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NONFERROUS METALS IN THE POLISH SIX-YEAR PLAN

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The Six-Year Plan set very important tasks for the nonferrous metal industry; the most important is to reduce imports of nonferrous ores and metals to a minimum. This requires a development of Poland's natural resources for economic self-sufficiency. The present nonferrous ore mines in Poland are confined to zinc and lead ores.

Before the war, domestic ore extraction covered nearly 40 percent of the requirements of zinc metallurgy. Now that the Three-Year Plan has been realized, this figure is considerably higher.

The Six-Year Plan provides for the expansion of zinc and lead ore production, and for the development of other metallic resources, such as copper and nickel. Drillings required by the Six-Year Plan surpass any previously undertaken in Poland. Ore deposits are tested for both quality and quantity of ore, and prospecting is conducted wherever deposits are known to exist or wherever they are likely to be found. Simultaneously, the technology of converting ores is being developed for both high-grade and low-grade ores.

Investment sums allotted to the development of nonferrous metal resources reflect the importance of the problem. Domestic requirements for nonferrous metals will be covered more and more by the Polish nonferrous metallurgical industry using indigenous ores. There will be constant progress toward self-sufficiency despite increasing domestic consumption.

Because domestic ores are predominantly low-grade, they first must be concentrated. Of the many methods of concentrating ores, flotation is most widely used for sulfide ores, and sintering for oxide ores. Both methods require a large financial outlay and much equipment, but both result in concentrates with maximum metallic content. Expenditures for the development of equipment for concentrating ores by sintering constitute an important item in investments for

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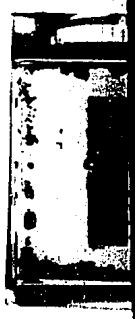


mining. Sintering of calamine will increase nearly fourfold. Expenditures for flotation equipment are also quite large. Investments are being made to expand the capacity of existing plants, and to construct new plants with modern equipment and layout.

In both expansion and new plant construction, the available structural parts are adapted to changed conditions. Simultaneously, efforts are made to standardize all auxiliary elements in similar plants to reduce the work of engineers, and to promote efficient interplant management. Shafts are being sunk with identical drilling machines; transportation is being standardized. Identical batteries of furnaces for sintering zinc and lead ores are being built, and flotation installations are being standardized.

Constant attention is given to the use of new reagents to recover more metal from ores, and efforts are being made to understand completely all variables in technological processes.

From ore to final product, the Six-Year Plan aims at better balance between output and input requirements. In all installations, automatic equipment is being introduced on a wide scale to save labor and assure the desired extraction or production. Great attention is also being paid to assure workers of the best working conditions and maximum safety in the new plants.

For the present, the development of zinc and lead mining will be concentrated in three centers. The main emphasis will be greater utilization of calamine, concentrated by sintering. The two new centers will be more or less equal as to the production of concentrates, but they will differ in the capacity for converting concentrates into metals. One will be a self-sufficient plant which will also convert scrap from other areas.

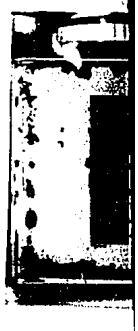
Copper ore mining will have two centers. The first center will supply sulfide concentrates; the second will use oxide ores. Both centers have great possibilities not yet fully explored; intensive drilling will be conducted in them.

Nickel ores found in Dolny Slask are concentrated by sintering into ferronickel. The concentrate, processed by various methods, is converted into valuable intermediates and nickel-base products.

Nonferrous metallurgy in the Six-Year Plan will be developed along two lines: (1) modernization of old equipment, and (2) development of new branches of production which up to now did not exist in Poland.

Much of the equipment of the zinc metallurgical industry is antiquated, for example, manually operated roasting furnaces, demanding great effort and producing a product of little value. This type of equipment will be replaced with modern, fully mechanized furnaces, which will have high productivity and will guarantee higher recovery of metals from ores, and more profitable operation. These modern furnaces will include mechanical multiple-hearth furnaces, Dwight-Lloyd belt conveyer furnaces, and efficient furnaces for the production of qualities suitable for electrolytic zinc called for in the Six-Year Plan.

Up to now, nonferrous metallurgy in Poland has been confined to the production of zinc, lead, and small amounts of accompanying metals -- cadmium and silver. There was little recovery of by-product arsenic and antimony. Now, all metals contained in the ore and required by Polish industries will be recovered, and entirely new branches of metallurgical conversion of copper, arsenic, nickel, and other concentrates will be developed. The activation of new branches of metallurgy is difficult, and requires large financial outlays and



wide experience. However, Poland has benefited from the experience of friendly neighbors, particularly the USSR. Soviet aid is especially significant because it comes during a period when the Western governments have refused aid to Poland even for hard currency.

Both sintering and smelting processes will be modernized. The present lead metallurgical plant is one of the oldest installations of this type in the world. The new metallurgical plant will be one of the most modern plants of this type. Machines will replace harmful manual work. Gases and dust, which up to now have been polluting the area, will be utilized. Waste products will be utilized, and new products, such as arsenic salts and metallic antimony, will be produced.

With increased extraction of domestic lead ore and modern production methods, lead production will cover almost all of Poland's requirements, despite increased consumption.

Zinc production will almost double. Prewar Poland was fourth in Europe's production of zinc, but after the completion of the Six-Year Plan, Poland will be the leading producer of zinc in Europe. Thus far, the production ratio of smelted zinc to electrolytic zinc has been 4:1. Production of refined zinc of 99.99 purity for alloys will be tripled. New methods of producing metal powders will be introduced in Poland.

The development of copper metallurgy and refining is a logical consequence of copper ore extraction. Nickel metallurgy will also be developed. Through the conservation of tin from mill ends of tin-plated sheets and used tin cans, tin production will be increased.

Copper production will increase to 60 percent of the domestic requirements, and nickel production will cover approximately 50 percent of the requirements.

For the first time in Polish history, waste obtained from the refining process will be converted, thus increasing the present production of silver many times. Selenium and tellurium, greatly desired by industry, will be obtained from by-product metalloids.

Other important by-products of nonferrous metal production are sulfuric acid and sulfur. Sulfuric acid production has increased notably, though not proportionately to the development of zinc metallurgy since the latter uses nonsulfur-bearing ores to a larger degree than heretofore. In line with an increase in zinc production, zinc white production -- an important export product -- will increase by more than half. The production of zinc alloys, used as substitutes for brass, will also increase.

The assortment of nonferrous metals would not be complete if lightweight metals, such as aluminum and magnesium were not produced. This problem too will be solved by Polish metallurgy. Poland's requirements for these metals are increasing more rapidly than was anticipated; however, Poland's tendency here, too, will be toward self-sufficiency.

New modern plants, located near raw material sources, will be built. Some of these plants will be using entirely new technological processes which will assure more metals and greater productivity. Here, too, equipment and technological processes will be standardized. Instead of small plants with specialized functions, there will be large establishments with a complete production cycle from ore to finished product, resulting in economies in transportation and production costs.

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Higher labor productivity will be an important contribution to the development of industry. Under the Six-Year Plan, labor productivity will increase 25 percent. This is the equivalent of 25 percent added to payrolls, thereby increasing the value of investments and the value of manufactured products.

There will be an expansion of plants converting nonferrous scrap metal, and expansion of the production of alloys such as brass, bronze, bearing metals, and various substitute alloys, including zinc alloys. Numerous aluminum alloys, such as alumimum bronze, aluminum silicon, duralumin, and many others, will be produced.

Recovery of metals from ashes and other waste resulting from the various stages of smelting and refining processes will be increased many times. Dust collectors of all types will also be used to recover every bit of metal.

Separate mention must be made of the development of rolling mills under the Six-Year Plan. While expenditures for this purpose are the lowest, each item is higher than heretofore. Rolled nonferrous metals must cover a constantly greater variety of domestic and export demands. Most of Poland's rolling mills are obsolete, and those that are modern cannot cover the constantly increasing requirements.

The production of nonferrous sheet and strip will increase. Production of these products will cover domestic requirements to a large degree. Modern machines, sheet and strip rolling mills, and high-pressure presses will be activated. Modern electric furnaces for smelting and annealing will also be built. Consumption of electric power, per ton produced, will increase in 1955 by nearly 50 percent. This means that old smelting and annealing furnaces heated with coal or gas will be replaced with new electrical installations. Old factories that cannot be expanded will disappear. In their place will be new ones, with a streamlined production cycle adapted to Poland's requirements which will not waste a gram of metal. The aid of the People's Democracies and the USSR will play an important role.

With Poland's finances assured, great undertakings will be attempted in which the human element plays an important role. There is no unemployment problem in Poland, but Poland does not have too many technicians, particularly in new fields. To train technical personnel, Poland is expanding schools covering a broad range of sciences.

At present, Poland has vocational schools and secondary schools in which students are taught metallurgy, chemistry, metalworking, electrotechnology, and mining. Both vocational and secondary schools will be transformed into a single type with emphasis on vocational training. In addition, there are four advanced specialized technical institutions -- two metallurgical, one chemical, and one mining -- to prepare supervisory technical personnel. The number of students in the specialized technical schools is increasing each year.

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