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ECONOMIC INTELLIGENCE REPORT

THE IRON AND STEEL INDUSTRY OF CZECHOSLOVAKIA

CIA/RR 67
20 December 1955

CENTRAL INTELLIGENCE AGENCY

OFFICE OF RESEARCH AND REPORTS

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(ORR Project 23.607)

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FOREWORD

This report presents a comprehensive survey of the development of the iron and steel industry of Czechoslovakia since World War II and under a Communist-dominated government and assesses the present position of the industry as a contributor to the economy of the Sino-Soviet Bloc. Estimates of production and capacity cover the period of the First Five Year Plan (1949-53) and 1954.

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THE IRON AND STEEL INDUSTRY OF CZECHOSLOVAKIA*

Summary

The iron and steel industry of Czechoslovakia, operating at only 90 percent of capacity, produced 4.3 million metric tons** of crude steel*** in 1954, an increase of 16 percent over production in 1953. Production of crude steel in 1954 was 35 percent of the total production of the European Satellites and 8 percent of that of the Soviet Bloc.

The most serious problem confronting the steel industry of Czechoslovakia, and the principal reason for its failure to meet production quotas, is the procurement and processing of raw materials. Other important factors influencing production include inefficient management, from the Ministry of Metals and Ores down to the plant level; low labor productivity; a shortage of skilled labor; and a high rate of absenteeism among workers. As a result, the iron and steel industry has been unable to accumulate operating reserves of either raw materials or products.

In spite of failures to meet planned goals, Czechoslovakia ranks on a par with the USSR as an exporter of finished steel, and the per capita consumption of finished steel in Czechoslovakia is the highest in the Sino-Soviet Bloc. In 1954, apparent consumption of finished steel was 0.24 ton per capita; in the USSR, 0.15 ton; and in East Germany, 0.14 ton. In 1953 the per capita consumption in the US was 0.49 ton.

Except for metallurgical coke and limestone, Czechoslovakia lacks an adequate base of raw materials to support an iron and steel industry. In 1954, indigenous production of low-grade iron ore satisfied only 36 percent of total iron ore requirements and was supplemented by imports of high-grade iron ore from the USSR, India, and Brazil.

* The estimates and conclusions contained in this report represent the best judgment of ORR as of 1 August 1955.

** Tonnages are given in metric tons throughout this report.

*** Crude steel includes steel for ingots and steel for castings.

Substantially all domestic iron ore and those Soviet ores that are of unsatisfactory physical and chemical quality must undergo beneficiation for blast-furnace use. Czechoslovak production of low-grade manganese supplied 50 percent (on a metallic basis) of requirements, but all high-grade manganese for the making of ferromanganese was imported. Approximately 100 percent of the alloying materials was procured outside of Czechoslovakia. Diminishing supplies of iron and steel scrap in relation to requirements have resulted in the decrease of scrap used in open-hearth furnace charges from 38 percent in 1949 to 30 percent in 1954. The shortage of scrap has emphasized the shortage of pig iron.

Notwithstanding the underfulfillment of production quotas, exports of steel products have risen steadily. In 1954, Czechoslovakia exported about 400,000 tons of semifinished and finished steel products -- almost exclusively to Sino-Soviet Bloc countries instead of Western countries, which formerly were major recipients. The 900,000 tons of metallurgical coke exported in 1954 represented a major contribution to consumers in East Germany and Hungary. On a cost basis these exports approximately balanced imports of the raw materials required by the Czechoslovak iron and steel industry.

The iron and steel industry of Czechoslovakia is vulnerable not only in its dependence on imports of raw material but also in its geographical concentration of production facilities. About 83 percent of the industry's crude steel and 80 percent of its pig iron are produced in 4 plants near Vitkovice and Trinec, and 58 percent of the industry's electric-furnace steel is produced in the Poldina Plant at Kladno.

A decision of the government of Czechoslovakia to shift to a wartime economy would not necessarily be reflected in the development of the iron and steel industry. Efforts to strengthen the raw material base and to increase production would be consistent with governmental emphasis on heavy industry and with efforts to restore the industry to its prewar level of quality.

I. Introduction.

A. Significance of the Industry.

The iron and steel industry of Czechoslovakia provides a substantial base for a highly developed industrial economy. The industry has the capacity to produce about 4.8 million tons of steel annually.* Production in 1954 amounted to 4.3 million tons -- approximately 90 percent of capacity. Although 1954 production failed to meet the plan goal, production of semifinished and finished steel provided a 0.24-ton per capita consumption for the country, the highest in the Sino-Soviet Bloc, and at the same time provided substantial exports, principally to other Sino-Soviet Bloc countries. Increased production to meet economic plan targets more in line with the capabilities of the iron and steel industry is largely dependent on improvement in the procurement of raw materials.

B. History and Development.

In 1937, Czechoslovakia had a well established iron and steel industry, dating from the mid-1850's, which had earned a world reputation for quality products. As a result of boundary adjustments made under the Munich Agreement of 30 September 1938, a small portion of the Czechoslovak iron and steel industry was transferred to Polish control. In the spring of 1939, Czechoslovakia was declared a German protectorate, and the iron and steel industry was placed under the direction of the Hermann Goering Works. The Germans accelerated production, added new equipment, and expanded existing facilities. During World War II, little damage was sustained by the industry, but under German operation equipment suffered from overexploitation and lack of maintenance.

Czechoslovakia was "liberated" in May 1945, and the nationalization of the steel industry was one of the principal goals of the newly formed Czechoslovak government. All steel plants were placed under the administration of the Czechoslovak Metallurgical Works, National Corporation (Ceskeslovenske Hut, Narodni Podnik), a directorate in the Ministry of Heavy Industry. 1/**

* Range of estimate: 4.7 to 5.1 million tons of crude steel capacity, based on estimates of open-hearth and electric-furnace capacity contained in detailed plant studies (see Appendix B).

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The Two Year Economic Plan (1947-48) provided 3.9 billion crowns (koruna) for investment in the iron and steel industry for the rehabilitation of plants and for the purchase of equipment to bring 1948 steel production up to the 1937 level. By the end of December 1947, equipment valued at 2.5 billion crowns had been ordered, but deliveries amounted to only 1 billion crowns. Underfulfillment of the investment plan was attributed to the delay in the approval of operating construction plans; the difficulties experienced in obtaining exports permits, particularly from Western countries; and the shortage of construction materials within Czechoslovakia. In spite of these difficulties, production of crude steel in 1948 exceeded 2 million tons, an accomplishment which can be attributed largely to the overexploitation of plant facilities.

The First Five Year Plan, which had a 1953 goal of 4.7 million tons of crude steel, allotted 14.9 billion crowns for investment in the metallurgical industry.* Another breakdown of the investment fund of 14.9 billion crowns divided the amount into 13.5 billion crowns for development and 1.4 billion crowns for current expenses. In addition to the 14.9 billion crowns, 400 million crowns were provided in the allotment to the power industry for investment in facilities at the iron and steel plants, and funds for iron and steel foundries outside the jurisdiction of the metallurgical industry were included in the investment plans for the metals industry. 2/

Although the 5-year investment program consisted principally of modernizing and expanding existing iron and steel plants, 2 new steel plants were scheduled for construction during the 1949-53 period.

Work began at once in the Ostrava area on the construction of the Klement Gottwald Steelworks at the site of a small pipe and tube mill in Kuncice nad Ostravici. When it is completed, this integrated plant will consist of 4 coke batteries with complete byproduct recovery facilities, 4 blast furnaces, modern open-hearth furnaces, and finishing facilities for a wide range of steel mill products. Although the plant is partially in production, full operation is not scheduled until some time during the Second Five Year Plan, which has not yet been announced.**

* See Appendix A, Table 29, p. 63, below.
** For additional details, see Appendix B.

As a primary objective of plans to industrialize Slovakia, in February 1951 the Central Committee of the Czechoslovak Communist Party ordered the construction by 1960 of a steel plant at Kosice with an annual capacity of 1.25 million tons. This plant, called Huko Kombinat, was to operate principally upon Krivoy Rog iron ore from the Ukraine supplemented by the low-grade Slovak ore. Building began in the spring of 1951, but progress was was slow and was accompanied by rumors of the abandonment of the project by the Ministry of Metals of and Ores. Construction was halted in late 1953, and although the project may be reactivated at a later date, it is believed that the lack of an economical raw material base, the absence of adequate communications facilities, and the shortage of skilled labor in the area have resulted in the elimination of the project.

The production of iron and steel in Czechoslovakia in 1937 and 1954 is shown in Table 1.

Table 1

Production of Iron and Steel in Czechoslovakia
1937 and 1954

Thousand Metric Tons

Product	1937 a/	1954 (Estimated)
Metallurgical coke	3,280	5,912 b/
Pig iron	1,675	2,800 c/
Crude steel	2,300	4,300 c/
Finished steel	1,570	3,100 b/

a. 3/
b. For methodology, see Appendix C.
c. 4/

Although the First Five Year Plan* terminated on 31 December 1953, no official announcements have been made of the Second Five Year Plan. It is believed that a second plan, along with new plans of the other Soviet Satellites, will be coordinated with the Soviet Sixth Five Year Plan and will cover 1956-60. The intervening years, 1954 and 1955, are being used in preparation for Czechoslovak participation in the Soviet over-all plan for the integration of the economies of the Soviet Bloc.

II. Organization and Administration.

A. Organization.

The economy of Czechoslovakia is administered by a number of ministries whose activities are coordinated by the Council of Ministers. The industrial ministries do not have sole responsibility for the industries under their jurisdiction and are restricted by limitations of authority. Representatives of the State Planning Office and of the Ministry of State Control, Soviet advisers, and Communist Party cadre groups may all participate in the operation of a plant. Coordination, planning, and production, therefore, are complicated and difficult. 5/

The iron and steel industry of Czechoslovakia is under the administration of the Ministry of Metals and Ores, headed by Josef Reitmajer. On 7 September 1951 a major reorganization resulted in the division of the Ministry of Heavy Industry into five new ministries: the Ministry of Heavy Engineering, the Ministry of General Engineering, the Ministry of Fuels and Power, the Ministry of Chemicals, and the Ministry of Metals and Ores. These new organizations represented, for the most part, the elevation of several main administrations of the Ministry of Heavy Industry to the status of full ministries. At the same time, a new administration, the Ministry of State Control, was created to check upon the performance of a minister in the execution of his responsibilities by verifying his adherence to laws, regulations, and orders and examining his disbursement of funds and allocation of materials. 6/

The organization of the Czechoslovak Ministry of Metals and Ores in 1954 is shown in the accompanying chart.**

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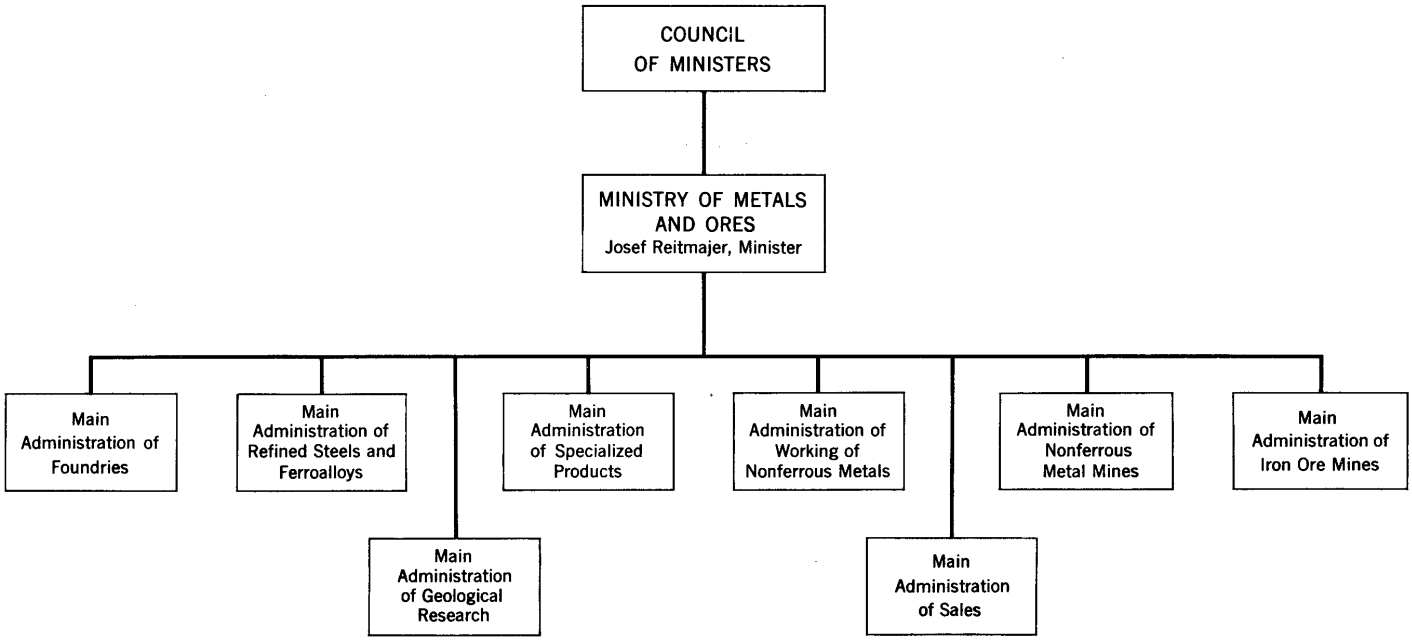
* For planned production targets of the First Five Year Plan, in tons and in value, see Appendix A, Tables 28 and 29, pp. 61 and 63, below, respectively.

** Following p. 6.

ORGANIZATION OF THE CZECHOSLOVAK MINISTRY OF METALS AND ORES, 1954



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B. Policies Affecting the Future of the Industry.

The iron and steel industry of Czechoslovakia has not been affected significantly by the 1954 Soviet policy of emphasis on the production of consumer goods. The underfulfillment of plans in the production of iron and steel products in the last 3 years has been the result of failures to procure adequate supplies of raw materials, inefficient planning and management, and a lack of competent personnel rather than the result of ordered reductions in output and investments in line with the "new course." Unlike the other European Satellites, particularly East Germany and Hungary, Czechoslovakia has placed very little stress on production of consumer goods. It is too early to predict Czechoslovak reaction to the early 1955 announcement that the USSR has reverted to strong emphasis on heavy industry. In any event, acceleration in production by the iron and steel industry in Czechoslovakia will require more efficient use of equipment, more raw materials, and more efficient operation of the industry. 7/

Long-range Soviet plans include the integration of the Czechoslovak iron and steel industry with those of the other Sino-Soviet Bloc countries. As early as January 1948, agreements were concluded between Czechoslovakia and other European Satellites for the coordination of the industries. To date, this policy has resulted principally in the formation of Committees for Scientific and Technical Collaboration, which have sponsored the exchange of workers and technicians for training purposes in steel plants and the exchange of results of experimental research at the ministerial and plant levels. Soviet plans, however, include the complete integration of the steel industries of the European Satellites, with the purpose of eliminating the duplication of these industries and fostering the specialization of each industry on that branch of production that it could develop most economically. These long-range plans will be developed through the centralization under Soviet control of the procurement and allocation of raw materials, the standardization of all products according to Soviet GOST specifications, and the specialization of products by country. 8/

III. Production and Supply of Iron and Steel.

A. General.

Czechoslovakia has the capacity to produce approximately 3 million tons of pig iron and 4.8 million tons of crude steel annually and has finishing facilities for the production of all standard types of steel products. Shortages and the irregularity of deliveries of quality iron ore and steel scrap, inefficient management, a shortage of skilled labor, low labor productivity, and the high rate of absenteeism of workers are all important factors contributing to the failure of the iron and steel industry to fulfill production plans. Although efforts to obtain additional supplies of steel in Free World markets have been largely unsuccessful, substantial exports of semifinished and finished steel products are maintained, principally to Sino-Soviet Bloc countries.

B. Pig Iron and Scrap.

1. Pig Iron.

Czechoslovak blast furnaces have the capacity to produce 3 million tons of pig iron a year. Since 1952, however, production has not met planned targets, and failures to fulfill planned goals in the production of crude steel and semifinished and finished steel products have resulted. The 1954 target was 3 million tons of pig iron, but production reached only about 2.8 million tons, 93 percent of the plan. Czechoslovak failure to meet goals for the production of pig iron can be attributed largely to the shortage of iron ore. Imports of pig iron to supplement the lagging production have been insignificant, probably because of a general shortage of pig iron within the Sino-Soviet Bloc. Planned and estimated production of pig iron in Czechoslovakia in 1949-54 are shown in Table 2.*

At the end of 1954 there were 21 blast furnaces in operation in Czechoslovakia, with the largest concentration in Moravia.** The location and capacity of blast furnaces in Czechoslovakia in 1954 are shown in Table 3.*

---

* Tables 2 and 3 follow on p. 9.

** See the map, Czechoslovakia: Iron and Steel Plants, inside back cover.

Table 2

Planned and Estimated Production of Pig Iron in Czechoslovakia
1949-54

Thousand Metric Tons

Production	1949	1950	1951	1952	1953	1954
Planned	1,865 a/	1,890 a/	1,905 a/	2,360 a/	2,725 a/	3,000 b/
Estimated c/	1,800	1,900	1,950	2,300	2,500	2,800

a. 9/
b. 10/
c. For methodology, see Appendix C.

Table 3

Location and Capacity of Blast Furnaces in Czechoslovakia a/*
1954

Plant Location and Name	Furnaces: Number	Furnaces: Daily Capacity per Furnace b/ (Metric Tons)	Estimated Annual Capacity (Thousand Metric Tons)
Bohemia			
Kraluv Dvur Ironworks,	1	275	138
Kraluv Dvur	1	130	
Konev Steel Plant, Kladno	4	200	272
Moravia			
Klement Gottwald Steelworks, Kuncice nad Ostravici	2	700	476

* Footnotes for Table 3 follow on p. 10.

Table 3

Location and Capacity of Blast Furnaces in Czechoslovakia a/
1954
(Continued)

Plant Location and Name	Furnaces: Number	Furnaces: Daily Capacity per Furnace b/ (Metric Tons)	Estimated Annual Capacity (Thousand Metric Tons)
Moravia (Continued)			
V.M. Molotov Ironworks, Trinec	1	270	996 to 1,112
	1	225	
	1	325	
	1	650	
	2	730 to 900	
Vitkovice Ironworks, Vitkovice	1	350	858
	1	375	
	3	600	
Slovakia			
Sverma Ironworks, Podbrezova	1	N.A.	100
Tisovec Blast Furnace Plant, Tisovec	1	N.A.	40
Total	21	8,060 to 8,400 c/	2,880 to 2,996

a. For methodology, see Appendix C.
b. Pig iron capacity.
c. Excludes capacity of the Sverma Ironworks and the Tisovec Blast Furnace Plant.

Blast furnaces in Czechoslovakia, for the most part, are modern and of conventional European design. Daily capacities range from 130 to 900 tons. Furnaces in operation before World War II, except for those in Slovakia, have been rebuilt and modernized, and at least three new blast furnaces have been constructed since the government assumed control over the industry. Two of the new furnaces were installed at the Klement Gottwald Steelworks and one at the V.M. Molotov Iron works at Trinec.

Blast furnaces produce all common grades of pig iron. Of total production, approximately 75 percent is the grade used for the making of basic steel in open-hearth furnaces, 15 to 20 percent is high-phosphorous pig iron for conversion to steel by the Thomas process, and 10 percent is of foundry grade for the making of castings in foundries located within steel plants and in the numerous gray iron foundries scattered throughout Czechoslovakia.

Immediate plans for increasing production of pig iron appear to be limited to the construction of two additional blast furnaces at the Klement Gottwald Steelworks at Kuncice nad Ostravici. These furnaces will add an estimated 475,000 tons annually to pig iron capacity by late 1956 or early 1957, doubling the capacity of the plant.

Plans announced in the early years of the First Five Year Plan for the construction of blast furnaces in Slovakia would have added approximately 1.5 million tons of capacity, but those plans are not being implemented and probably have been abandoned. The plans included a blast furnace at the Stalin Heavy Machinery Plant in Turciansky Svaty Martin, which was to have an annual capacity of 175,000 tons; 8 blast furnaces at the Huko Kombinat in Kosice, which were to have an annual capacity of 1 million tons; and a new blast furnace at the Tisovec Blast Furnace Plant. At one time it was announced that as part of the Second Five Year Plan, there was to be built in the vicinity of Zilina, a new steel combine which would have an annual pig-iron capacity of 600,000 to 800,000 tons. There has been no recent information on the implementation of this plan. 11/

2. Scrap.

The shortage of iron and steel scrap in Czechoslovakia has been another important factor in the failure of the steel industry to meet its production quotas. Scrap supplies were adequate in the years immediately following World War II. In 1948, however, the shortage began to be felt, largely as a result of heavy exports of steel mill products and manufactured items, and scrap collection agencies were set up throughout the country. By 1952 the shortage was critical, and intensive collection drives, including house-to-house canvasing by school children, were inaugurated. As the shortage grew more acute, charges of raw materials in open-hearth furnaces were changed, pig iron inputs increasing from approximately 54 percent in 1949 to 60 percent in 1954 and the scrap charge declining from approximately 38 percent in 1949 to 30 percent in 1954. Attempts to relieve the scrap shortage by importing scrap iron and steel from the USSR have not been successful. Consumption of raw materials in the production of steel in Czechoslovakia, 1949-53 plan and 1954 estimate, is shown in Table 4.* Table 4 also illustrates the anticipated shortage of iron and steel scrap in the Czechoslovak steel industry.

C. Crude Steel.

Steel production in Czechoslovakia met economic plan goals until 1953. It is estimated that in 1953 production fell short of the target by approximately 1 million tons and in 1954 by 600,000 tons. Failures to meet quotas in 1953 and 1954 can be attributed principally to the lag in production of pig iron and to the acute shortage of iron and steel scrap rather than to a lack of steelmaking capacity. Only an insignificant amount of crude steel is imported. Planned and estimated production of crude steel in Czechoslovakia in 1949-54 is shown in Table 5.*

Czechoslovakia has the furnace capacity to produce approximately 4.8 million tons of crude steel annually. Of this total, approximately 250,000 to 275,000 tons consist of electric furnace capacity, largely concentrated in Moravia, particularly in the Moravska-Ostrava area. Compared with those in the US and the USSR, open-hearth furnaces in Czechoslovakia are small, and only a few furnaces have capacities of from 220 to 250 tons.**

* Tables 4 and 5 follow on p. 13.
** Continued on p. 16.

Table 4

Consumption of Raw Materials in the Production of Steel
in Czechoslovakia
1949-53 Plan and 1954 Estimate

Percentage of Total Charge

Raw Material	Plan a/ 1949	1950	1951	1952	1953	Estimate b/ 1954
Pig iron	54.1	54.2	53.5	56.8	58.6	60.0
Iron and steel scrap	37.8	37.7	38.3	34.3	32.1	30.0
Ferroalloys	1.4	1.4	1.4	1.4	1.3	1.4
Iron ore	6.7	6.7	6.8	7.5	8.0	8.6
Total	100.0	100.0	100.0	100.0	100.0	100.0

a. 12/
b. 13/

Table 5

Planned and Estimated Production of Crude Steel
in Czechoslovakia
1949-54

Thousand Metric Tons

Production	1949	1950	1951	1952	1953	1954
Planned	2,650 a/	2,680 a/	2,750 a/	3,160 a/	4,700 a/	4,900 b/
Estimated	2,700 c/	2,750 c/	2,800 c/	3,200 c/	3,700 c/	4,300 d/

a. 14/
b. 15/
c. For methodology, see Appendix C.
d. 16/

The location and capacity of open-hearth furnaces in Czechoslovakia in 1954 are shown in Table 6.

Table 6

Location and Capacity of Open-Hearth Furnaces in Czechoslovakia
1954

Plant Location and Name	Furnaces a/* Number	Capacity per Furnace (Metric Tons)	Estimated Annual Capacity b/ (Thousand Metric Tons)
Bohemia			
Ceskomoravska-Kolben-Danek, Stalingrad Heavy Equipment Plant, Prague	N.A.	N.A.	N.A.
Gustav Klimentis Iron-works, Hradek	3	30	87.8
Konev Steel Plant, Kladno	6	30	433.6
	1	60	
	5 Bessemer	N.A.	
V.I. Lenin Machine Building Plant, Pilsen	2	15	258.4
	2	30	
	1	35	
	1	40	
	2	50	
Poldina Steel Plant, Kladno	9 to 12	N.A.	150.0
May Day Steel Plant, Most	3	40	117.0

* Footnotes for Table 6 follow on p. 16.

Table 6

Location and Capacity of Open-Hearth Furnaces in Czechoslovakia
1954
(Continued)

Plant Location and Name	Furnaces a/ Number	Furnaces a/ Capacity per Furnace (Metric Tons)	Estimated Annual Capacity b/ (Thousand Metric Tons)
Moravia			
First Brno and Kralovo Pole Engineering Works, Brno	N.A.	N.A.	N.A.
Gustav Klimentis Wire and Cable Factory, Nowy Bohumin	6 Small	N.A.	110.0 to 125.0
Klement Gottwald Steel Works, Kuncice nad Ostravici	4	220 to 250	572.0 to 650.0
V.M. Molotov Ironworks Trinec	1	20 to 25	1,081.0 to 1,211.0
	5	45 to 50	
	2	65 to 70	
	2	100 to 120	
	5	120 to 140	
	2	150	
Storek Krenovo Machine Building Plant, Brno	3 Small	N.A.	N.A.
Vitkovice Ironworks, Vitkovice	1	30 to 40	1,416.9 to 1,616.7
	2	35 to 40	
	1	40 to 45	
	1	120 to 140	
	1	140 to 160	
	1	160 to 180	
	1	200 to 225	
	6	220 to 250	

Table 6

Location and Capacity of Open-Hearth Furnaces in Czechoslovakia
1954
(Continued)

Plant Location and Name	Furnaces a/		Estimated Annual Capacity b/ (Thousand Metric Tons)
	Number	Capacity per Furnace (Metric Tons)	
Slovakia			
Sverma Ironworks, Podbrezova	5	40	195.0
K.Ye. Voroshilov Armaments Plant, Dubnica nad Vahom	1	15	14.6
Total	85 to 88 c/		4,436.3 to 4,859.1

a. Open-hearth unless otherwise indicated.
b. Crude steel capacity. For methodology, see Appendix C.
c. Includes 5 Bessemer converters.

In addition to open-hearth furnaces and Bessemer converters, there are in Czechoslovakia approximately 50 electric furnaces. Except for one 30- to 40-ton electric furnace at the Vitkovice Ironworks, these electric furnaces vary from 3 to 10 tons in capacity and produce approximately 250,000 to 275,000 tons of electric-furnace steel annually. They are located in 27 steel foundries, some of which are within steel plants. Most of the furnaces, however, are in steel foundries of manufacturing plants.*

* For details, see Appendix B.

No plans are being implemented for the immediate expansion of steelmaking facilities in Czechoslovakia. Czechoslovak planners probably are concerned with methods for raising production of steel to a total more in line with capacity. It is possible that additional electric furnaces will be added to manufacturing plants under the administration of the Ministry of Heavy Engineering, and three small open-hearth furnaces may be built in Slovakia at the Stalin Heavy Machinery Plant in Turciansky Svaty Martin, also under the Ministry of Heavy Industry. The construction of the Huko Kombinat at Kosice in eastern Slovakia, which was scheduled for completion in 1960 with an annual capacity of 1.25 million tons of steel, has been abandoned. The Second Five Year Plan, when announced, may possibly contain funds for the completion of the Huko Kombinat and for the construction of a new steel combine near Zilina, also in Slovakia, with a planned capacity of 600,000 to 800,000 tons of steel. It is doubtful, however, that any new construction will be undertaken until existing capacities are utilized more fully. 17/

D. Finished Steel.

Planned goals for finished steel were fulfilled from 1949 through 1952, and production provided for the export of approximately 200,000 tons each year in addition to domestic consumption. Failure to meet planned goals in 1953 and 1954 has resulted in shortages at domestic plants consuming steel, but exports were maintained in increasing amounts and rose to an estimated 390,000 tons in 1954. Small quantities of finished steel are imported, principally from Austria, West Germany, Belgium-Luxembourg, and Norway.

Authoritative information on plans and production of finished steel is limited. Data on plans and production are notably incomplete for steel foundries in fabricating plants outside the jurisdiction of the Ministry of Metals and Ores. Information on rolled steel products, however, is fairly conclusive. Planned and estimated production of rolled steel products in Czechoslovakia in 1949-54 is shown in Table 7.*

* Table 7 follows on p. 18.

Table 7

Planned and Estimated Production of Rolled Steel Products in Czechoslovakia 1949-54

Thousand Metric Tons

Production	1949	1950	1951	1952	1953	1954
Planned	1,645 a/	1,664 a/	1,664 a/	1,920 a/	2,726 a/ b/	3,300 c/
Estimated d/	1,600	1,700	1,700	1,900	2,100	2,500

a. 18/
b. This is a revision of the original plan figure of 2,074,000 metric tons.
c. 19/
d. 20/. The planned percentages of rolled products to crude steel production were as follows: 1949 and 1950, 61 percent; 1951 and 1952, 60 percent; 1953, 58 percent. The 1953 percentage was adopted for 1954. Percentages were applied to estimated crude steel production. The resulting estimates were rounded to two significant figures.

Estimated production of rolled steel products in Czechoslovakia by type of product, in 1949 and 1954 is shown in Table 8.*

Although Czechoslovakia converts about the same percentage of crude steel into sheets and strip as the USSR and East Germany (14.9, 15, and 13.8 percent, respectively), this production must have been inadequate, because the Czechoslovaks attempted to procure from the US a hot strip mill for the V.M. Molotov Ironworks in Trinec. Shipment of this mill was embargoed, and as yet a replacement has not been provided. As equipment of this type also can produce light armor and ship plates, emphasis on these products may be a reflection of the requirements of the Czechoslovak armaments industry as well as of export commitments to East Germany and the USSR.

Finished steel, including castings, forgings, and rolled products, is produced in 33 plants in Czechoslovakia. Of these plants, 16 are under the administration of the Ministry of Metals and Ores, and

* Table 8 follows on p. 19.

Table 8

Estimated Production of Rolled Steel Products in Czechoslovakia, by Type of Product 1949 and 1954

Type of Product	Percent of Total Production [a]	Production (Thousand Metric Tons) 1949 [b]	1954 [b]
Bars	11.0	180	280
Structurals	28.7	460	720
Rails and accessories	12.2	200	300
Plate	7.8	120	200
Sheet	11.9	190	300
Tinplate	0.4	6	10
Strip	3.0	48	75
Pipes and tubes	11.2	180	280
Wire rod and wire	13.8	220	340
Total	100.0	1,600	2,500

a. Percentage distribution derived from 1949 plan. 21/
b. Derived by applying 1949 percentages to estimated 1954 total production of rolled steel products (see Table 7, p. 18, above). Figures are rounded to two significant figures.

17 are steel foundries under the direction of the Ministry of Heavy Engineering. Four plants under the Ministry of Metals and Ores are estimated to produce 70 percent of the finished steel made in Czechoslovakia. These four plants -- the Klement Gottwald Steelworks at Kuncice nad Ostravici, the Konev Steel Plant at Kladno, the V.M. Molotov Ironworks at Trinec, and the Vitkovice Ironworks at Vitkovice -- are the largest steel plants in Czechoslovakia.*

* For descriptions of finishing facilities installed in the individual plants, see Appendix B.

Before World War II, rolling mill equipment installed in steel plants in Czechoslovakia generally was of German design. Mills were operated expertly, the rate of rejects was low, and Czechoslovak finished steel products, even though output was small compared with that of other steel-producing countries, enjoyed a world reputation for quality. Under German operation of the industry during World War II, considerable modernization of facilities was accomplished, and a cold strip mill and a pipe and tube mill were added. Since the nationalization of the steel plants the government has continued mechanization and modernization of equipment and has added a number of new rolling mills and finishing facilities, including a blooming mill, 2 plate mills, a section mill, 2 sheet and strip mills, a cold strip mill, a rod mill, 2 wire mills, 2 seamless tube mills, and 2 cold pipe drawing shops.

Plans for the expansion and development of steel-finishing facilities in Czechoslovakia have not been announced but probably will be included in the Second Five Year Plan. Although the project to build an integrated steel plant at Kosice, Slovakia, has been abandoned, it is possible that the construction of the Huko Kombinat will be resumed at a later date and that the blooming mill, a continuous billet mill, and a structural mill will be provided. 22/

E. Alloy Steel.

Before World War II, Czechoslovakia was known throughout the world as a producer of alloy steel. The Poldina Steel Plant, which has been operating in Kladno since 1889, was engaged exclusively in the manufacture of high-quality alloys. Through the development of many new specialty steels, some before World War I, and the establishment of a global network of sales representatives and warehouses, the firm became a symbol of excellence in alloy steel technology.

During World War II, great changes took place in the quality and variety of alloy steels produced in Czechoslovakia, not only in those produced by the Poldina plant but by other plants as well. These changes were the result of a scarcity of alloying metals required for the production of alloy steel. Of necessity, carbon steels and steels slightly "alloyed" with silicon and manganese were substituted for alloy construction grades. 23/ The limited stocks of the more important ferroalloys were used only in alloying steels intended for critical service applications and for tool steels, the quality of which was maintained at high levels throughout most of the war. 24/

In the interim period between the end of the war and the Communist coup, Czechoslovak alloy steel producers made a vigorous effort to reestablish prewar raw material sources and markets. Gradually pre-1939 standards of quality were regained, and following the shift of Czechoslovak industry to peacetime production, the output of alloy steels began to rise. 25/

Under Communist pressures, the Poldina plant again was supplying a large share of the alloy steel requirements of Czechoslovak manufacturers by 1949 and was beginning to export specialized alloys and manufactured products to the USSR. The Poldina plant was working at a near-capacity rate of 100,000 tons per year by 1951 and was the principal plant producing alloy steels for the market. 26/ Other concerns that have electric furnaces -- the V.I. Lenin Machine Building Plant at Pilsen and the Vitkovice Ironworks, for example -- were producing some tool steels, armor castings, heat-resistant alloys, and other steels for arms and machinery, chiefly for use in their own manufactured products.

Despite full-capacity production the output of the alloy steel producers in Czechoslovakia apparently was insufficient in 1952 to meet both the rising alloy needs of Czechoslovak industry and export commitments. Shortages of certain ferroalloying materials, chiefly tungsten, molybdenum, cobalt, nickel, and vanadium, were acute throughout the industry. To insure the most economical utilization of available alloying materials, 27/ it was necessary to change specifications and to reduce the variety of alloys produced. As conservation efforts became mandatory, 28/the production of alloyed construction steel in 1952 dropped from 78 types to only 28. In early March 1951, all consumers were ordered to report to the Ministry of Industry the extent of their inventories of cobalt- and tungsten-containing steels and as of that time none of these steels was to be used without the consent of the National Defense Ministry. 29/

Information about present conditions within the alloy steel producing industry is lacking, but annual production of electric furnace steel in Czechoslovakia is estimated to be from 250,000 to 275,000 tons, most of which is believed to be alloy steels. The evidence indicates that Czechoslovakia produces a wide range of alloy and stainless steels similar to those produced in the US. Ferroalloy supply problems appear to be decreasing because of increased imports, expanding Czechoslovak ferroalloy production, and progress in the manufacture of specialized alloying materials. Alloy producers,

however, continue to have difficulties in obtaining some ferroalloying materials; Czechoslovak technical literature makes continual reference to alloy conservation and substitution measures.

In time of emergency the existing installations of the Czechoslovak steel industry, if provided adequate quantities of alloying materials, could increase substantially the alloy steel supply of the Soviet Bloc. The level of technical competence is high, many steel plants have had experience in the production of alloys during the past 20 years, well-equipped laboratories are in operation, and Czechoslovak metallurgists follow closely the latest developments in Western metallurgical technology.

IV. Production and Supply of Raw and Alloying Materials.

A. Basic Raw Materials.

1. General.

Of the basic raw materials required by the iron and steel industry, Czechoslovakia is self-sufficient only in metallurgical coke and limestone. Production of iron ore and manganese must be heavily supplemented by imports.

With large reserves of coal suitable for making metallurgical coke and a modern and efficient coke industry, Czechoslovakia not only satisfies domestic blast-furnace requirements for coke but also produces a large surplus for export. Limestone deposits are adequate and are located within easy hauling distances of iron and steel plants. Iron ore reserves, although extensive, are limited to low-grade ores, and production supplies only 27 percent of the iron requirements of the metallurgical industry. To supplement output, high-grade iron ore is imported from the USSR, India, and Brazil, sources which have replaced Sweden, the chief prewar supplier. The mining of low-grade manganese supplies about 50 percent of the requirements for manganese and is augmented by imports, principally from the Soviet Bloc.

2. Iron Ore.

Although the iron ore reserves of Czechoslovakia are the largest in the European Satellites, the ore is generally of low grade. The average ore mined contains approximately 34 percent iron; the bulk of output requires beneficiation to provide a satisfactory

furnace charge. 30/ Because of the unsatisfactory quality and the high cost of production of domestic ores, the Czechoslovak iron and steel industry has depended heavily on imports of high-grade foreign ores to meet its growing requirements.

Reserves of iron ore in Czechoslovakia are estimated at 400 million tons, nearly 200 years' supply at the present rate of exploitation. 31/ The failure to implement a major expansion of iron ore production is caused by economic considerations of quality and position of the ore bodies rather than by any quantitative deficiency. Not only does the ore have low iron and high silica content but also the principal deposits must be mined underground. The rate of production of iron ore in Czechoslovakia in 1949, 0.1 ton per man-hour as compared with 1.7 tons per man-hour in the US in the same year, indicates that ore from foreign sources, when available at reasonable prices, is a far more economical blast-furnace feed than is the domestic product. 32/

The principal iron ore mines in Czechoslovakia are situated in eastern Slovakia and in Bohemia, southwest of Prague. Since the end of World War II, production of iron ore in Slovakia has increased steadily, and it now accounts for approximately 75 percent of national production. 33/ Planned and estimated production of iron ore in Czechoslovakia in 1949-54 is shown in Table 9.*

The upward revision of goals for 1951-53 probably resulted primarily from the failures to obtain sufficient iron ore from Sweden. These goals for 1952 and 1953 were found to be unrealistic and again were revised. The drastically reduced goal set for 1954 -- which, in turn, was unfulfilled -- probably was based on official recognition of the high cost of expanding Czechoslovak production at the rates previously desired compared with that of importing high-grade iron ore from other sources to replace Swedish supplies.

Several reasons have been given for not fulfilling plans. The primary causes appear to have been the slow introduction of mechanization and the labor shortages in several mines. Slow preparation of reserves was given as another reason. Because most of the iron mines in Czechoslovakia are underground operations, some of considerable depth, the shortcomings appear to be serious problems

* Table 9 follows on p. 24.

Table 9

Planned and Estimated Production of Iron Ore in Czechoslovakia
1949-54

Thousand Metric Tons

Year	Original Plan Goal a/	Revised Plan Goal	Estimated Production
1949	1,355		1,536 b/
1950	1,370		1,659 b/
1951	1,360	1,630 c/	1,775 b/
1952	1,370	2,840 c/	1,853 b/
1953	1,380	5,180 c/	1,849 d/
1954	N.A.	2,041 e/	2,037 f/

a. 34/
b. 35/
c. 36/
d. 37/
e. 38/
f. 39/

which impair the 1955 outlook for the expansion of domestic production. Expansion of the iron and steel industry will necessitate heavy investments for the construction of beneficiating facilities above the capacity needed to process imported Soviet ores, which are of unsatisfactory physical and chemical quality despite their high iron content. Because 87 percent of the Czechoslovak iron ore supply (metallic iron content) in 1954 came from domestic production plus imports from the USSR,* the provision of facilities of this type would appear to be essential to a solution of Czechoslovakia's iron ore problem.

Despite intensive efforts to expand production during the First Five Year Plan in Czechoslovakia, the degree of self-sufficiency in iron ore dropped from 46 percent in 1949 to 27 percent in 1954.**

* Eighty percent of Czechoslovak imports of iron ore come from the USSR. 40/

** See Table 10, p. 26, below.

Although the provision of facilities for sintering and agglomerating Krivoy Rog ore should reduce Czechoslovak dependence on the West, that dependence probably will not be eliminated for a considerable period.

The decline in imports of Swedish iron ore, which dropped from 400,000 tons in 1952 to approximately 5,000 tons in 1953 and appears to have been negligible in 1954, has been offset largely by increased imports from India, Brazil, and other Western countries. 41/ According to Czechoslovak claims, imports of iron ore from India amounted to over 440,000 tons in 1953 and probably exceeded 320,000 tons in 1954. 42/ Also in 1954, Czechoslovakia reportedly signed a contract with a Brazilian company calling for the import of 250,000 tons of Brazilian iron ore. 43/ At the end of 1954, negotiations also were under way between Czechoslovakia and Chile involving the acquisition of 120,000 tons of Chilean iron ore. 44/ Although all of these ores are of high quality, in view of the high costs of the ores to Czechoslovakia and the probable installation of additional facilities for beneficiation, it is doubtful that such sources will become permanently established. The current pattern is considered to be more of a stopgap measure to alleviate the shortage of iron ore in the Czechoslovak iron and steel industry. The precarious balance of this situation has been revealed by frequent reports of iron ore shortages which resulted in temporary curtailment of production of pig iron at individual plants.

The estimated supply of iron ore in Czechoslovakia in 1949-54 is shown in Table 10.*

3. Manganese Ore.

The production of low-grade manganese ore in Czechoslovakia supplies approximately 70 percent on a tonnage basis and 50 percent on a metallic basis of the requirements of the iron and steel industry. Domestic ore is used primarily for the making of pig iron and spiegeleisen. High-grade manganese ore for the production of ferromanganese must be imported -- principally from the USSR, Rumania, Hungary, and Bulgaria.

* Table 10 follows on p. 26.

Table 10

Estimated Supply of Iron Ore in Czechoslovakia
1949-54

Year	Production		Imports		Total Supply	
	Quantity (Thousand Metric Tons)	Value a/ (Million Crowns)	Quantity (Thousand Metric Tons)	Value b/ (Million Crowns)	Quantity (Thousand Metric Tons)	Value (Million Crowns)
1949	1,536	83	1,214 c/	87	2,750	170
1950	1,659	90	2,296 d/	165	3,955	255
1951	1,775	96	1,629 d/	117	3,404	213
1952	1,853	101	2,656 d/	191	4,509	292
1953	1,849	100	2,869 d/	207	4,718	307
1954	2,037	111	3,700 e/	266	5,737	377

a. The 1949-53 planned value per ton of iron ore (377 crowns) 45/ was converted to present crown value (54.3 crowns). Exchange rates of 1 crown = US $0.02 in 1949 and 1 crown = US $0.1389 in 1954 were used in the consumption.
b. Available prices of Czechoslovak iron ore imports vary widely, ranging from US $7.00 per ton to US $18.50 per ton. An average of US $10.00 per ton was assumed and converted to value per ton in terms of Czechoslovak crowns (US $10.00 = 72 crowns). This value was then applied to imported tonnages for each year.
c. 46/
d. 47/

[redacted] 5(50X1

Manganese reserves consist of low-grade manganiferous ores averaging 17 percent manganese. 49/ The extent of these reserves is unknown, but evidence indicates that the reserves are limited. The more important mines are located at the Svabovce-Kisovce deposits near Poprad in eastern Slovakia and at the Chvaletice deposits west of Pardubice in eastern Bohemia.

Throughout the First Five Year Plan, production of manganese has failed consistently to meet goals, 50/ which were planned at 5,000 to 30,000 tons greater than planned consumption. 51/ Failure to improve mining conditions and to supply new mining equipment affected production -- particularly that of the Svabovce-Kisovce mines, which produce approximately 90 percent of output. 52/ The underfulfillment of goals may have precluded the accumulation of inventories, but it probably did not create a bottleneck in the production of pig iron.

Planned imports of manganese ore approximate 30 percent, by volume, of total requirements. 53/ This amount includes an estimated 50,000 to 60,000 tons of metallurgical-grade ores (at least 35 percent metallic manganese), which is used annually for the production of ferromanganese. The larger part of imported ore comes from the USSR, Bulgaria, Hungary, and Rumania, with occasional shipments from India, Egypt, Turkey, and Burma. 54/ The small tonnages received from outside of the Sino-Soviet Bloc are believed to be based on trade considerations rather than on unavailability of Bloc ores. The estimated supply of manganese ore in Czechoslovakia in 1949-53 is shown in Table 11.*

4. Metallurgical Coke.

Czechoslovakia has a highly developed metallurgical coke industry which, although it has failed to meet Five Year Plan goals since 1948, not only satisfies the requirements of the iron and steel industry but also provides a large surplus for export. Exports of coke in 1954 amounted to 900,000 tons, about 15 percent of production. These exports went principally to Soviet Bloc countries. The metallurgical coke industry is concentrated in the Ostrava-Karvinna area of Moravia, close to the large reserves of metallurgical-grade coking coal and in the immediate vicinity of the largest concentration of iron and steel plants.

Supervision of the production of oven coke** is centered in 2 ministries, the Ministry of Metals and Mines, which administers the output of coke batteries located at 4 metallurgical plants, and the

* Table 11 follows on p. 28.

** Coke produced in coke ovens. Not all coke produced, however, is of metallurgical grade; a portion fails to meet metallurgical standards for size and chemical content.

Table 11

Estimated Supply of Manganese Ore in Czechoslovakia
1949-53

	Production		Imports		Total Supply	
Year	Quantity a/ (Thousand Metric Tons)	Percent of Total	Quantity b/ (Thousand Metric Tons)	Percent of Total	Quantity (Thousand Metric Tons)	Value c/ (Million Crowns)
1949	130	62	81	38	211	178
1950	170	67	87	33	257	203
1951	180	67	89	33	269	210
1952	230	70	97	30	327	241
1953	240	69	107	31	347	261

a. 17 percent manganese content. 55/
b. 30 to 48 percent manganese content. 56/
c. Values of domestically produced manganese ore and imported manganese ore were based on 1950 published prices 57/; Bohemian ores at 220 crowns per ton, Slovakian ores at 374 crowns per ton, and imported ores at 1,621 crowns per ton.

Ministry of Fuels and Power, which directs the production of coke batteries located at 7 or more coal mines. Although the Czechoslovaks refer to plants as metallurgical coke plants and as mine coke plants, there is no difference in the quality of the coke produced.

Plans for increasing the production of oven coke were important features of both the Two Year Plan (1947-48) and the First Five Year Plan. Planned and estimated production of oven coke in Czechoslovakia in 1949-54 is shown in Table 12.*

* Table 12 follows on p. 29.

Table 12

Planned and Estimated Production of Oven Coke in Czechoslovakia 1949-54

Production	1949	1950	1951	1952	1953	1954
Planned a/	4,820	5,040	5,150	5,565	6,020	N.A.
Estimated b/	4,695	4,876	5,071	5,375	5,700	5,912

a. 58/
b. 59/

Estimated production of oven coke in Czechoslovakia, by plant, in 1950-54 is shown in Table 13.*

The expansion of oven coke plant facilities began during World War II. In 1942 the Germans decided to build a coke-chemical plant at the Konev Steel Plant in Kladno. This plant was to operate on northern Bohemian coal in order to overcome the difficulties involved in transporting coke from batteries in the Ostrava area. The plant was completed by Krupp in 1943, but it was discovered that the Bohemian coal was unsuitable for the making of metallurgical coke, and the coke ovens now operate on coal from the Ostrava Basin.

In the years following World War II, coke facilities have been modernized and expanded by the Czechoslovak government. The First Five Year Plan provided 640 million crowns for the equipment of coke oven plants under the administration of the Ministry of Fuels and Power -- the General Svoboda, Lazy, Trojice, President Benes, and Jan Coke-Chemical Plants. Funds were also included in the First Five Year Plan for the metallurgical industry for improvement of coking facilities at steel plants. In 1950 and 1953, coke batteries No. 5 and No. 6 were added to the V.M. Molotov Ironworks at Trinec. Three coke batteries were built at the Klement Gottwald Steelworks at Kuncice nad Ostravici in the 1952-54 period, and a fourth battery is

* Table 13 follows on p. 30.

Table 13

Estimated Production of Oven Coke in Czechoslovakia, by Plant
1950-54

Plant Location Name	Equipment		Production (Thousand Metric Tons)				
	Batteries	Coke Ovens	1950 a/*	1951 a/	1952 a/	1953 a/	1954 b/
Bohemia							
Konev Steel Plant, Kladno	1	60 to 80	425	450	450	450	450
Moravia							
General Svoboda Coke Chemical Plant, Privoz	7	368	1,356	1,456	1,420	1,420	1,420
Jan Coke-Chemical Plant, Karvinna	4	125	525	545	525	525	237
Klement Gottwald Steel Works, Kuncice nad Ostravici	3	216			425	750	1,000
Lazy Coke-Chemical Plant, Lazy	1	55	250	250	250	250	250
V.M. Molotov Ironworks, Trinec	6	201	675	690	675	675	793

* Footnotes for Table 13 follow on p. 31.

Table 13

Estimated Production of Oven Coke in Czechoslovakia, by Plant
1950-54
(Continued)

Plant Location Name	Equipment		Production (Thousand Metric Tons)				
	Batteries	Coke Ovens	1950 a/	1951 a/	1952 a/	1953 a/	1954 b/
Moravia (Continued)							
President Benes Coke-Chemical Plant, Karvinna	4	137	325	335	310	310	325
Trojice Coke-Chemical Plant, Slezska Ostrava	3	90	185	190	180	180	190
Vaclav Coke-Chemical Plant, Poruba c/	1	40					90
Vitkovice Ironworks, Vitkovice	7	370	1,090	1,110	1,095	1,095	1,157
Karolina Plant	(4) d/	(216)	(565)	(575)	(570)	(570)	(546.8)
Vitkovice Plant	(3)	(154)	(525)	(535)	(525)	(525)	(610.2)
Zbysov Coke-Chemical Plant, Zbysov e/	1	12	45	45	45	45	
Total production			4,876	5,071	5,375	5,700	5,912

a. 60/

50X1

c. Tentatively identified.
d. Figures in parentheses are components of figures for the Vitkovice Ironworks.
e. The production of this plant has not been confirmed. No figure is carried in the 1954 estimate column.

planned for a later date. A new coke battery was added to the Vitkovice Ironworks in the 1952-54 period. Further plans for the construction of new coking facilities are not known, but it is probable that the Second Five Year Plan will include funds for the further expansion of the industry.

5. Limestone.

Czechoslovakia has ample limestone resources suitable for use as fluxing agents in blast furnaces and steelmaking facilities. The quarries are located close to the iron and steel plants. The estimated consumption of limestone in the iron and steel industry of Czechoslovakia in 1949-54 is shown in Table 14.

Table 14

Estimated Consumption of Limestone in the Iron and Steel Industry of Czechoslovakia 1949-54

Thousand Metric Tons

Year	Consumption a/
1949	1,670
1950	1,760
1951	1,800
1952	2,120
1953	2,320
1954	2,580

a. Derived on the basis of 400 kilograms of limestone used per ton of pig iron and 86 kilograms of limestone per ton of steel. 61/

B. Alloying Materials.

1. General.

Czechoslovakia lacks all of the metals required for the production of ferroalloys. Before World War II, Czechoslovakia imported most of its alloying materials from low-cost producers in Western Europe, mainly Norway, Sweden, and the UK. Norway and Italy still supply significant quantities of ferrochromium and ferrosilicon. The tightening of export controls by the West in 1950 and the Communist policy of autarky caused Czechoslovakia to seek new sources within the Sino-Soviet Bloc for most of these alloying materials. The USSR and, to a lesser extent, Poland and East Germany have been the principal suppliers. The supply has not always been adequate, and the industry has resorted to smuggling and the payment of premium prices on the Western black market.

The relatively high cost of electric power, a shortage of electric furnace capacity, and a lack of raw materials have limited production of ferroalloys to blast-furnace ferromanganese and some electric-furnace ferrosilicon and ferrochromium, which are produced in the electro-chemical plant at Sokolov and the Vitkovice Ironworks. Production of ferrochromium and ferrosilicon increased steadily during the First Five Year Plan.

[redacted] Czechoslovakia also has initiated the production of other ferroalloys. Production of these is as yet quite small. 50X1

2. Ferromanganese.

Annual production of ferromanganese in Czechoslovakia totals 20,000 to 25,000 tons, mostly produced in blast furnaces at the Vitkovice 62/ and Trinec iron and steel plants. 63/ The electro-chemical industry produces small quantities of electric-furnace ferromanganese. 64/ In addition to ferromanganese, Vitkovice and Trinec produce 6,000 to 10,000 tons of spiegeleisen per year. 65/ Metallurgical-grade manganese ore required for ferromanganese is imported by rail from the USSR.

To supplement production of ferromanganese, 3,000 to 4,000 tons of both blast-furnace and electric-furnace ferromanganese are imported annually. 66/ The Sino-Soviet Bloc, especially the

USSR, supplies the bulk, but shipments are also known to have originated in Italy and Austria. 67/ The estimated supply of ferromanganese and spiegeleisen in Czechoslovakia in 1949-54 is shown in Table 15.

Table 15

Estimated Supply of Ferromanganese and Spiegeleisen in Czechoslovakia 1949-54

Year	Product	Production a/ (Metric Tons)	Imports b/ (Metric Tons)	Total (Metric Tons)	Value (Million Crowns)
1949	Ferromanganese	19,000	3,800 c/	22,800	193
	Spiegeleisen	6,000	N.A.	6,000	19
1950	Ferromanganese	19,000	3,400 d/	22,400	195
	Spiegeleisen	6,000	N.A.	6,000	20
1951	Ferromanganese	21,000	3,500	24,500	227
	Spiegeleisen	6,000	N.A.	6,000	23
1952	Ferromanganese	23,000	3,500	26,500	266
	Spiegeleisen	8,000	N.A.	8,000	32
1953	Ferromanganese	24,000	3,500	27,500	42
	Spiegeleisen	10,000	N.A.	10,000	6
1954	Ferromanganese	25,000	3,500	28,500	44
	Spiegeleisen	10,000	N.A.	10,000	6

a. For methodology, see Appendix C.
b. Estimates for 1951-54 are based on residual figures derived by subtracting production from apparent consumption and adjusting in accordance with data contained in various trade documents.
c. 68/
d. 69/

3. Ferrochromium.

Czechoslovakia has no deposits of chromite and is dependent entirely on imports for its requirements. Before World War II, Yugoslovia, Turkey, and the Union of South Africa were the main sources of these imports, but after 1948 Albania and the USSR became the chief suppliers, and since 1952 Albania has been almost the sole supplier. Imports in recent years appear to have been sufficient for industrial needs. The iron and steel industry of Czechoslovakia required about 13,000 tons, approximately 40 percent of these imports in 1953. The manufacture of refractory materials and chemical compounds accounted for the remaining 60 percent.

Estimated imports of chromium ore by Czechoslovakia in 1949-54 are shown in Table 16.*

Ferrochromium is produced in the Sokolov Chemical Plant in Sokolov nad Ohri, in Bohemia. Production, however, does not meet requirements and is supplemented by imports from Norway, Italy, the USSR, and East Germany. The estimated supply of ferrochromium in Czechoslovakia in 1949-54 is shown in Table 17.**

4. Ferrosilicon.

Production of ferrosilicon in Czechoslovakia increased 5 times during the First Five Year Plan, starting from 2,500 tons in 1949. Ten thousand tons a year (45-percent grade) are produced in an electric furnace that was installed at the Vitkovice Ironworks during the German occupation. Higher grade ferrosilicon (45 to 90 percent) is produced by the electrochemical industry.

Growing demands for ferrosilicon have made it necessary to continue some imports of higher grade ferrosilicon. The USSR, Poland, and East Germany, supplied the bulk of the imports before 1952. Since then, Italy has become a major supplier, and the perennial Czech-Norwegian trade agreement covers about 500 tons of ferrosilicon a year.

The estimated supply of ferrosilicon in Czechoslovakia in 1949-54 is shown in Table 18.***

* Table 16 follows on p. 36.
** Table 17 follows on p. 37.
*** Table 18 follows on p. 38.

Table 16

Estimated Imports of Chromium Ore by Czechoslovakia
1949-54

Year	Imports (Metric Tons)	Value a/ (Million Crowns)
1949	15,800 b/	32
1950	21,500 c/	43
1951	27,000 c/	54
1952	32,800 d/	66
1953	32,500 e/	65
1954	36,000 f/	72

a. 70/
b. 71/
c. Interpolation.
d. 72/
e. 73/
f. Estimate based on previous year's imports and reports covering part of 1954 imports.

5. Molybdenum.

Czechoslovakia has always been dependent on foreign sources, principally Western Europe, for all of its molybdenum requirements. Tightening of export controls by the West during the early 1950's substantially reduced this source of supply.

During 1952, Czechoslovakia began importing molybdenum ores and concentrates from Communist China. 74/ Imports of concentrates containing a minimum of 65 percent molybdenum sulfide are estimated at between 200 and 300 tons for 1953. 75/ Actual imports for 1954 and planned imports for 1955 may be slightly higher.

Table 17

Estimated Supply of Ferrochromium in Czechoslovakia
1949-54

Year	Production (Metric Tons)	Imports (Metric Tons)	Total (Metric Tons)	Value a/ (Million Crowns)
1949	1,000 b/	4,100 c/	5,100	170
1950	1,250 b/	4,800 d/	6,050	203
1951	1,500 b/	5,000 e/	6,500	218
1952	2,200 f/	5,000 e/	7,200	241
1953	3,700 g/	4,500 e/	8,200	275
1954	6,300 h/	2,400 i/	8,700	291

a. Based on weighted average price of 33.5 crowns per metric ton. 76/
b. Extrapolation based on more accurate documented data for later years.
c. 77/
d. 78/
e. Estimate based on previous year's imports and estimates of production.
f. Estimate based on consumption of 6,000 tons of chromium ore. 79/
g. Estimate based on consumption of 10,000 tons of chromium ore. 80/
h. 1954 Plan, 70-percent increase over 1953. 81/
i. 82/

Table 18

Estimated Supply of Ferrosilicon in Czechoslovakia
1949-54

Year	Production a/ (Metric Tons)	Imports b/ (Metric Tons)	Total (Metric Tons)	Value c/ (Million Crowns)
1949	2,500 d/	9,100 e/	11,600	72
1950	5,000 f/	6,800 g/	11,800	74
1951	7,500 f/	6,400 h/	13,900	95
1952	10,000 i/	6,200 h/	16,200	111
1953	12,000 j/	6,000 k/	18,000	18
1954 l/	15,000	5,000	20,000	19

a. Silicon content is approximately 45 percent.
b. Silicon content ranges from 45 to 90 percent.
c. Based on average US price for 50 percent ferrosilicon (exchange rates used were as follows: 1949-52, 1 crown = US $0.02; 1953-54, 1 crown = US $0.1389).
d. 83/
e. 84/
f. Estimate based on interpolation between 1949 and 1952.
g. 85/
h. Estimate based on import data for 1950 and 1953 and on production.
i. 86/
j. Estimate based on volume of previous annual increases.
k. 87/
l. Estimate based on trends in previous years.

Ferromolybdenum and molybdenum metal, wire, and sheet are imported from the USSR or, through clandestine channels, from the West. 88/ Planned imports of ferromolybdenum totalled 178 tons in 1949. 89/ Italy was reported to have shipped 200 tons to Czechoslovakia in 1954. 90/ The 1952 rate of consumption of metallic molybdenum by the iron and steel industry in Czechoslovakia was reported to be 135 ton tons. 91/

The shortage of molybdenum reported frequently from 1950 through 1952 probably does not exist at this time. Reserves of metallic molybdenum for chemical and metallurgical purposes were reported to be 121 tons as of mid-1953. 92/

Supplies of molybdenum may have been improved by the discovery of molybdenite in the Sulova area in 1953. 93/ The size or industrial importance of this strike is not known, nor can it be ascertained whether or not attempts have been made to process the ore.

6. Titanium.

Until 1952, Czechoslovakia imported its supply of ferrotitanium, principally from the USSR. 94/ During the latter part of 1951, Czechoslovakia started to import large quantities of titanium ore from India and Finland. 95/ In 1954, Czechoslovakia offered Sweden 150 tons of ferrotitanium, an indication that Czechoslovakia may be producing ferrotitanium in some quantity. 96/

7. Tungsten.

The tungsten ore resources of Czechoslovakia are negligible. A few mines in the northwestern part of the country, in the vicinity of Pribram and Teplice, are reported to be producing tungsten concentrates along with lead, copper, and other mineral products, but the total quantity of concentrates produced probably is small. As this general area is noted for uranium mining, it is possible that the tungsten is recovered as a byproduct in the processing of uranium-bearing minerals.

Czechoslovak requirements of tungsten concentrates, about which little is known, are believed to be imported from Communist China, either directly, or indirectly via the USSR. Small quantities have been exported, principally to Austria for processing into tungsten powder which is returned to Czechoslovakia.

Ferrotungsten is produced in Czechoslovakia in unknown quantities. In late 1954 the Czechoslovak Trade Ministry reportedly stated that there were no import requirements for ferrotungsten at that time and that none was contemplated in the near future. 97/

8. Vanadium.

Mineral deposits containing vanadium do not occur in Czechoslovakia. Before World War II, Czechoslovakia extracted vanadium from imported Swedish iron ore. 98/ After World War II and until 1950, ferrovanadium was purchased in Sweden. 99/ In 1950, Czechoslovakia began to import from the USSR vanadium-bearing slag (3.6 to 7.6 percent metallic vanadium), which was then processed for the iron and steel industry at the Vitkovice Ironworks. 100/ Czechoslovakia imported 50 tons of ferrovanadium in 1950, and present needs for the iron and steel industry probably are only slightly larger. 101/

9. Nickel.

Czechoslovakia imports nearly all of its nickel supply. The USSR is the primary source, but clandestine trade with the West supplies an estimated 10 to 15 percent of requirements. Imports from the West at premium prices indicate that the USSR does not fully satisfy the requirements of Czechoslovakia.

Imports of nickel by Czechoslovakia in 1949-54 are shown in Table 19.*

In 1954, apparently stimulated by the desire to augment imports and to reduce dependence on unreliable sources of supply in the West, Czechoslovakia initiated production of nickel from domestic ores. 102/ Improved techniques in the processing of low-grade ore possibly added impetus to this development. 103/ Production plans are unknown, but the small, low-grade nickel deposits, located in the Erzgebirge district of Bohemia and in Ceske Budejovice in southern Bohemia, are believed to be capable of supporting only a modest production effort. 104/

* Table 19 follows on p. 41.

Table 19

Imports of Nickel by Czechoslovakia
1949-54

Year	Imports (Thousand Metric Tons)	Value a/ (Million Crowns)
1949	1.8 b/	69
1950	1.7 b/	64
1951	1.8 b/	66
1952	1.8 b/	68
1953	2.0 b/	79
1954	2.1 c/	81

a. 105/. Prices as of 1 August 1949.
b. Planned figures for the metallurgical industry 106/ divided by the 1949 ratio (97 percent) of metallurgical use to total use. These figures were checked with miscellaneous data covering estimated requirements, known imports, and trade agreements.
c. 1954 estimate based on a Czechoslovakia-USSR trade agreement 107/ and indications that the USSR was supplying nickel steadily during 1954. 108/

10. Cobalt.

Since 1948, Czechoslovakia has been dependent principally on the smuggling of cobalt from Western European countries to meet the requirements of the iron and steel industry. Up to that time, shipments from Sweden were sufficient to meet demands. Attempts to alleviate the critical shortage of cobalt, a shortage which resulted in the curtailment of the production of high-speed steels in 1951-52 and of rotor blades for jet aircraft engines in 1953, have not been successful.

Various methods of overcoming the cobalt shortage have been devised. In 1952-53, Czechoslovakia imported from Communist China cobalt ore which they presumably had the capability to smelt and refine. During 1954, attempts to get cobalt ore from Iran failed. Cobalt is imported also as a component of other materials -- 10 tons of crinite, a cobalt-based (59 percent metallic cobalt) alloy was obtained from France in 1954.

The estimated supply of cobalt in Czechoslovakia in 1949-54 is shown in Table 20.

Table 20

Estimated Supply of Cobalt in Czechoslovakia
1949-54

Year	Imports a/ (Metric Tons)	Value b/ (Thousand Crowns)
1949	10 c/	191
1950	15 d/	312
1951	20 e/	486
1952	35	975
1953	20 f/	557
1954	30 g/	900

a. These are minimum quantities. Estimates are based on miscellaneous trade documents.
b. 19,100 crowns per 100 kg in 1949 109/ multiplied by ratios of US price variance in following years.
c. 110/
d. Interpolation.
e.. 111/
f. 112/
g. 113/

Cobalt occurs with nickel ore in the Jachymov area of northwestern Bohemia and in the Krompachy region in central Slovakia. The Krompachy mines were worked in 1944, but there is no evidence that mining has been done in recent years. In 1954 it was announced that production of nickel from domestic ores had been initiated in Czechoslovakia,* and it impossible that small quantities of cobalt will be produced as a byproduct. 114/

V. Foreign Trade.

A. General.

The values of imports and exports related to the iron and steel industry of Czechoslovakia appear to be approximately in balance. Principal imports are raw materials for steelmaking and alloying. In addition, Czechoslovakia also imports amall quantities of pig iron, possibly some iron and steel scrap, and small amounts of semifinished and finished carbon and alloy steel to meet special domestic needs. Exports consist principally of metallurgical coke and semifinished and finished steel in amounts that in 1953-54 were equivalent to about 15 percent of the production of metallurgical coke and of finished steel in Czechoslovakia. The physical volume of both imports and exports has increased during recent years, reflecting not only the growth in requirements for raw materials to support the expansion in domestic steel production but also the increasing demand for iron and steel in the Sino-Soviet Bloc.

B. Geographical Distribution.

The Sino-Soviet Bloc supplies the major portion of the total import requirements of the iron and steel industry of Czechoslovakia and is the recipient of more than 95 percent of the metallurgical coke, virtually all of the alloy steel, and perhaps 85 percent of the semifinished and finished steel that Czechoslovakia exports. The USSR alone furnishes about 58 percent (metallic iron content) of Czechoslovakia's requirements for iron ore; is the principal supplier of manganese ore, nickel, and other alloying materials; and possibly provides large tonnages of pig iron and of iron and steel scrap. In return the USSR apparently takes about one-half of the semifinished and finished steel exported by Czechoslovakia, as well as substantial amounts of the output of such specialized alloys as high-speed tool steel.

* See p. 40, above.

Other members of the Sino-Soviet Bloc also supply varying proportions of the import requirements of the iron and steel industry of Czechoslovakia and are important markets for the industry's output. For example, East Germany, which supplies a portion of Czechoslovakia's ferrochromium requirements, takes 60 to 65 percent of the exports of metallurgical coke and about 15 percent of the industry's exports of semifinished and finished steel. During 1954, reportedly, East Germany also received about 3,000 tons of alloy steel, of which 60 percent was alloy construction steel. (Soviet shipments of alloy steel to East Germany in 1954 amounted to more than 7,000 tons.) Hungary also supplies important tonnages of raw materials and in return probably receives a major part of its own industry's requirements of metallurgical coke. 115/ Rumania, Albania, and Bulgaria are relatively less important as supply sources or as export markets. Albania, however, is the sole source of the Czechoslovak supply of chromium, and Rumania takes more than 15 percent of the semifinished steel exported by Czechoslovakia.

Czechoslovak trade with the Free World, in addition to imports of iron ore and other basic raw and alloying materials, includes imports of minor quantities of pig iron, alloy steel, and semifinished and finished carbon steel from Western European countries. Imports from the West, although they are only a small fraction of the total trade of the Czechoslovak iron and steel industry, are of some importance in terms of the total available supply of certain commodities -- alloying materials, for example. In addition to shipments moving through legal channels, there is a certain amount of clandestine traffic, particularly in alloying materials that are embargoed under the Battle Act. Exports to the West consist largely of semifinished and finished steel.

C. Trade by Categories of Commodities.

1. Metallurgical Coke.

Czechoslovakia not only produces its own requirements for metallurgical coke but also is a major supplier of other European Satellites. East Germany obtains from Czechoslovakia from one-fifth to two-fifths of the coke required by its iron and steel industry, and Czechoslovak shipments of coke to Hungary account for a sizable proportion of the consumption in that country. Total exports of coke

by Czechoslovakia may have amounted to more than 1 million tons in 1953 and 1954.* Estimated exports of metallurgical coke by Czechoslovakia, by destination, in 1950-54 are shown in Table 21.**

2. Semifinished and Finished Steel.

As a member of the Sino-Soviet Bloc, Czechoslovakia has continued its historical position as a net exporter of semifinished and finished carbon and alloy steel. Since 1948, when total exports of steel were estimated at 376,000 tons, they have increased somewhat, but shipments now are almost exclusively to the USSR and other Communist countries instead of to Western markets which formerly were major outlets. 117/

A similar shift has taken place in exports of alloy steel. Before World War II, Czechoslovakia was a major exporter of alloy steels to the West. Most of these steels were produced in the Poldina Plant. As much as 50 percent of the Czechoslovak production of alloy and special steels may now be destined for Sino-Soviet Bloc countries. Czechoslovakia and the USSR probably are responsible for supplying a large part of the requirements for alloy and special steels of the other Soviet Bloc countries and Communist China.

Czechoslovak imports of semifinished and finished carbon steels are negligible, [redacted] 50X1
[redacted] Although Czechoslovakia, because of its export commitments and shortages of alloying material, has made frequent attempts to purchase high-alloy steels in Western Europe, most of these attempts have been frustrated by COCOM restrictions. Estimated imports and exports of semifinished and finished steel, by Czechoslovakia, by origin and destination, in 1953-54 are shown in Table 22.*** 50X1

3. Pig Iron and Scrap.

There is little available information on the movement of pig iron and scrap into or out of Czechoslovakia. Reported imports of pig iron amounted to more than 10,000 tons in 1952, less than 9,000 tons in 1953, and about 1,500 tons in 1954. Austria supplied most of

* Total Czechoslovak exports of coke have been estimated at 1 million tons in 1948 and at 1.3 million tons annually during 1949-51. 116/
** Table 21 follows on p. 46.
*** Table 22 follows on p. 48.

the known imports in 1952-53, and minor tonnages were reported from Belgium-Luxembourg, East Germany, Norway, and the USSR. 118/ [redacted] 50X1
[redacted] The trade agreement with 50X1
the USSR, however, provides for annual Soviet shipments of 100,000 tons of scrap and about the same amount of foundry pig iron. 119/ Except for a shipment of 1,200 tons of pig iron in 1952, there is no indication of actual imports against these quotas.*

Table 21

Estimated Exports of Metallurgical Coke by Czechoslovakia
by Destination
1950-54

Thousand Metric Tons

Destination	1950	1951	1952	1953	1954
Soviet Bloc					
Bulgaria	N.A.	21 a/**	N.A.	N.A.	15 b/
East Germany	348 c/	417 d/	700 e/	685 f/	595 g/
Hungary h/	300	300	300	300	300
Rumania i/	25	25	25	25	25
USSR	N.A.	2 a/	N.A.	N.A.	N.A.
Total i/	673	765	1,025	1,010	935
Other Countries					
Austria	104 k/	120 l/	34 l/	6 l/	16 l/
France	2 m/	1 n/	6 n/	0 n/	0 n/
Switzerland	68 k/	23 o/	14 o/	0 o/	0 o/
Yugoslavia	50 p/	15 p/	0	0	0
Total	224	159	54	6	16
Grand total j/	897	924	1,079	1,016	951

* Continued on p. 50.
** Footnotes for Table 21 follow on p. 47.

Table 21

Estimated Exports of Metallurgical Coke by Czechoslovakia
by Destination
1950-54
(Continued)

a. 120/
b. 121/
c. 122/
d. 123/
e. [redacted] 700,000 tons were imported from Czechoslovakia. [redacted] total 6-month actual deliveries of 351,000 tons. 124/ 50X1 50X1
f. Estimate [redacted] rail shipments of 28,278 carloads of coke through Bad Schandau, 1 March through 31 December, plus estimates of 3,000 carloads per month during January and February. Estimated tonnage -- 20 tons per car. 50X1
g. Estimate [redacted] rail shipments through Bad Schandau during first 6 months. There are indications that additional shipments may have entered East Germany through other points. 50X1
h. Hungary's imports of coke probably exceed 300,000 tons a year. [redacted] 125/ 50X1
i. The 1952 total is the only actual figure given for the 5-year period. Fragmentary information tends to support an estimate of at least 25,000 tons a year for 1950-54. 126/ 50X1
j. Totals are minimum quantities; they do not include estimates for the destinations and years for which source data are not available.
k. 127/
l. 128/
m. 129/
n. 130/
o. 131/
p. 132/

Table 22

Estimated Imports and Exports of Semifinished and Finished Steel by Czechoslovakia, by Origin and Destination a/*
1953-54

Metric Tons

Destination of Exports	1953	1954
Sino-Soviet Bloc		
Bulgaria	N.A.	N.A.
East Germany	62,800 b/	58,400 b/
North Korea	N.A.	200 c/
Rumania	65,000 d/	65,000 d/
USSR	214,000 e/	203,750 e/
Total f/	341,800	327,350
Other Countries		
Argentina	31,851 g/	N.A.
Austria	N.A.	4,000 h/
Brazil	N.A.	5,992 i/
Denmark	N.A.	2,000 h/
Finland	1,000 h/	13,000 h/
Iceland	N.A.	2,000 h/
India	N.A.	2,615 j/
Indonesia	N.A.	(US $294,000) k/
Italy	1,159 l/	N.A.
Lebanon	N.A.	9 m/
Netherlands	N.A.	2,000 h/
Portugal	N.A.	1,000 h/
Sweden	2,000 h/	8,000 h/
Switzerland	N.A.	5,000 h/
Turkey	1,000 h/	11,000 n/
UK	2,000 h/	6,000 h/
Total f/	39,010	62,616

* Footnotes for Table 22 follow on p. 49.

Table 22

Estimated Imports and Exports of Semifinished and Finished Steel by Czechoslovakia, by Origin and Destination a/
1953-54
(Continued)

Metric Tons

Origin of Imports	1953	1954
Austria	24,000 n/	5,000 h/
Sweden	1,000 h/	N.A.
West Germany	8,000 h/	3,000 h/
Belgium-Luxembourg	624 o/	2,000 h/
France	p/	N.A.
Norway	1,000 h/	1,000 h/
Total	34,624	11,000 f/

a. Amounts shown represent minimum shipments.
b. 133/
c. 134/
d. Estimated on the basis of a report which covers 1950, 1951, and 1952 and gives an annual minimum of 70,000 tons. 135/
e. [redacted] 50X1
[redacted] 50X1 The 1949 trade agreement between these two countries provided for shipments of some 120,000 tons of these commodities to the USSR, and subsequent agreements have claimed that various percentage increases in trade would occur in the years to which the agreements applied. If the original quota were met and if the claimed increases occurred, tonnage in 1953-54 may have approximated the amount reported. 136/
f. Totals do not include estimates for years for which no source data are available.
g. 137/
h. 138/
i. 139/
j. 140/
k. Trade agreement. 141/
l. 142/
m. 143/

Table 22

Estimated Imports and Exports of Semifinished and Finished Steel by Czechoslovakia, by Origin and Destination a/ 1953-54 (Continued)

n. Based on compilation of [redacted] shipments for the year. 50X1

o. 144/

p. 145/. Trade agreement provided for French exports of 18,000 tons. No actual exports were reported by France.

VI. Distribution of Products.

A. Pig Iron, Crude Steel, and Semifinished Steel.

All pig iron and crude steel produced in Czechoslovakia is consumed by steel plants and foundries within the country. About 80 percent of the ingot steel is produced from hot metal in the four integrated plants, and the remainder is made from cold pig iron from blast furnaces located at considerable distances. Some semifinished steel is exported, principally to the USSR and the European Satellites.

B. Rolled Steel Products.

A breakdown for the 1949 and 1953 allocation of rolled steel products in Czechoslovakia was contained in an official plan issued by the Economic Council in 1949. 146/ These percentages of planned production were applied to estimated 1954 production. Because production in 1954 was an estimated 600,000 tons under the plan, these percentages probably are subject to considerable modification. Exports, for example, are estimated to have been about 16 percent of production, compared with the planned 20.3 percent for 1949 and 1953. Planned distribution of rolled steel products in Czechoslovakia in 1949 and 1954 is shown in Table 23.*

* Table 23 follows on p. 51.

Table 23

Planned Distribution of Rolled Steel Products in Czechoslovakia a/
1949 and 1954

Industry	Percentage of Total Production	1949 (Thousand Metric Tons)	1954 (Thousand Metric Tons)
Metallurgy and machinery	46.8	750	1,200
Trades and handicraft	4.4	70	110
Transportation	8.7	140	220
Construction	7.3	120	180
Maintenance b/	9.1	150	230
Exports	20.3	320	510
Reserves	0.5	8	12
Wastage	1.1	18	27
Second class material	0.6	10	15
Tolerance (error)	1.2	19	30
Total	100.0	1,600	2,500

a. Percentages were derived from documentary source, 147/ which contained planned distribution of rolled products in 1949. These percentages were applied to estimated 1949 and 1954 production of rolled products (see Table 9, p. 24, above), and results were rounded to two significant figures.
b. Includes maintenance for the following industries: mining, metallurgy, electric power, chemicals, glass, ceramics, textile, paper, leather, rubber, and food and agriculture.

VII. Inventories and Stockpiles.

A counterpart of the Soviet Main Administration of State Material Reserves, established in some of the other European Satellites, has not been organized as yet in Czechoslovakia.

There are shortages of materials at every level of the iron and steel industry in Czechoslovakia. Blast-furnace shops complain of irregular deliveries and the inadequacy of supply of iron ore; steelmakers charge that the lack of pig iron, scrap, and ferroalloys prevents the fulfillment of production schedules; rolling mill operators claim that finishing facilities are not being utilized economically; and manufacturing plants complain of the quality of finished steel. It is probable that the steel industry has not been able to accumulate a strategic reserve of iron and steel products.

VIII. Manpower and Costs and Values.

A. Manpower.

Labor productivity in the iron and steel industry in Czechoslovakia is much lower than that in the US industry but compares favorably with that in the East German industry. On the basis of 1953 US data, 1954 East German figures, and 1953 Czechoslovak plans, the following comparison is made:

Iron and Steel Industry	Annual Crude Steel Tonnage per Worker
Czechoslovakia (1953)	39.2
East Germany (1954)	36.2
US (1953)	155.6

Although the 1953 labor plan for the metallurgy industries in Czechoslovakia includes workers in the nonferrous metals industry, this segment -- on the basis of gross value of its output -- amounts to only about 10 percent of the total. This difference is counterbalanced by the fact that the 1953 labor plan does not include those steelworkers employed in steel foundries located in manufacturing plants.

The First Five Year Plan called for an increase of about 25 percent in the number of workers, but production was to increase 48 percent. According to the Plan, then, labor productivity was to increase about 18 percent. 148/

The manpower plan for the Ministry of Metals and Ores in Czechoslovakia in 1949-53 is shown in Table 24.

Table 24

Manpower Plan for the Ministry of Metals and Ores in Czechoslovakia a/ 1949-53

	Average Number of Workers				
Type of Worker	1949	1950	1951	1952	1953
Office worker	11,880	12,810	13,620	13,860	14,080
Apprentices	2,560	2,720	2,880	2,990	3,100
Manual workers	67,760	72,170	75,700	76,550	77,320
Total	82,200	87,700	92,200	93,400	94,500

a. The figures include those workers engaged in the production of nonferrous metals as well as those producing iron and steel.

B. Costs and Values.

According to the First Five Year Plan, costs of production are divided into three main categories: expenses for raw materials, personnel expenses, and other expenses. Expenses for raw materials cover all material costs, including coal for coke and fuel; personnel expenses comprise wages and salaries; and other expenses include amortization, 50X1 which amounts to approximately 50 percent of this category.

[redacted]

* Table 25 follows on p. 54.

Because of the impossibility of assigning a valid value to the Czechoslovak crown, the absolute cost of the production of steel in Czechoslovakia compared with that in the US cannot be determined. It would appear that the higher relative cost of raw materials in Czechoslovakia reflects the uneconomic sources of the industry's supply.

IX. Technology, Quality, and Specifications.

A. Technology.

The organization responsible for the direction of research and the development of technology in the iron and steel industry of Czechoslovakia has not been identified. Such an organization probably is part of the Main Administration of Foundries in the Ministry of Metals and Ores. This office directs the programming, controls the budget, and reviews the results of the various research organizations, and laboratories under its jurisdiction.

Research institutes and experimental laboratories exist in all of the larger iron and steel plants in Czechoslovakia. The trends of the investigations under way in these organizations were itemized in the First Five Year Plan. The planned projects included research on the efficient processing of domestic ores, the development of economical methods for producing pig iron and steel, the manufacturing and casting of steel, the processing of steel by moulding, the refining of steels, the manufacture of pure metals, the economical production of semifinished and finished steel products, new applications of steels and of variously formed metals and alloys, metallurgical analysis, and methods of testing metallurgical products.

The First Five Year Plan allocated 345.5 million crowns for the new research institutions, about 2 percent of all investment planned for metallurgical plants in Czechoslovakia. Allocation included an unknown amount for the development of research on nonferrous metals. Planned investment in research and development in the iron and steel industry of Czechoslovakia in 1949-53 is shown in Table 26.*

* Table 26 follows on p. 56.

Table 26

Planned Investments in Research and Development in the Iron and Steel Industry of Czechoslovakia a/ 1949-53

Organization	Amount (Million Crowns)
Construction of research institute (no further information)	155.3
Completion of research institute (no further information)	31.0
Welding institute in Slovakia	13.0
Research institute in Vitkovice	66.0
Research institute in Trinec	27.2
Research institute in Kladno	40.0
Research institute in Podbrezova	13.0
Total	345.5

a. 151/

In addition to the 345.5 million crowns allocated for the building of research institutes, 750 million crowns were allocated for the performance of research in metallurgy at existing institutions and laboratories. 152/

Professional competence is at a premium at all levels of the iron and steel industry in Czechoslovakia. Before World War II, Czechoslovak engineers, technicians, plant foremen, and skilled workers were recognized internationally for their ability and for

the quality of their products. The war interrupted professional training for 7 years, and, as a result, there has been a shortage of well-trained, efficient personnel at all levels of the industry, from the mining of raw materials through the finishing of steel products. Another factor contributing to the shortage of key personnel was the purge of workers following the Communist coup of February 1948. Engineers, technicians, administrators, and skilled laborers were removed from their jobs and replaced by individuals whose only qualification was political reliability. The lack of competent personnel has been reflected in the quality of the industry's output and has been an important reason for failures to meet planned goals. 153/

B. Quality.

The reputation of the iron and steel industry in Czechoslovakia for the quality of its products before World War II has suffered in recent years. The use of inferior raw materials, the shortages of alloying metals, the ever-increasing production norms in steel plants, the scarcity of competent personnel, and the high rate of absenteeism of workers have all contributed to the poor quality of steel products. Rejection of steel items by consumers in Czechoslovakia is common, and complaints of traditional buyers of Czechoslovak steel outside of the country, particularly in the West, have resulted in failures to reorder. 154/

C. Specifications.

A complete list of standards to cover all steel produced in Czechoslovakia has not been issued, and the lack of such a list has been a subject of concern in technical publications. Czechoslovak standards began to be issued in 1950, and at the present time they cover only those steels which are most widely sold or which are most difficult to produce. Designations usually consist of the initials CSN, the number 41 or 42, and a four-digit number. Standard Class 41 and 42 are reserved for the metallurgical industry.

Soviet long-range plans for the integration of the steel industries of the European Satellites include the standardization of all steel products to Soviet GOST specifications, but little preparatory work has been done in Czechoslovakia to achieve such unification. 155/

X. Capabilities, Vulnerabilities, and Intentions.

A. Capabilities.

The iron and steel industry of Czechoslovakia ranks first in production among the European Satellites and contributes significantly to the economy of the Sino-Soviet Bloc in exports of metallurgical coke and finished steel. Abundant resources of coking coal would provide an economic base for substantial expansion of production if Western sources of high-grade iron ore were freely available. Under the policies imposed by the Czechoslovak government, however, the industry will continue to be handicapped by inadequate and sub-standard domestic iron ore and by the long rail haul of iron ore from the Krivoy Rog, its principal source.

B. Vulnerabilities.

Economically and strategically the iron and steel industry of Czechoslovakia is vulnerable to any interruption in the importation of its raw materials. The larger part of the requirements for iron ore and almost the entire supply of alloying materials are imported. Interruption of the delivery of these raw materials would result in curtailment of production.

The industry is also vulnerable to the extent that concentration of facilities constitutes a vulnerability. Vitkovice contains 2 steel plants: the Vitkovice Ironworks and the Klement Gottwald Steelworks, whose blast furnaces produce approximately 41 percent of the nation's pig iron and 48 percent of its crude steel. The V.M. Molotov Ironworks at Trinec produces approximately 39 percent of the pig iron output of Czechoslovakia and 35 percent of the crude steel. The Poldina Steel Plant at Kladno, maker of the famous Poldi special steels, produces about 58 percent of the electric-furnace steel.

C. Intentions.

Intentions of the government of Czechoslovakia to shift to a wartime economy would not be immediately evident from developments in the iron and steel industry. If a change of direction is adopted by the government, the implementation of the "new course" could be concealed by the apparent continued effort of the iron and steel industry to raise production to a level more in line with capacity and the announced economic plan goals.

APPENDIX A

FIRST FIVE YEAR PLAN (1949-53) FOR THE METALLURGICAL INDUSTRY IN CZECHOSLOVAKIA

The Czechoslovak First Five Year Plan, which had a 1953 goal of 4.7 million tons of steel, allotted 14.9 billion crowns for investment in the metallurgical industry. The planned investment program for the metallurgical industry in Czechoslovakia in 1949-53 is shown in Table 27.* The planned production of the metallurgical industry in Czechoslovakia in 1949-53 is shown in Table 28.** The value of planned production of the metallurgical industry in Czechoslovakia in 1949-53 is shown in Table 29.***

* Table 27 follows on p. 60.
** Table 28 follows on p. 61.
*** Table 29 follows on p. 63.

Table 27

Planned Investment Program for the Metallurgical Industry
in Czechoslovakia a/
1949-53

Area and Purpose	Amount (Million Crowns)
Czechoslovak Provinces (Bohemia and Moravia)	
Production of iron and steel, including central administration, sales outlets, warehouses, and research institutes	12,999.5
Production of nonferrous metals	1,033.0
Total	14,032.5
Slovakia	
Production of iron and steel	450.0
Welding Research Institute	13.0
New metallurgical plant (believed to be the Huko Kombinat at Kosice)	50.0
Metallurgical production (wire, screws, cogs)	60.0
Production of nonferrous metals	294.5
Total	867.5
Grand total	14,900.0

a. 156/

Table 28

Planned Production of the Metallurgical Industry
in Czechoslovakia a/*
1949-53

Thousand Metric Tons

Product	1949	1950	1951	1952	1953
Metallurgical coke b/	4,820	5,040	5,150	5,565	6,020
Mining coke	(3,340) c/	(3,550)	(3,550)	(3,550)	(3,550)
Metallurgical coke	(1,480)	(1,490)	(1,600)	(2,015)	(2,470)
Pig iron	1,865	1,890	1,905	2,360	2,725
Foundry	(200)	(200)	(200)	(280)	(310)
Other	(1,665)	(1,690)	(1,705)	(2,090)	(2,415)
Steel	2,650	2,680	2,750	3,160	3,550 (original) 4,700 (revised)
Forgings	255	256	296	350	475
Rolling mill products	1,645	1,664	1,666	1,920	2,074 (original) 2,726 (revised)
Products of wire, screw, and chain plants	109	118	129	139	152

* Footnotes for Table 28 follow on p. 62.

Table 28

Planned Production of the Metallurgical Industry
in Czechoslovakia a/
1949-53
(Continued)

Thousand Metric Tons

Product	1949	1950	1951	1952	1953
Gray iron castings	N.A.	N.A.	N.A.	N.A.	669
Iron and steel plants	(86)	(102)	(138)	(139)	(140)
Metalworking plants	N.A.	N.A.	N.A.	N.A.	(529)
Wrought iron castings	N.A.	N.A.	N.A.	N.A.	19.7
Iron and steel plants	(4.0)	(4.2)	(7.7)	(7.7)	(7.2)
Metalworking plants	N.A.	N.A.	N.A.	N.A.	(12.5)
Steel castings	N.A.	N.A.	N.A.	N.A.	151.0
Iron and steel plants	(26.5)	(32.0)	(37.0)	(41.0)	(44.0)
Metalworking plants	N.A.	N.A.	N.A.	N.A.	(97.0)

a. 157/
b. The production of metallurgical coke is concentrated in 11 coke plants. Seven of these plants are at coal mines, and their production is reported as mine coke; 4 are at steel plants, and their production is reported as metallurgical coke.
c. Figures in parentheses are components of product category totals.

Table 29

Value of Planned Production of the Metallurgical Industry in Czechoslovakia a/
1949-53

Million Crowns

Product	1949	1950	1951	1952	1953
Pig iron	4,100	4,160	4,200	5,190	6,000
Steel	6,100	6,160	6,320	7,260	8,160
Rolled products and forgings	8,740	8,830	9,000	10,430	11,720
Products of forges, presses, and switch and drawing plants	9,964	10,543	11,146	11,891	12,981
Products of wire, screw, and chain plants	1,624	1,752	1,919	2,065	2,256
Gray iron castings	N.A.	N.A.	N.A.	N.A.	N.A.
Iron and steel plants	N.A.	N.A.	N.A.	N.A.	N.A.
Metalworking plants	N.A.	N.A.	N.A.	N.A.	(5,290) c/
Wrought iron castings	N.A.	N.A.	N.A.	N.A.	N.A.
Iron and steel plants	N.A.	N.A.	N.A.	N.A.	N.A.
Metalworking plants	N.A.	N.A.	N.A.	N.A.	(280)
Steel castings	N.A.	N.A.	N.A.	N.A.	N.A.
Iron and steel plants	N.A.	N.A.	N.A.	N.A.	N.A.
Metalworking plants	N.A.	N.A.	N.A.	N.A.	(1,440)

a. 158/
b. Original 1953 plan; the revised plan is not available.
c. Figures in parentheses are components of product category totals.

APPENDIX B

FERROUS METALLURGICAL PLANTS IN CZECHOSLOVAKIA IN 1954*

1. Plants in Bohemia.

a. Ceskomoravska-Kolben-Danek, Stalingrad Heavy Equipment Plant (formerly known as the Marshal Tito Heavy Equipment Plant) at Prague [redacted] 50X1

This plant is one of the largest of its kind in Czechoslovakia. Its iron and steel foundries, which were modernized and expanded during World War II and again in 1952-54, produce a wide range of finished iron and steel castings for other fabricating plants. The number, kind, size, and capacities of steelmaking furnaces are not known.

b. Chabarovice Foundry (formerly known as the Skoda Foundry) at Chabarovice [redacted] 50X1

This plant contains an iron and a steel foundry which produce castings for tank tracks, armor plate, motor housings, propellers, hand grenades, and cogwheels. Facilities and capacities are not known.

c. Julius Fucik Iron and Steel Company (formerly known as the Poldihuette Company) at Chomutov [redacted] 50X1

This plant was constructed in 1916 by the Poldina Steel Plant to process semifinished steel produced in its Kladno Plant.

Two 0.5-ton electric furnaces and one 5-ton in the iron and steel foundry are estimated to have produced 6,000 tons of steel and 3,500 tons of castings in 1954.

50X1

[redacted]

Finishing facilities include 1 hot rolling mill, 1 cold rolling mill, annealing shops, 2 rod and wire drawing shops, and 1 structural shap cold drawing shop. Because no information is available on the amount of semifinished steel shipped into the plant from the Poldina Steel Plant at Kladno, production of finished steel cannot be estimated.

d. Gustav Klimentis Ironworks (also known as the Skoda-Hradek Ironworks, the Bila Cerkev Ironworks, and the Rokycany Ironworks) at Hradek 50X1

This plant, constructed in the 1920's by the Skoda Works to meet the requirements of the Pilsen plant for a wide variety of shapes and sections, was expanded during World War II and in postwar years.

In 1954, three 30-ton open-hearth furnaces had a capacity estimated at 87,800 tons of crude steel. Production is supplemented by shipments of ingot steel and semifinished steel from the Vitkovice Ironworks, the Konev Steel Plant, and the Poldina Steel Plant.

Finishing facilities include 1 hot bar mill, 1 cold bar, 1 structural mill, 1 profile mill, and 1 forge shop.

e. Gustav Klimentis National Tube Rolling Mill (also known as the Chomutov Rolling Mill) at Chomutov 50X1

This rolling mill was built in 1880-90 and expanded during the First Five Year Plan (1949-53). Ingot steel is received from the Konev Steel Plant at Kladno, the May Day Steel Plant at Most, the V.I. Lenin Machine Building Plant at Pilsen, and the Poldina Steel Plant at Kladno. Products include seamless tubes up to 50 millimeters (mm) in diameter, pipes, metal flasks, drive shafts, and steel masts.

Finishing facilities include 2 blooming mills, 4 continuous pipe mills, 5 hot drawing mills, and 1 cold drawing mill. Production of finished steel in 1954 is estimated at 125,000 to 150,000 tons.

f. Konev Steel Plant (formerly known as the Prague Industrial Corporation) at Kladno 50X1

Blast furnaces were rebuilt and rolling mills were mechanized at this integrated steel plant during the First Five Year Plan. One coke battery of 60 to 80 ovens has an annual capacity estimated at 450,000 tons of metallurgical coke. Four blast furnaces, each with

a daily capacity of 200 tons, have an annual capacity estimated at 272,000 tons of pig iron. Two open-hearth shops contain an unknown number of open-hearth furnaces, 5 Bessemer converters, and a 6- to 8-ton electric furnace, with annual capacities estimated at 233,600 tons, 200,000 tons, and 7,000 tons, respectively.

Finishing facilities include 1 blooming mill, 2 roughing mills, 1 rail mill, 1 hoop mill, 1 sheet mill, and 1 rod mill. Production in 1954 is estimated at 250,000 tons of rolling mill products and 2,000 tons of steel castings.

g. Kraluv Dvur Iron Works (also known as the Sokolovsky Iron Works) at Kraluv Dvur [redacted] 50X1

This 50-year-old plant was operated during World War II by the Germans, who expanded facilities, including many of the present rolling mills. The First Five Year Plan provided for the construction of an iron foundry with an annual capacity of 42,000 tons. The plant formerly contained open-hearth furnaces and Bessemer converters, but these steelmaking facilities were dismantled in the postwar period. Two small blast furnaces were torn down and replaced by 1 blast furnace with a daily capacity of 275 tons and 1 blast furnace with a daily capacity of 130 tons. Capacity in 1954 is estimated at 138,000 tons of pig iron, of which approximately 40,000 tons is foundry pig iron. The balance is steel pig iron which is shipped to other steel plants.

Finishing facilities include 1 hot sheet mill, 1 cold strip mill, and 2 cluster mills. Steel billets are shipped into the plant for processing from the Konev and Vitkovice steel plants. Production of rolled products in 1954 is estimated at 50,000 tons.

h. V.I. Lenin Machine Building Plant (formerly known as the Skoda Pilsen Machine Building Plant) at Pilsen [redacted] 50X1

This plant, in operation in the mid-1800's, has been expanded into the largest of its kind in Czechoslovakia. It contains two iron foundries, a steel foundry with a forge shop, and steelmaking furnaces.

Crude steel facilities include 8 open-hearth furnaces, as follows: 2 of 15 tons, 2 of 30 tons, 1 of 35 tons, 1 of 40 tons, and 2 of 50 tons. The annual capacity of these open-hearth furnaces is estimated at 258,400 tons. There are also two 6-ton electric furnaces and two 10-ton electric furnaces with an annual capacity estimated at 32,000 tons. Although this plant, therefore, has the capacity to

produce an estimated 290,400 tons of crude steel annually, operations of such facilities are based on the demands of consumers. Production of crude steel in 1954 probably amounted to 150,000 to 175,000 tons.

i. May Day Steel Plant (also known as the Most Steel Plant) at Most [redacted] 50X1

This plant, which produces principally wire products, was overhauled in 1950, including the rebuilding of 2 open-hearth furnaces which were rebuilt to a capacity of 40 tons. A third furnace was added in 1951. Crude steel capacity in 1954 is estimated at 117,000 tons. Approximately 45 percent of crude steel is shipped to the Julius Fucik National Tube Mill at Chomutov for finishing.

Finishing facilities include 1 reversing mill, 5 continuous mills, 1 structural mill, and 1 wire-twisting mill. Production of finished steel, consisting of structurals, reinforcing steel, and wire products, is estimated at 62,000 tons in 1954.

j. Poldina Steel Plant at Kladno [redacted] 50X1

This plant, famous for Poldi special steels, operates on shipments of pig iron from other plants. Production of crude steel is supplemented by shipments from the nearby Konev Steel Plant.

Steel Shop No. 1, contains 6 to 8 small open-hearth furnaces of unknown capacities and 3 to 7 electric furnaces with capacities ranging from 10 to 20 tons. Steel Shop No. 2 contains 3 or 4 small open-hearths and possibly 2 electric furnaces. The production goal was 130,000 tons of crude steel in 1951. Production in 1954 is estimated at approximately 150,000 tons.

Finishing facilities include 1 billet mill, 2 structural mills, 1 stainless steel mill, 1 plate mill, 1 wire mill, and 2 forge shops. Production of finished steel in 1954 is estimated at approximately 82,000 tons.

k. Skoda Foundry No. 1 (formerly known as the Alba Iron Foundry) at Horovice [redacted] 50X1

This foundry makes electric furnace steel and steel castings for diesel motors and parts. The number and size of the electric furnaces are unknown.

1. Skoda Steel Plant No. 4 at Horovice [redacted] 50X1

Construction of this plant began in 1948. No information is available on the type and size of the furnaces installed for the production of crude steel for castings.

m. Sokolov Chemical Plant (formerly known as the Falknov Chemical Plant) at Sokolov [redacted] 50X1

Before World War II this plant produced ferrochrome, ferromanganese, and ferrovanadium. Production in 1954 was limited to the production of ferrochrome in 2 or 3 electric furnaces of unknown capacities.

n. Zbrojovka-Brno in Tynec nad Sazavou (formerly known as the Jawa Foundry) at Tynec nad Sazavou [redacted] 50X1

This small foundry, with an unknown number of electric furnaces, produces steel castings. The production goal in 1953 was 2,200 tons of electric furnace steel. Capacity in 1954 is estimated at 2,500 tons.

2. Plants in Moravia.

a. First Brno and Kralovo Pole Engineering Works, Gottwald Factories (also known as the Klement Gottwald Machine Building Plant No. 1) at Brno [redacted] 50X1

This plant is an important manufacturer of industrial machinery. Its steel foundry is reported to contain 1 open-hearth furnace, 1 Bessemer converter, and 2 electric furnaces. No further information is available.

b. General Svoboda Coke-Chemical Plant (formerly known as the Frantisek Coke-Chemical Plant) at Privoz [redacted] 50X1

In 1954 this plant had 7 coke batteries of 368 ovens with an annual capacity estimated at 1,420,000 tons of metallurgical coke.

c. Klement Gottwald Steelworks (also known as the Kuncice Steelworks, the "Czech Donbas," and Vitkovice South) at Kuncice nad Ostravici [redacted] 50X1

In 1946, plans were made to expand a small pipe and tube mill at Kuncice into an integrated steel mill by the end of 1955. The First

Five Year Plan provided for coke ovens with an annual capacity of 500,000 tons, 2 blast furnaces with an annual capacity of 500,000 tons, open-hearth furnaces, and rolling mills.

In 1954, 3 coke batteries of 216 ovens had an annual capacity estimated at 1 million tons of metallurgical coke. Two 700-ton blast furnaces had an annual capacity estimated at 476,000 tons of pig iron. Four 200- to 250-ton open-hearth furnaces had an annual capacity estimated at from 572,000 to 650,000 tons of crude steel.

Finishing facilities include 1 blooming mill, 1 sheet mill with an annual capacity of 1.2 million tons, 1 plate mill, 1 pipe and tube mill, 1 seamless tube mill, 1 steel foundry, 1 forge shop, and 1 galvanizing shop. Because an unknown amount of semifinished steel is received from the Vitkovice Ironworks, production of finished steel in 1954 cannot be estimated.

d. Jan Coke-Chemical Plant (also known as the Larisch-Moenich Coke-Chemical Plant) at Karvinna (Doly) [redacted] 50X1

In 1954 this plant had 4 coke batteries of 125 ovens with an annual capacity estimated at 236,900 tons of metallurgical coke.

e. Gustav Klimentis Wire and Cable Factory (also known as the Bohumin Wire and Cable Factory and formerly as the Albert Hahn Ironworks) at Novy Bohumin [redacted] 50X1

The First Five Year Plan provided for the modernization of this plant and for the installation of a new wire mill with an annual capacity of 250,000 tons, a drawing mill, and an iron foundry with an annual capacity of 14,000 tons.

In 1954, 6 small open-hearth furnaces and 1 electric, all of unknown size, had a capacity estimated at 110,000 tons to 125,000 tons of crude steel. Production is supplemented by shipments of about 13,000 tons of semifinished steel annually from other plants.

Finishing facilities include 1 blooming and billet mill, 1 slabbing mill, 1 structural mill, 1 wire-drawing mill, 1 seamless tube mill, 1 butt-welded pipe shop, and 1 nail shop. Production of finished steel in 1954 is estimated at 99,400 tons and consists of structurals, plate, pipes and tubes, and wire products.

f. Lazy Coke-Chemical Plant at Lazy [redacted] 50X1

This plant, with 1 coke battery of 55 ovens, had an capacity estimated at 250,000 tons in 1954.

g. Mesto Zdar Iron and Steel Foundry at Mesto Zdar [redacted] 50X1

This foundry contains 3 electric furnaces of unknown size and in 1954 had a capacity estimated at 24,000 tons of crude steel and 14,000 tons of steel castings.

h. V.M. Molotov Ironworks (also known as the Trinec Ironworks) at Trinec [redacted] 50X1

The V.M. Molotov Ironworks is 1 of the 3 largest integrated steel plants in the country. The First Five Year Plan provided funds for expansion, including a blast furnace, a sintering plant, coke ovens, open-hearth furnaces, hot rolling mills, a refractory plant, additional power facilities, and a gray iron foundry.

In 1954, 6 coke batteries, with 201 ovens, had an estimated capacity of 793,000 tons of metallurgical coke.

Pig iron facilities consist of 6 blast furnaces with estimated daily capacities as follows: 1 of 270 tons, 1 of 225 tons, 1 of 325 tons, 1 of 650 tons, and 2 of 730 to 900 tons. Total annual capacity of these blast furnaces is estimated at 996,000 to 1,112,000 tons. Crude steel facilities include 17 open-hearth furnaces with capacities as follows: 1 of 20 to 25 tons, 5 of 45 to 50 tons, 2 of 65 to 70 tons, 2 of 100 to 120 tons, 5 of 120 to 140 tons, and 2 of 150 tons. Total annual capacity of these open-hearth furnaces in 1954 is estimated at 1,081,000 to 1,211,000 tons. There are also two 10-ton electric furnaces with an annual capacity estimated at 20,000 tons. Total crude steel capacity in 1954 is therefore estimated at 1,101,000 to 1,231,000 tons.

Finishing facilities include 1 blooming mill with an annual capacity of 600,000 tons, 1 blooming mill with an annual capacity of 700,000 tons, 1 universal mill, 1 continuous mill, 1 rail mill, 4 structural mills, 1 wire mill, 1 forge shop, 1 centrifugal pipe casting shop, and 1 steel foundry. Because an unknown amount of semifinished steel is shipped to other plants for finishing, production of finished steel cannot be estimated.

i. Moravian Steel Plant (formerly known as the Repcin Iron and Steel Foundry) at Olomouc 50X1

This small iron and steel foundry produces iron and steel castings and pipe. The steel foundry contains two 3-ton electric furnaces which had a capacity estimated at 6,000 tons of steel in 1954.

Finishing facilities include a steel foundry and two pipe mills.

j. Ostrava Machine Tool Plant and Foundry (formerly known as the Elbertshagen and Glassner Machine Tool Plant and Foundry) at Moravska-Ostrava 50X1

The foundry of this plant contains an unknown number of furnaces for the production of crude steel for castings.

k. President Benes Coke-Chemical Plant (formerly known as the Hohenegger Coke Plant and the Hohanneschacht Coke Plant) at Karvinna (Doly) 50X1

In 1954 this plant had 4 coke batteries of 137 ovens with an annual capacity estimated at 325,000 tons of metallurgical coke.

l. Stalingrad Ironworks (also known as the Liskovec Ironworks and Karlova Hut) at Liskovec 50X1

This plant, built in the late 1890's, was modernized by the Germans during World War II and expanded in 1950 by the addition of a cold rolling mill. Semifinished steel is received from steel mills at Vitkovice and Trinec and from the Konev Steel Plant in Kladno.

Finishing facilities include 1 hot-dip tinplate mill, 1 cold strip mill, 2 hot pack mills, 2 cold sheet mills, 1 plate mill, 1 zinc-coating shop, and 1 bridge construction shop. Products include sheet, plate, tinplate, galvanized sheet and plate, and bridge assemblies. Production of finished steel in 1954 is estimated at 250,000 tons.

m. Storek Krenova Machine Building Plant at Brno [redacted] 50X1

The steel foundry of this plant produces crude steel for castings either in 1 or more electric furnaces installed by the Germans during World War II or in 3 small gas-heated, open-hearth furnaces of unknown capacity.

n. Svinov Tube Rolling Mill at Svinov [redacted] 50X1

This tube mill, under the direction of the Vitkovice Ironworks, was equipped originally with a small Pilger mill. It has been expanded to produce seamless tubes and electrically welded tubes. Production in 1954 is estimated at 20,000 to 25,000 tons of pipes and tubes.

o. Tatra Motor Vehicle and Railroad Car Plant (formerly known as the Ringhoffer Motor Vehicle and Railroad Car Plant) at Koprivnice [redacted] 50X1

This plant contains a steel foundry and forge shop. An unknown number of electric furnaces produces crude steel for casting and forgings.

p. Tovarna Obrabecich Stroju (TOS) Machine Tool Factory (also known as the Great October Machine Tool Plant and as the Gloekner Motor Vehicle Plant) at Kurim [redacted] 50X1

This factory, which was almost entirely destroyed during World War II, contains a new steel foundry which was completed in 1952.

In 1954, 3 or more electric furnaces are estimated to have produced 15,000 tons of crude steel and 10,000 tons of steel castings.

q. Trojice Coke-Chemical Plant (also known as the Trinity Coke-Chemical Plant and formerly as the Wilczek Coke-Chemical Plant) at Slezska Ostrava [redacted] 50X1

In 1954 this plant, with 3 coke batteries of 90 coke ovens, had a capacity estimated at 190,000 tons of metallurgical coke.

r. Vaclav Coke-Chemical Plant at Poruba [redacted] 50X1

This plant consists of 1 coke battery of 40 ovens and in 1954 had a capacity estimated at 90,000 tons of metallurgical coke.

s. Vitkovice Ironworks at Vitkovice [redacted] 50X1

This plant, which was founded in 1928, has been expanded into 1 of the 3 largest integrated steel plants in Czechoslovakia. Production includes iron and steel castings, forgings, blooms, billets, bars, skelp, plate and sheet, strip steel, seamless and welded pipes and tubes, screws, bridge constructions, and mining equipment.

In 1954, 2 groups of coke batteries -- the Karolina, with 4 batteries of 216 ovens, and the Vitkovice, with 3 batteries of 154 ovens -- had a capacity estimated at 1,157,000 tons of metallurgical coke.

Pig iron facilities consist of 5 blast furnaces with daily capacities as follows: 1 of 350 tons, 1 of 375 tons, and 3 of 600 tons. Total annual capacity of these blast furnaces in 1954 is estimated at 858,500 tons. Crude steel facilities include 14 open-hearth furnaces with capacities as follows: 1 of 30 to 40 tons, 2 of 35 to 40 tons, 1 of 40 to 45 tons, 1 of 120 to 140 tons, 1 of 140 to 160 tons, 1 of 160 to 180 tons, 1 of 200 to 225 tons, and 6 of 220 to 250 tons. Total annual capacity of these open-hearth furnaces in 1954 is estimated at 1,416,900 to 1,616,700 tons. There are also 4 electric furnaces, as follows: 1 of 5 tons, 2 of 10 tons, and 1 of 30 to 40 tons. Annual capacity of these electric furnaces in 1954 is estimated at 55,000 to 65,000 tons. Total crude steel capacity in 1954 is therefore estimated at 1,471,900 to 1,681,700 tons.

Finishing facilities include 1 blooming mill, 1 billet mill, 1 bar mill, 3 plate mills, 2 sheet mills, 1 rail and structural mill, 1 universal mill, 1 280-mm strip mill, 1 450-mm rolling mill, 1 330-mm rolling mill, 1 280-mm rolling mill, 1 350-mm finishing mill, 1 280-mm finishing mill, 1 pipe and tube mill, 1 steel foundry, and 1 forge shop. Because ingots and semifinished steel are shipped in unknown quantities to other finishing mills, no estimate can be made of production of finished steel in 1954.

3. Plants in Slovakia.

a. East Slovak Machine Building Plant (also known as the CKD Krivan Plant) at Prakovce [redacted] 50X1

The steel foundry in this plant contains an unknown number of furnaces of unknown size for the production of crude steel for castings.

b. Hlinik nad Hronom Steel Foundry at Hlinik nad Hronom [redacted] 50X1

This foundry, completed in March 1951, contains three electric furnaces of an unknown size for the production of crude steel for castings.

c. Hronec Iron and Steel Foundry at Hronec [redacted] 50X1

The First Five Year Plan provided a sum equal to US $800,000 for the modernization and expansion of this foundry. A steel foundry with an annual capacity of 10,000 tons was completed and probably yields 5,000 to 6,000 tons of finished castings.

d. Kovohute Plant at Banska Stiavnica [redacted] 50X1

Little information is available on this plant, which probably has electric furnace capacity for making crude steel for castings.

e. Viliam Siroky Iron and Copper Works at Krompachy [redacted] 50X1

Construction of this plant was begun in 1938, suspended during World War II, and given high priority by the First Five Year Plan. Information on steelmaking facilities is not available, but the plant probably contains steelmaking furnaces.

f. Stalin Heavy Machinery Plant (also known as the CKD Krivan Heavy Machinery Plant) at Turciansky Svaty Martin [redacted] 50X1

Construction of this plant began in mid-1947. Plans included one 600-ton blast furnace, 3 open-hearth furnaces, and 1 light rolling mill of Czechoslovak design. A foundry, the equipment of which is not known, went into production in December 1949. A steel foundry,

with an unknown number of electric furnaces, was under construction in October 1952. The three small open-hearth furnaces were scheduled for operation in 1953. In 1954 the electric and open-hearth furnaces probably were producing crude steel for castings.

g. Sverma Ironworks (also known as the Central Slovak Ironworks) at Podbrezova [redacted] 50X1

This plant, built in 1860, was modernized during the First Five Year Plan. The open-hearth furnaces were rebuilt, and additions included a scrap crusher, new gas generators, and a pipe mill.

In 1954, 1 small blast furnace had an annual capacity estimated at 100,000 tons of pig iron. Additional pig iron is received from the nearby Tisovec Blast Furnace Plant. Five 40-ton open-hearth furnaces and one 10-ton electric furnace had a capacity estimated at 205,000 tons of crude steel.

Finishing facilities include 1 universal mill, 3 structural mills, 1 rod mill, 1 sheet and strip mill, and 1 seamless tube mill. Production of finished steel in 1954 is estimated at 107,000 tons.

h. Tisovec Blast Furnace Plant (also known as the Mosa Blast Furnace Plant) at Tisovec [redacted] 50X1

The single blast furnace at this plant was overhauled following World War II. The entire production, estimated at 40,000 tons in 1954, is consumed by the nearby Sverma Ironworks.

i. K.Ye. Voroshilov Armament Plant (also known as the Skoda Armament Plant) at Dubnica nad Vahom [redacted] 50X1

This plant, constructed in the 1920's by the Skoda Works, Pilsen, was enlarged before World War II and again during German occupation.

In 1947 the Czechoslovak government made plans to transfer all armament production of the Skoda Pilsen Plant to Dubnica nad Vahom. At present the plant is being expanded again, and a new town is being built nearby to house the workers.

In 1948-49 a new iron and steel foundry, reportedly one of the largest in Czechoslovakia, was started. It contains one 15-ton open-hearth furnace with an annual capacity estimated at 14,600 tons and two 6-ton and two 4-ton electric furnaces with an annual capacity estimated at 20,000 tons. All steel is used to make steel castings, production of which in 1954 is estimated at 19,000 tons.

APPENDIX C

METHODOLOGY

The methodology employed in this report in reaching conclusions and in making estimates has been explained, in most instances, in the text or in the footnotes to tables. Methods not so given are described below.

1. Pig Iron and Crude Steel.

a. Estimates of Production.

[redacted] 50X1
50X1
50X1

[redacted] The 1954 estimate of production of crude steel, 4.3 million tons, was based on an announcement made by the Czechoslovak delegate at the April 1955 meeting of the Steel Committee of the Economic Commission for Europe and, pending further information, is believed to be approximately correct and within the capabilities of the iron and steel industry. Production estimates based on the output of individual steel plants were not possible with the information available.

The estimate of production of electric furnace steel was based on a factor of 1,000 tons of steel annually per ton of furnace capacity. Experience has shown this factor to be consistently within reason, although production from various types of furnaces fluctuates widely.

[redacted] 50X1

b. Estimates of Capacity.

Daily capacities of blast furnaces generally were available. Each capacity was multiplied by 340, the estimated number of operating days per year, to obtain the estimated annual capacity for production of pig iron. An example follows:

Estimated 1954 Blast-Furnace Capacity of the V.M. Molotov Ironworks at Trinec

Blast Furnace Number	Estimated Daily Production (Metric Tons)	Operating Days per Year	Production Capacity (Thousand Metric Tons)
1	270	340	91.8
2	225	340	76.5
3	325	340	110.5
4	650	340	221.0
5	730 to 900	340	248.2 to 306.0
6	730 to 900	340	248.2 to 306.0
	Estimated pig iron capacity		996.2 to 1,111.8

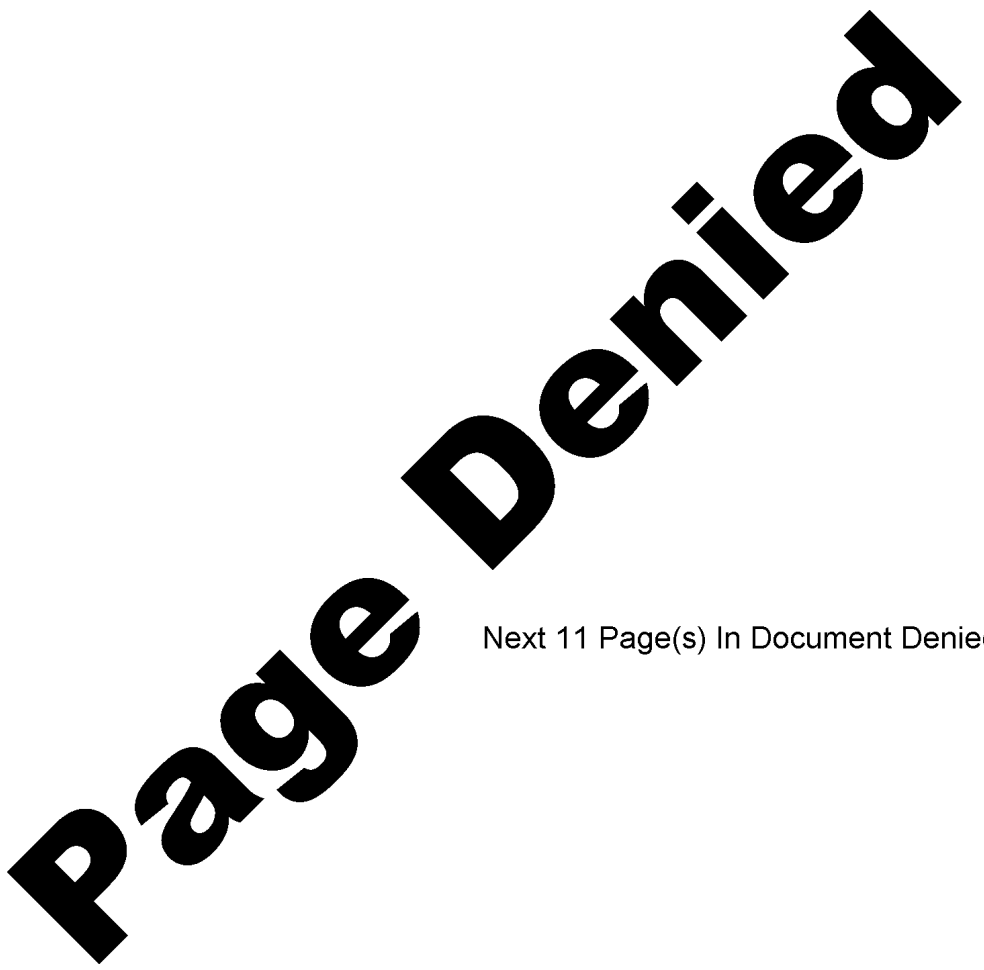
50X1

50X1

Estimated 1954 Steel Capacity of the V.M. Molotov Ironworks at Trinec

Number of Furnaces	Capacity of Each (Metric Tons)	Heats per Day	Operating Days per Year	Production Capacity (Thousand Metric Tons)
Open-Hearth Shop No. 1				
5	45 to 50	3	325	219.5 to 244.0
1	120 to 140	2	325	78.0 to 91.0
Open-Hearth Shop No. 2				
1	20 to 25	3	325	19.5 to 24.4
2	65 to 70	3	325	126.8 to 136.4
2	100 to 120	2	325	130.0 to 156.0
4	120 to 140	2	325	312.0 to 364.0
Open-Hearth Shop No. 3				
2	150	2	325	195.0
	Total open-hearth steel capacity			1,080.8 to 1,210.8

50X1



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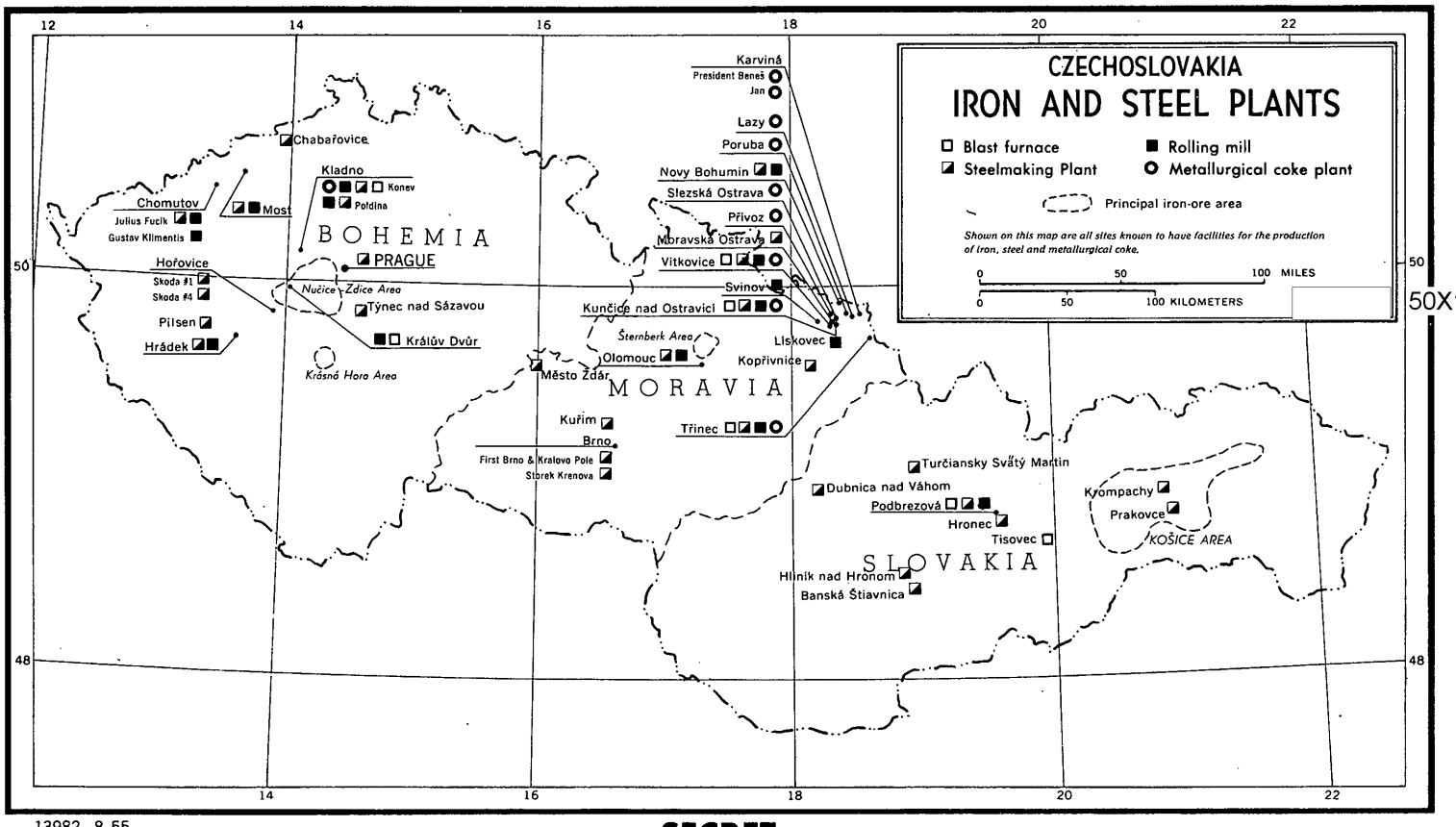

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