sagunto on October 26, 1971. Subsequently their proposal was presented to the Spanish Government on October 30, 1971.

ALTOS HORNOS DEL MEDITERRANEO's corporate capital is distributed as follows:

	<u>\$</u> <u>Participation</u>
Altos Hornos de Vizcaya, S.A.	66.7
U.S. Steel Corporation	15.0
Private Spanish Banks	<u>18.3</u>
TOTAL	<u>100.0</u>

The multinational character of the Plant is evidenced by the participation of North American capital through UNITED STATES STEEL CORP., whose total share is 28 percent; 15 percent by direct participation and the other 10 percent through ALTOS HORNOS DE VIZCAYA, of which it is a partner.

In March 1972, a Decree by which the Spanish Government awarding to ALTOS HORNOS DEL MEDITERRANEO, S.A. the concession to construct and operate the Fourth Integrated Steel Plant in Sagunto was published.

The new Plant will be located in the area adjoining the present plant at Sagunto, which is owned by ALTOS HORNOS DE VIZCAYA. At the present time the new plant site is being used for orange groves. Acquisition of the properties involved began in February, 1973.

5.2. BRIEF DESCRIPTION OF THE PROJECT

The project submitted by ALTOS HORNOS DEL MEDITERRANEO, in accordance with the bidding conditions established by the Government, consists of three phases. The facilities will be placed in operation on a phase by phase basis until the plant reaches its full planned production of 6 million tons of raw steel per year, which will be transformed into flat products.

Schematically, the phases and facilities planned in the initial study are as follows:

PHASE 1. - The facilities in this phase will start up in 1975.

The major facilities of this phase have been officially authorized and work has already begun. The facilities are as follows:

- A Continuous Pickle Line designed to utilize HCl, with capacity to process 1,432,000 tons of hot rolled coils per year in widths to 2,134 mm.
- A Five Stand Cold Mill, with a roll length of 2,033 mm., for an annual capacity of 1,329,000 tons. of plates.
- Annealing Furnace Facilities.
- Two Four High Single Stand Temper Mills with roll lengths of 2,033 and 1,400 mm. respectively.
- Three Sheet Shear Lines.
- A Combined Cutting Line, for an annual production capacity of 30,000 tons of plastic coated or galvanized sheets.

along with the associated Auxiliary and Service Facilities.

- **PHASE II.** - Will start operation by the end of this decade, and will consist of the initial phase of the Integrated Plant, with a production of 3 million tons of raw steel. Major facilities will include: Coke Ovens, No 1 Sinter Plant, No 1 Blast Furnace, two LD Converters, Continuous Slab Casting, a Hot Strip Mill, No 2 Cold Strip Mill, an Electrolytic Tinplate Line, along with Auxiliary and Service Facilities including a sea-port.
- **PHASE III.** - This phase includes a series of facilities to double the annual production capacity to 6 million tons of steel for processing into finished products. The corresponding facilities will start up within the first years of the 1980-1990's decade.

The new facilities in PHASE III will consist of expansions of the facilities that were installed in Phase II, including: Coke Ovens Expansion, Sinter Plant (second Line), Blast Furnace (second Furnace), LD Shop (3rd Vessel), Continuous slabs Casting Expansion, Continuous Hot Strip Mill Expansion (expanded to 4.5 million tons per year), as well as associated Auxiliary and Service Facilities Expansion.

The following new production facilities will be incorporated:

- No 3 Five Stand Cold Mill.
- A Galvanizing Line, for an annual production of 110,000 tons.
- A Pipe Mill with an annual production of approximately 200,000 tons of large diameter welded pipe.

6. FINAL CONSIDERATIONS AND FUTURE PROSPECTS

After examination of the aforementioned data, plus special contemplation of the Spanish Steel Industry in 1970, the following observations can be made:

- In the last 12 years, the development of the Spanish Steel Industry has experienced a spectacular increase, multiplying its steel production by 5 times in that period. In 1973 an output of 9.5 million tons was attained. In the next 10 years, it would not be hazardous to expect to surpass the figure of 20 million tons of steel. This prediction is made in light of the fact that the country's economy is now undergoing full development, with a constant increase in the Gross National Product together with a well defined Steel Policy, notwithstanding the fact that steel consumption per person continues to be comparatively low (270 Kgs. of steel per person in 1973).
- Spanish Steel Industry occupies the 13th position in the steel industry of the world. In 1973, according to IISI's provisional data, Spain registered the largest increase in steel production, with a rise of 18.6 %, while the world production index showed an increase of 8 %. It is possible that in the next few years, Spain will have even a slightly higher standing.

- There are at present two Integrated Steel Plants in Spain, ENSIDESA and ALTOS HORNOS DE VIZCAYA, each of whom exceeds 2 million tons steel production. UNINSA will also surpass this figure before 1975.
- The starting up of ALTOS HORNOS DEL MEDITERRANEO's Phase I in Sagunto at the end of 1975, and the termination of Phase III in the first years of the 1980-1990 decade, will make it an Integrated Steel Plant comparable in size to other large plants in the world, with an annual steel production of 8 million tons in a single plant.
- It is possible that before 1980, the formation of the two following important groups will take place:
 - The ALTOS HORNOS DE VIZCAYA-ALTOS HORNOS DEL MEDITERRANEO Group, with an approximate combined ultimate steel capacity of 9 million tons. The corporate capital would be entirely private.
 - The ENSIDESA-UNINSA Group, with a combined production capacity of about 7 million tons of steel. The Government would hold a major participation in its corporate capital.

The dimension of these two hypothetical Groups would reach a level more than acceptable among the European Steel Enterprises. The Spanish Integrated Steel Industry is following the technological evolution of production processes very attentively.

- For the coming years, productive processes will be based on modern Blast Furnaces with diameters from 9 to 12 m. charged with agglomerated materials; LD Oxygen Converters, increasing use of the Continuous Casting System, together with the conventional hot rolling, terminating the process with modern Structural, Rod and Heavy Plate Mills as well as having Hot Rolling and Cold Rolling Mills, along with Coated Product Lines.
- The Non-integrated and Special Steelmaking Plants will continue to function with their Electric Furnaces, transforming them to elevated levels of ultra-high power, and having continuous casting lines to supply the small and medium sized rolling mills. It would not be unusual if some of these Mini-Plants, with steel productions of around half a million tons, decide to use the direct reduction systems, feeding its Electric Furnaces with pre-reduced ore.
- The Spanish Integrated Steel Industry is experiencing, and will continue to experience, a deficit in raw materials which makes it necessary to import coking coal, iron ore, pellets, and scrap. On the other hand, it has the advantage, however, that all its facilities are located near the coast with adequate ports.
- With a base of modern facilities, efficient operating and administrative practices, the finished products have already reached excellent quality, at competitive costs comparable to those existing in the world markets.

- In 1972, shipments of steel products to Western and Eastern European Countries, as well as to America, have reached a total of 1.85 million tons. All this is very favourable when the possible integration into the European Common Market is considered.
- The present productivity in the Basic Steel Industry is 140 tons of steel per person and slightly higher in the Integrated Steel Plants (about 175 tons per person). By 1980, the Integrated Steel Plants should reach the figure of about 275 tons per person. The culmination of AHM's Phase III will permit us to simply surpass estimates of a future production of 500 tons per person, and the great technical progress in the existing Integrated Plants should allow us to count on a domestic index of national productivity at an international level.
- ALTOS HORNOS DEL MEDITERRANEO constitutes a typical example of international enterprise, with a direct participation of the American steel-making industry by UNITED STATES STEEL CORP. amounting to 15 % of its corporate capital.

Since 1964, the aforementioned American corporation has had a 25 % share in Altos Hornos de Vizcaya's corporate capital. The German Company, FRIED KRUPP, has a small share in UNINSA. The Japanese Companies NISSHIN STEEL and NISSHO-IWAI, have an important participation in the Steel Plant ACERINON, which is a producer of stainless steel products that was recently put into operation in Campo de Gibraltar. These and other foreign firms supply technical assistance to the Spanish Steel Industry.

In AHM's Phase I it is planned to purchase large quantities of coils from other foreign steelmaking plants which offer adequate quality conditions at competitive prices.

To expand these important steelmaking facilities it will be necessary to institute a large investment program that will face serious fiscal and financial problems. This will require maximum collaboration between the Government, Banking Institutions and Steelmaking Enterprises. Total investment programmed for AHM's three phases will reach a figure of 2,000 million dollars, at 1973 prices. This is considered the largest industrial investment ever undertaken in Spain.

The investment situation is favorable as shown by the notable profits registered in 1972. Also there has been a considerable improvement in the steelmaking Companies' financial structure. Without exception, all those Companies that participated in the Acci3n Concertada were able to make their amortization payments to the Government in accordance with contracted promises, which represented a remarkable financial success in each case.

- The development of the Spanish Steel Industry has given full employment to a combined total of 80,000 workers in 1972. At present the average

income per capita is 1,300 dollars, while a prudent and conservative estimate for 1980 indicates an income that may exceed 2,000 dollars per person.

- To fulfil these forecasts, the Spanish Steel Industry, better structured, will permit the attainment of an adequate balance, and will without doubt, support the harmonious development of the whole industry of the country.

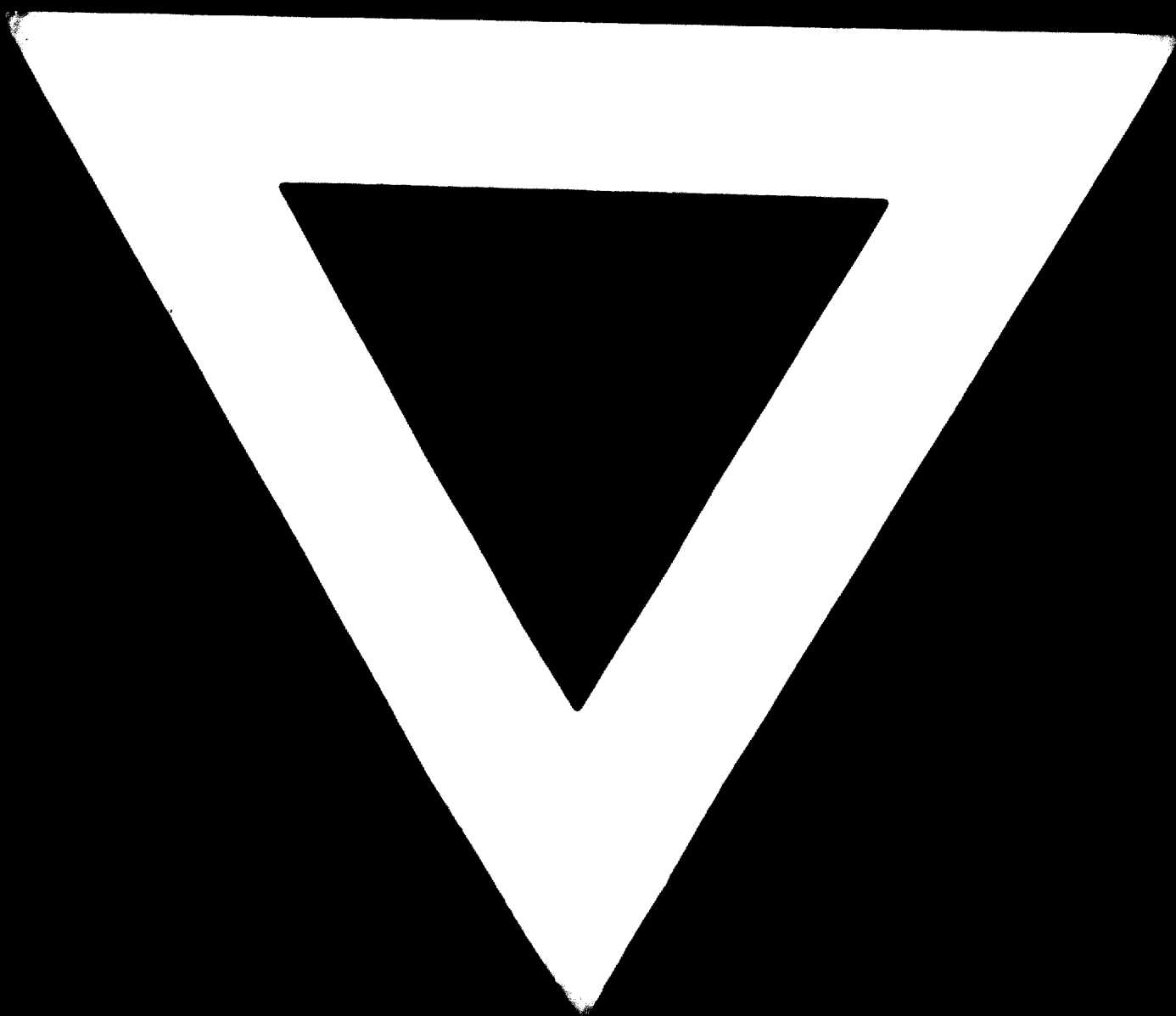
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