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ECONOMIC INTELLIGENCE REPORT

THE CONSTRUCTION INDUSTRY
OF NORTH KOREA
1954-56



CIA/RR 105
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CENTRAL INTELLIGENCE AGENCY
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(ORR Project 47.1737)

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Office of Research and Reports

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THE CONSTRUCTION INDUSTRY OF NORTH KOREA*
1954-56

Summary

After the Korean War, three successive programs were initiated to reconstruct and expand the economy of North Korea. The first program, during 1953, emphasized rehabilitation work; the second, a Three Year Plan of reconstruction, was carried on during 1954-56; and the third, a Five Year Plan of development and expansion of the economy during 1957-61 (provisions of which have not yet been announced) was to be based on the accomplishment of the first two programs.

In 1956, at the completion of the Three Year Plan, the construction industry of North Korea had partly rehabilitated the war-devastated economy. Without substantial aid from the Sino-Soviet Bloc, even this amount of progress in rehabilitation and construction could not have been achieved.

By the end of 1956, industry was rehabilitated to the point where parts of plants were in operation and production was approximately at the 1949 level except in the chemical and fuel industries. The cement industry was partly rehabilitated, with production slightly exceeding the 1949 level, but other building materials lagged behind the demands of the construction industry. Power facilities had not attained the 1949 level, and reconstruction work needed to be carried into the period of the Five Year Plan. Railroads were rehabilitated, and two new rail lines had been built to relieve bottlenecks on the only east-west route. Track conditions, however, remained inferior to those of 1949. The main effort in rail construction was being directed to the rehabilitation of electrified lines, with the goal of completing this work by 1961. Highways in the south near the 38th parallel were rehabilitated, but no new highway construction of any importance was under way. The agricultural area was still undergoing development through

* The estimates and conclusions contained in this report represent the best judgment of ORR as of 1 July 1957.

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reconstruction of irrigation systems. The amount of housing rehabilitated and constructed was inadequate both in respect to quality and quantity.

It is evident that construction projects in all sectors of the economy were planned by Soviet advisers attached to administrative organs responsible for these projects. The implementation of planning, however, was hampered by a loosely organized construction effort. Because construction projects were not under centralized control, there was little standardization of construction design, supplies of labor and construction materials were often poorly allocated, and construction machinery and equipment were not utilized to the fullest extent. The reorganization at the beginning of 1957, which placed construction of all types under the Ministry of Construction, probably will tend to correct these deficiencies and increase the rate of construction.

North Korea has suffered from a critical shortage of construction materials and equipment needed to carry out a large-scale rehabilitation program. Although the Sino-Soviet Bloc supplied a large amount of these materials to the construction industry, improper use of this aid slowed the rate of construction. A short supply of skilled labor and technicians caused construction materials to be wasted and construction equipment to be left idle and abandoned at many construction sites through inexperience and improper supervision. Consequently, the services of Bloc technicians were necessary on major construction sites to insure the progress made in rehabilitation by 1956.

A major problem of the construction industry was the lack of an adequate supply of labor. Chinese Communist army units and North Koreans from all segments of the population were recruited to augment the labor force. Efforts to create a permanent construction labor force were blocked by the channeling of construction labor into production enterprises as rehabilitation progressed. Training programs for construction labor appreciably increased neither the number of skilled workers nor the level of productivity of labor by the end of 1956.

The transmission of construction goals of the Three Year Plan into the period of the Five Year Plan demonstrates the failure of the construction industry to rehabilitate the economy to the levels planned by the end of 1956. Aid from the Sino-Soviet Bloc is declining, and no further aid approaching the 1954-56 level has been announced. At the present time, therefore, North Korea is faced with the necessity of relying on its own resources for carrying out construction in the Five Year Plan.

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I. Introduction.

During the 40 years of Japanese control before World War II, Korea emerged from a state of handicraft industry and economic feudalism to a position among the more advanced industrial areas of Asia. As a member of the Japanese colonial empire, Korea was developed as a part of the Japanese economy and not as a self-sustaining unit. Under Japanese sponsorship, capital was invested in the construction and development of heavy and light industry, hydroelectric power, mining, and agriculture for the purpose of fulfilling the requirements of the Japanese economy. Railroads were constructed mainly along the coasts to facilitate the movement of traffic through the ports. Japanese technicians and managers held the key positions in the economy, and native Koreans constituted the labor force. Under the Japanese, a relatively small Korean labor force of skilled and semiskilled workmen and a much larger force of unskilled workmen was created. At the end of World War II, nearly all of the Japanese engineers, technicians, and skilled laborers were repatriated. This left Korea seriously deficient in trained technical personnel in all sectors of the economy.

The main industrial base and most of the natural resources were located north of the 38th parallel after the division of Korea in 1945. During its occupation by the USSR in the period 1945-48, North Korea inaugurated a program of industrial reconstruction* to repair the relatively slight damage from World War II. The program followed previous Japanese policy in that it was closely integrated with and orientated toward the economy of the occupying power. The rehabilitation of factories, railroads, and mines that had existed before the war and the emphasis on heavy industry were all directed toward meeting the requirements of the USSR. In March 1949 the USSR granted North Korea long-term credits amounting to 222 million rubles (US \$55.5 million)** for the purchase of machinery, equipment, and industrial

* In this report, four types of additions to production capacity are distinguished, as follows: (1) rehabilitation -- the restoration of previously existing capacity; (2) reconstruction -- rehabilitation plus some additional expansion beyond previous capacity; (3) expansion -- additions to a given level of capacity not involving rehabilitation; and (4) new construction.

** The conversion rate at the official exchange rate is 4 rubles to US \$1, which probably overstates the dollar value of Soviet aid by 100 percent. Dollar values are given in US dollars throughout this report.

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raw materials for the reconstruction program. 1/* Soviet engineers and technicians planned and supervised construction projects in which Koreans made up the unskilled labor force. Some Korean industrial cadres were either trained on the job or in newly instituted technical schools, and some cadres were sent to the USSR and to other Sino-Soviet Bloc countries for training.

The Korean War rendered the industrial sector of the North Korean economy more than 65 percent inoperable. 2/ It is estimated that the damage suffered by the economy amounted to about 420 billion won 3/ (US \$3.5 billion),** much greater than that suffered as a result of World War II. Because of extensive war damage, North Korea instituted three successive programs to reconstruct and expand the economy. The first program was one of rehabilitation work carried out in 1953 in all industries preliminary to the second program. The second program, the Three Year Plan (1954-56), provided for rehabilitation and reconstruction work and envisaged the outstripping of the 1949 level of production in most sectors of the economy. The third program, the First Five Year Plan*** (1957-61), although unpublished, was to be based on the results achieved during the post-Korean War period and, according to announcements made in 1957, will continue many of the goals planned for fulfillment under the Three Year Plan.

II. Organization of the Construction Effort.

The administration of the construction industry in North Korea has undergone at least two important organizational changes since 1953, both of which were the result of the government's lack of experience in planning and administration. At the beginning of the reconstruction period in 1953, 5/ the State Construction Commission was created to carry out general rehabilitation activities and was made directly responsible to the Cabinet. Even after the creation of this special commission, however, each ministry continued to be responsible for its own construction projects. The jurisdictional

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*** The conversion rate is 120 North Korean won to US \$1 obtained on the basis of the following cross rates which prevailed in 1954-55: 4 rubles equal US \$1, and 30 won equal 1 ruble. 4/

*** Hereafter referred to as the Five Year Plan.

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relationship which existed between the ministries and the commission with regard to responsibility for construction is not clear. Construction trusts* were established under the State Construction Commission and the ministries, and local construction trusts were established under the peoples committees of the provinces and of the cities of P'yongyang and Kaesong.

After the first year of the Three Year Plan, an administrative change occurred which indicated that this incongruous organization with its disparate economic functions was not effectively implementing the reconstruction program. In January 1955 the Ministry of Construction was established, and the functions of the State Construction Commission were transferred to this Ministry. 6/ Construction trusts continued to exist under the jurisdiction of several ministries and local organizations.

At the beginning of 1957 a further reorganization of the construction industry occurred, with the result that control over construction activities now appears to be more centralized and more efficient. The provincial and local construction trusts were merged under the Ministry of Construction. 7/ Industrial construction projects formerly under the jurisdiction of other ministries were placed under the Ministry of Construction. Construction units in each province were merged into a single provincial construction trust under the Ministry of Construction, with headquarters in the capital city of the province. Some municipalities are apparently equal in status to provincial trusts under the Ministry of Construction. For example, in the city of P'yongyang, five new construction trusts have been created from previously existing units. These new trusts are responsible for construction projects in their respective districts.

III. Construction Under the Three Year Plan (1954-56).

A. Investment in the Construction Program.

In early 1957, North Korea announced that during the period of the Three Year Plan a total of 80.6 billion won (US \$672 million) was invested in rehabilitation and capital construction projects in all

* A trust is an administrative organ responsible for the allocation of resources to the enterprises under its control and for the supervision of construction projects -- it acts as an intermediary between the ministry and the construction site.

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sectors of the economy. ^{8/} This amount was 1.8 billion won in excess of the amount planned to be invested during the period of the Three Year Plan. The distribution of investment in capital construction* in the Three Year Plan, 1954-56, is shown in Table 1.

Table 1

Distribution of Investment in Capital Construction in North Korea
During the Three Year Plan ^{a/}
1954-56

<u>Sector</u>	<u>Total Investment (Billion Won)</u>	<u>Percent of Total Investment</u>
Productive sector		
Industry	39.9	
Agriculture	7.4	
Transportation and communications	10.6	
Commercial and public catering	1.0	
Subtotal	<u>58.9</u>	<u>73.1</u>
Nonproductive sector ^{b/}	21.7	26.9
Total	<u>80.6</u>	<u>100.0</u>

a. Derived from ^{10/}.

b. In Communist terminology, all expenditures for social overhead, such as those for housing, hospitals, and education, are considered to be nonproductive expenditures.

* Capital construction figures include two primary components of investment: that in construction-installation work and that in production machinery and equipment. The state of statistical reporting in North Korea is at such a low level that these two primary components of investment in capital construction have not been differentiated. Their percentage relationships are probably based on the Soviet-Chinese Communist model of 52 to 60 percent for construction-installation work and 32 to 38 percent for machinery and equipment.

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Of the total of 39.9 billion won (US \$332.5 million) invested in industry, 32.4 billion won were for heavy industry and 7.5 billion won were expended on light industry. 11/ Construction of water conservancy projects accounted for 4.2 billion won (US \$35 million) of the total investment of 7.4 billion won in agriculture. 12/ The 21.7 billion won (US \$180.8 million) invested in the so-called non-productive sector of the economy were for the reconstruction of housing, educational, cultural, and public health facilities and of public buildings in urban areas.

The volume of investment in capital construction for 1949 and 1953-55 is shown in Table 2.* An analysis of the investment relationships implicit in Table 2 is helpful in reconstructing the pattern of changing demands placed upon the resources of the construction industry in 1953-55.

Comparing 1953 with 1949, the increase in investment for industry, agriculture, and transportation and communications was much greater than that for nonproductive construction. This distribution indicates the choice that was made in the immediate post-Korean War period to mobilize the construction resources in favor of industry, agriculture, and transportation and communications as opposed to the construction of housing, educational, cultural, and public health facilities.

By contrast, comparing 1954 with 1953, total investment in capital construction in the nonproductive fields increased at a much greater rate than did total investment in the productive fields. This distribution reflects the upsurge of investments in the construction of educational facilities to support the technical training program and in the construction of housing necessitated by the increasing demands of the Three Year Plan.

Investment in transportation and communications in 1954 compared with 1953 increased at a greater rate than investment in other categories. The higher priority assigned to capital construction in this field indicates the necessity for rehabilitating the

The costs of administration, survey, and design represent the remaining portion of capital investment. 9/

* Table 2 follows on p. 8.

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Table 2

Index of the Volume of Investment in Capital Construction
in North Korea a/
1953-55

	1949 = 100		
Sector	1953	1954	1955
Productive sector	150	370	476
Industry	151	348	518
Agriculture	159	210	402
Transportation and communications	171	707	498
Nonproductive sector <u>b/</u>	102 <u>c/</u>	381	359
Educational and cultural establishments	22 <u>c/</u>	267	172
Public health establishments	48 <u>c/</u>	151	252
Housing	98 <u>c/</u>	353	430
Total volume of investments	135	373	441

a. 13/. Figures are based on prices of 1 January 1950. Percentage relationships of 1956 to 1955 are not available.

b. In Communist terminology, all expenditures for social overhead, such as those for housing, hospitals, and education, are considered to be nonproductive expenditures.

c. There are probably other construction projects included in the nonproductive sector which were not listed in the preceding source.

transportation and communications networks as quickly as possible to support economic growth.

In 1956, the final year of the Three Year Plan, investment in capital construction was concentrated in major construction projects which were in the last phases of construction. 14/ Investment for capital construction in industry, especially heavy industry, and in agriculture continued to have a high priority.

Figures are not available for planned investment in capital

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construction during the Five Year Plan. In 1957, however, it was announced that investment in capital construction would be reduced in comparison with 1956 except for increased investment in housing and educational facilities. ^{15/} This reduction probably indicates that construction projects begun under the Three Year Plan are being carried over into the period of the Five Year Plan. With the decline in aid from the Sino-Soviet Bloc,* it would indicate, further, that few new starts in construction will be made during the Five Year Plan, but rather that completion of projects spread out over a number of years will be emphasized.

B. Aid by the Sino-Soviet Bloc to the Construction Effort.

The progress made in North Korea in rehabilitation and reconstruction during the Three Year Plan could not have been achieved without large-scale aid from the Sino-Soviet Bloc. A part of this aid, both economic and military, has provided the construction industry with technicians, materials, machinery and equipment, and skilled labor. ^{16/} The estimated aid by the Sino-Soviet Bloc to North Korea, 1954-64, is shown in Table 3.

Table 3

Estimated Aid by the Sino-Soviet Bloc to North Korea ^{a/}
1954-64

	Million US \$					
<u>Country</u>	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958-64</u>	<u>Total</u>
USSR (1954-56)	97.5	85.0	67.5			250.0
Communist China (1954-57)	122.0	89.4	56.9	56.9		325.2
European Satellites (1954-64)	35.6	31.0	56.0	26.0	73.4	222.0
Total	<u>255.1</u>	<u>205.4</u>	<u>180.4</u>	<u>82.9</u>	<u>73.4</u>	<u>797.2</u>

a. ^{17/}

* See B, below.

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The aid from the USSR has been used on construction projects in nearly all sectors of the economy, especially on heavy industrial projects. That from Communist China has provided skilled labor as well as material and technical assistance to construction projects and has been used for rehabilitating transportation, water conservancy, and light industrial installation (see Appendix A and the map, Figure 1*). About 80 percent of the total aid granted by the Sino-Soviet Bloc to North Korea to date was expended during the Three Year Plan. 18/ In the future, North Korea probably must rely on production from its present rehabilitated capacity for exports to obtain imports needed to sustain the construction program.

The USSR has furnished technical personnel for reconstruction projects in practically every type of industry, in agriculture, and in urban rehabilitation, but its main interest has been in the reconstruction of heavy industry. The influence of the USSR is especially evident in the construction industry, where Soviet construction techniques are being copied and assimilated by the North Koreans. 19/

Communist China has contributed several hundred technicians and thousands of laborers to the North Korean reconstruction program. Thousands of Peoples Volunteers (units of the Chinese Peoples Liberation Army) have been used for rehabilitation of railroads and roads, water conservancy projects, reconstruction of plants in the building materials industry, rehabilitation of the capital city of P'yongyang, and on other projects in the branches of light industry.

Other Sino-Soviet Bloc countries have contributed technicians and skilled labor to reconstruction projects in specific sectors of the North Korean economy: Poland in the reconstruction of mines and railroad facilities; East Germany in the chemical and metallurgical industries, particularly those in the Hamhung-Hungnam industrial area, the building materials industry, and urban construction in Wonsan; Czechoslovakia in the machine tool and electrical industries; Hungary in the engineering industry; Bulgaria in the lumbering and woodworking industries; and Rumania in the cement industry. 20/

C. Construction in Major Sectors.

The role of the construction industry in the economy of North Korea is of major importance. In economic planning, emphasis has been

* Inside back cover.

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placed on the following: (1) rapid industrialization, which requires not only rehabilitation but also expansion of existing plants and the construction of new plants; (2) the reconstruction and expansion of power facilities; (3) the rehabilitation of railroads and roads; (4) the construction of housing for workers in cities and at industrial installations; and (5) extensive irrigation and flood-control construction.

The Three Year Plan stressed construction as an important precondition for the successful fulfillment of production in all sectors of the economy. Premier Kim Il-song, in his report to the Third All-Party Congress of the North Korean Labor (Communist) Party in 1956, stated that the major task of the Plan was to lay a foundation for the future by giving priority to the development of heavy industry and at the same time rapidly rehabilitating light industry and agriculture. 21/ Additional rehabilitation and construction of transportation and power facilities were necessary to supply construction sites and installations with materials and power.

1. Industry.

The Korean War rendered the industrial sector of the North Korean economy about 65 percent inoperable. Metallurgical and chemical plants, power installations,* and mines were the most severely affected. It was reported in early 1957 that more than 8,000 plant buildings 22/ were destroyed during the war.

In the Three Year Plan, priority was given to the reconstruction of industry, with emphasis on heavy industry. 23/ North Korea planned to restore the 1949 level of production by the reconstruction of existing facilities and to construct new industries to correct the imbalanced economy. 24/ To insure rapid industrial recovery, approximately half of the investment in capital construction was directed to the reconstruction of the industrial sector. During the Three Year Plan, investment in industrial construction amounted to 39.9 billion won (US \$332.5 million), of which 32.4 billion won (US \$270 million) were for heavy industry and 7.5 billion won (US \$62.5 million) were for light industry. 25/

Progress in reconstruction was indicated by the announcement that the production goal envisaged in the Three Year Plan for state-operated and cooperative organizations was fulfilled during

* See 2, p. 12, below.

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1955. 26/ Nevertheless, the electric power industry, the fuel industry, and the chemical industry failed to reach their pre-Korean War level of production by the end of 1956. 27/ As a result, it is planned during 1957 to continue emphasizing reconstruction efforts in these branches of industry. 28/

During 1953-56, more than 240 industrial establishments were reported completely or partly reconstructed, and about 80 were reported newly constructed. 29/ Although these industrial installations were reported to be rehabilitated, only parts of plants were in operation, and many of the plants reported to be newly constructed were still under construction at the beginning of 1957. As a result, many of the goals of the Three Year Plan for industrial reconstruction will be carried over into the period of the Five Year Plan.*

The great hindrance to the rehabilitation and construction of industry has been the critical shortage of construction materials and skilled manpower brought about by the Korean War. The progress made in industrial recovery during the Three Year Plan could not have been accomplished without large-scale aid** from the Sino-Soviet Bloc, which furnished these necessary items to the construction program.

2. Power Facilities.

One of the most important prerequisites to the rehabilitation and continued development of the North Korean economy is the restoration and expansion of electric power facilities. This will depend initially on the reconstruction of the major hydroelectric systems (see the map, Figure 2***) which were badly damaged during the Korean War.

The Three Year Plan provided for production capacity in electric power to be restored to approximately the 1949 level by the end of 1956. 30/ This goal was not attained, however, and is being carried over into the period of the Five Year Plan. During 1953-55 the state invested 5.1 billion won (US \$42.5 million) in the restoration and construction of electric power facilities. An additional sum of 2.7 billion won (US \$22.5 million) was planned to be invested

* See Appendix A for a list of selected construction projects showing the reported status of construction at the end of 1956.

** See B, p. 9, above.

*** Inside back cover.

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in 1956. 31/ The North Koreans themselves have invested a minimal amount in the rehabilitation of power installations and have relied heavily on Sino-Soviet Bloc aid, especially from the USSR and Czechoslovakia.

The greatest reconstruction effort has been expended on the Sup'ung Powerplant on the Yalu River. Technical and material aid from the USSR, reported to amount to 100 million rubles (US \$25 million), 32/ has been concentrated on this plant, the largest in North Korea. The project for the reconstruction of the dam at Sup'ung was under way in March 1957 33/ but probably will not be completed until 1959.

Czechoslovakia has provided engineers and various parts of generating equipment for the Pujon, Changjin, and Hoch'on River projects, 34/ which were scheduled for completion in 1955 35/ but are still in progress. 36/

Projects for the construction of the Tongno River Powerplant and the Kanggye Powerplant, which were begun by the Japanese, have been resumed. 37/ Construction of the Tongno River Powerplant is reported to have begun in September 1955, 38/ but actual construction probably did not start until April 1956. 39/ This plant is scheduled to be in partial operation in 1959. Other construction in progress at this site includes accommodations for workers and the completion of a 94-kilometer (km) road to be used for transporting construction materials and supplies. 40/ The pouring of concrete for the dam was scheduled to begin in April 1957. The Kanggye Powerplant is reported to have reached an advanced stage of planning before World War II. Work at this site was resumed in May 1956, and the plant is scheduled to begin limited operation in 1961. 41/

3. Transportation Facilities.

a. Railroads.

Because of its importance to the economy, reconstruction of the railroad system in North Korea began immediately after the Korean War. During the period of the armistice negotiations, reconstruction and rehabilitation efforts were intensified, and in 1953 it was announced that all mainline tracks had been restored. 42/ The prewar level of operation, however, had not yet been attained. 43/ This rehabilitation can be attributed to the readily available supplies of

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construction materials previously deposited along the routes during the war and the concentration of labor composed of the Chinese Peoples Volunteers and that recruited from the North Korean population.

The Three Year Plan, which began in 1954, emphasized continued restoration of existing line and yard track and the reconstruction of bridges and other rail facilities. In the period between the armistice and the end of 1955, about 860 km of rail line and more than 300 bridges, totaling 21 km in length, were reconstructed or newly constructed. ^{44/} At the end of 1955, all of the war-damaged lines had been rehabilitated, although track conditions remained inferior to those of 1950, largely because of hasty repairs and inexperienced workers. Most of the classification yards, stations, and repair facilities were reconstructed.

The railroads in North Korea are oriented in a north-south direction paralleling the coasts. Only one line, the P'yongyang-Wonsan line, connects the east and west coastal railroads. A new 120-km rail line, which is believed to have been constructed before 1954, extends from Kusong southeast through Kunu-ri to Sinp'yong (Sinsongch'on), a rail junction on the P'yongyang-Wonsan line. This provides a more direct east-west route and avoids the bottlenecks at the P'yongyang and Sinanju junctions. An extension of this line northeastward from Kusong to Sinuiju was reported under construction in May 1956, but its present status is not known. ^{45/} Another new route, believed to have been built about the same time as the Kusong-Sinp'yong line, is a 48-km line north from Tokch'on to Huich'on, an extension of the Sinp'yong-Tokch'on route. This line serves as an alternate to the Manp'ojin-P'yongyang line and also bypasses the Sinanju junction.

In July 1955, North Korea announced plans to electrify more than 600 km of rail lines by 1961.* ^{46/} In 1955 a construction fund of 200 million won (US \$1.7 million) was expended on electrification, and in 1956 it was planned to be increased to 400 million won (US \$3.3 million). ^{47/} The steepest section of the P'yongyang-Wonsan line, terminating at Yangdok, was reported completed in May 1956. ^{48/} By 1961 the entire 160-km P'yongyang-Wonsan line, about 300 km of the Manp'ojin-P'yongyang line, and the 72-km Yongch'on-Ch'ongjin (Kimchaek) section of the Najin-Wonsan line will be electrified. The USSR, which is supervising the electrification program, is furnishing technicians

* This is rehabilitation work, with some new construction included.

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and equipment, and Czechoslovakia is supplying electric locomotives. 49/ Electrification on the scale projected will depend on the completion of power stations now under construction.

b. Highways.

The North Korean highway network has not changed substantially since before World War II. After the Korean War the highways, which had been heavily damaged, were reconstructed. Major emphasis was directed toward repair of strategic highways in the southern part of North Korea. By the end of 1956, some of the main highways had been widened and extended, and some bridges had been replaced. 50/ It is believed that, except for short stretches of hard-surfaced roads in the vicinities of P'yongyang and Wonsan, most of the main highways are graveled. Some of the reconstruction and most of the maintenance is the responsibility of adjacent villages. As a result, the quality of construction is poor, and maintenance is a continual problem. Consequently, most highways, although passable, are not in good condition. 51/

4. Housing.

In 1953 the North Korean government estimated that a total of 28 million square meters (sq m) of housing had been destroyed during the Korean War. 52/ Such large-scale destruction of existing housing, coupled with the increased demands levied by an expanding economy, necessitated immediate repair and new construction of housing facilities. To alleviate the shortage brought on by this destruction, the Three Year Plan provided for a large-scale program of housing construction, chiefly in major cities. The goals set in the Three Year Plan, however, were low relative to the need. It was planned to construct and reconstruct about 4.7 million sq m of housing 53/ in the program over a 3-year period. Figuring an average requirement of about 7 sq m per capita, 54/ this amount of housing would accommodate only about 700,000 persons* by 1956.

In February 1957, North Korea reported that since the end of the Korean War 55/ 6.1 million sq m of housing for workers had been constructed and reconstructed with state funds. In spite of this performance during the 4 years 1953-56, housing construction quotas

* It is estimated that the population of North Korea declined 13 percent from 9.1 million in 1949 to 7.9 million in 1955.

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for 1955 and 1956 reportedly were not fulfilled. 56/ Shortfalls in housing construction during the Three Year Plan are largely attributable to the high priority given industrial construction for manpower and materials. The type and quality of housing, moreover, have been of a temporary and semipermanent nature. 57/

Most of the housing constructed has been in urban areas. It is reported that 3.6 million sq m of housing were built in the city of P'yongyang with the aid of the Chinese Peoples Volunteers, 58/ and 170,000 sq m of housing were built in the Hamhung-Hungnam area with the aid of East Germany. 59/

To aid housing construction in rural areas, the Three Year Plan provided that the state would extend credit and provide building materials to individuals in these areas. 60/ A total of 7.3 million sq m of housing 61/ is reported to have been built or rehabilitated in 1953-56. Construction of dwellings in rural areas, however, was dependent on individual initiative, as most of the construction materials allotted for housing construction were allocated to urban areas. Also, housing in rural areas did not require the same type of materials as that in urban areas and probably involved little state expenditure.

Absolute figures are not available for the amount of investment in housing construction during the Three Year Plan, but an index of the volume of investment in housing construction is as follows 62/:

<u>1949 = 100</u>			
<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1956</u>
98	353	430	512*

As shown in this tabulation, the rapid rate of increase of investment in housing construction in 1954 above the level of 1953 reflects the effort to speed the construction of housing at the beginning of the Three Year Plan. The rate of increase of investment decreased markedly in 1955 and 1956, however, indicating that the greatest volume of investment in housing construction was accomplished

* Derived from 63/.

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in 1954. The relative decrease in the rate of investment during 1955 and 1956 corresponds to the announcement that the housing construction quotas for these years were not fulfilled.

The continuing need for housing is shown by the announcement that dwellings with a total floor space of more than 6 million sq m will be built in the period of the Five Year Plan. 64/ This goal, which probably refers to urban workers' housing, is minimal, and even if it is fulfilled, adequate housing will remain a problem for the indefinite future.

5. Agriculture.

In 1953, North Korea began an immediate rehabilitation of the irrigation systems and reservoirs destroyed during the Korean War. With the loss of the agricultural areas to the south, North Korea planned to extend the irrigated area by the expansion of old systems and the construction of new systems. During the Three Year Plan a total of 4.2 billion won (US \$35 million) 65/ was invested in irrigation and flood control projects, an increase above the 2.3 billion won originally provided for in the Plan. 66/

The rehabilitation and construction projects were reported to have expanded irrigated acreage more than 87,000 chongbo (approximately 215,000 acres) 67/ by 1956. The largest irrigation project is in South P'yongan Province (P'yongan-Namdo). This project, originally scheduled for completion in 1955, was nearly completed in April 1957. 68/ Labor for this project includes peasants recruited from agricultural cooperatives, the South P'yongan Provincial Irrigation Construction Trust, and Chinese Peoples Volunteers.

Most of the equipment and materials used in the irrigation projects reportedly are supplied by domestic industry. 69/ Because industrial construction has a high priority for scarce construction materials, lower priority projects such as irrigation have suffered, with the result that construction has been and will continue to be delayed.

IV. Labor Force.

One of the most pressing problems of the construction industry in North Korea is a shortage of both skilled and unskilled labor. Initially, this shortage was caused by Japan's policy of placing its own nationals in the key positions in the Korean economy and allowing few

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Koreans to be trained for these positions. At the close of World War II and the repatriation of the Japanese, Korea suffered a great loss in technical and skilled personnel. The USSR made little effort, moreover, to alleviate this loss during its occupation before the Korean War. Military and civilian war casualties and the large-scale movement of population to the south during and after the Korean War left North Korea with an even more serious shortage of labor with which to rebuild its economy. North Korea has attempted to compensate for this shortage by the use of technicians from the Sino-Soviet Bloc and by an intensive educational program for labor.

A. Supply and Productivity.

One of the major problems facing North Korea at the end of the Korean War in 1953 was its short supply of labor. In 1953-55 it was necessary to deploy most of the labor force to rehabilitation and reconstruction work. As reconstruction progressed during the period of the Three Year Plan, however, the need for labor in the productive field pulled labor from construction and thereby prevented the creation of a permanent and stable construction labor force. 70/

Even with the over-all shortage of labor there was a continued increase in labor employment in all branches of the economy. The relative increases in the number of workers in construction and industry in 1949 and 1952-55 are shown in Table 4.*

The policy of incorporating women into the labor force explains this increase to a great extent. It should be noted that the relative increases shown in Table 4 took place over a period in which the population suffered a net decline of 13 percent.

At the beginning of the Three Year Plan it was planned to increase labor productivity 76 percent in industry and 74 percent in capital construction by 1956. 71/ At the end of the Three Year Plan, however, as shown in Table 5,* increases in labor productivity fell far short of the planned increases, especially in the construction industry.

Several factors contributed to the failure of the construction industry to meet increased productivity goals. Construction sites

* Tables 4 and 5 follow on p. 19.

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Table 4

Index of Increases in Number of Workers and Office Employees
 in Industry and Construction in North Korea a/
 1952-55

	1949 = 100			
Sector	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>
Industry				
Total workers and employees	58	67	88	107
Workers	60	68	88	110
Construction				
Total workers and employees	42	111	161	183
Workers	45	118	167	194

a. 72/.

Table 5

Index of Increases in Labor Productivity
 in North Korea
 1954-56

	1953 = 100		
Sector	<u>1954 a/</u>	<u>1955 b/</u>	<u>1956 c/</u>
Industry	141	149	156
Construction	123	135	136

a. Derived from 73/.

b. Derived from 74/.

c. Derived from 75/.

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lacked organization, machinery was not properly utilized, and not enough effort was expended to train and supervise workers. 76/ The workers lacked adequate housing, sanitation, and other necessities, and the state was slow in bringing construction workers under the contract wage system.* The percentage of workers who left jobs in the construction sector remained high in comparison with other sectors. 77/

B. Education and Training.

North Korea has attempted to increase the number of skilled workers by building technical schools and by enrolling and graduating more engineers and technicians. In addition, a program of training skilled workers in on-the-job classes has been instituted at construction projects, and students and workers have been sent to Sino-Soviet Bloc countries for further study and training.

At the beginning of 1954 a construction university was opened at P'yongyang. 78/ This school was reported to be operated by the state for the purpose of training cadres and technicians in specialized fields of construction and to have three departments -- building construction, construction engineering, and a department for industrial cadres.

Data on the number of students and trainees enrolled are available for individual years, 1954-56, but it is impossible to differentiate the categories and levels of training. At the end of the Three Year Plan it was announced that more than 4,200 technical personnel 79/ and skilled workers graduated from universities, colleges, and technical and factory workers' schools and were assigned to rehabilitation and construction projects. In addition, 800 technical personnel 80/ and specialists trained in Sino-Soviet Bloc countries were assigned to various branches of the economy.

The number of trainees graduated during the Three Year Plan is inadequate to meet the demands of the reconstruction program during the Five Year Plan. Even with the greater emphasis on training, continued reliance on Sino-Soviet personnel will be necessary.

* The contract wage system is the process of setting up productive norms for the workers and rewarding them according to their degree of fulfillment.

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V. Construction Materials.

The Three Year Plan called for increased production of construction materials. The critical shortage resulting from the Korean War made North Korea dependent on the Sino-Soviet Bloc for large quantities of these materials in order to carry out planned rehabilitation and reconstruction projects. Attempts were made to relieve the shortage by collecting and reusing materials already available at construction sites and by partly rehabilitating cement plants and brick factories for immediate production.

By 1956 the shortage of cement had been relieved somewhat, but the production of bricks, structural steel, and lumber was still lagging behind the demands of the construction industry. 81/ Lack of production has not been the only factor that has contributed to the continued shortage of construction materials. Waste at construction sites, the need for better methods of transportation and allocation of materials, and the lack of utilization of local materials have all contributed to this shortage. 82/

During the Three Year Plan, 5 of the 7 previously existing cement plants in North Korea were rehabilitated and began limited operation.* The restoration of these plants was made possible by the importation of production equipment and technicians from the Sino-Soviet Bloc. Restoration has been divided among the USSR, Communist China, East Germany, and Czechoslovakia as follows: Komusan under Soviet supervision; Chonnae-ri under Sino-Soviet, Czechoslovak, and East German supervision; Sungho-ri under Sino-Soviet supervision; Haeju under Sino-Soviet and Czechoslovak supervision; and Ku-Madong under Soviet and Czechoslovak supervision. 83/ Because there has been no mention of cement production in the Sungho-ri Plant at P'yongyang or from the Sariwon Plant since 1953, undamaged equipment may have been salvaged and moved from these plants to one or several cement plants being rehabilitated or constructed.

Two new cement plants were under construction in 1956: the Sin-Madong

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Cement Plant at Ch'ongnyong-ni [redacted] under Soviet supervision 84/ and the Unsan Plant at Unsan [redacted] under Rumanian supervision. 85/ The Sin-Madong plant is being built near Madong in Pongsan-gun, Hwanghae-pukto. 86/ Originally it had been planned to build a new plant at Sungho-ri, but this site was cancelled in favor of the Ch'ongnyong-ni area because large deposits of clay and silica were found near the latter site. This plant, planned to have an annual production of 400,000 metric tons* of cement, 87/ is scheduled to begin operation in 1960. Rumanian cement and construction technicians arrived in North Korea in 1954 88/ to begin surveying the site of the Unsan Plant. It was reported to be under construction in 1955, 89/ but progress of construction is not known.

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It is estimated that during the Korean War about 80 percent of the cement production capacity was rendered inoperable. 90/ The total amount of cement produced for 1949 and 1954-56 and the amount planned to be produced in 1957 are shown in Table 6.

Table 6

Production of Cement in North Korea
1949 and 1954-57

Thousand Metric Tons				
<u>1949</u>	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u> <u>(Plan)</u>
500 <u>a/</u>	225 <u>b/</u>	350 <u>c/</u>	597 <u>d/</u>	800 <u>e/</u>

a. 91/.

b. Derived from 92/.

c. Derived from 93/.

d. 94/.

e. 95/.

The cement industry recuperated slowly and failed to fulfill its annual production goals in 1954 and 1955. As a result it was necessary

* Tonnages are given in metric tons throughout this report.

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to continue to import cement from Communist China during these years. The 597,000 tons produced in 1956 fell short of the original goal of 650,000 tons to be achieved in 1956 under the Three Year Plan. 96/

It is planned during 1957 to produce 800,000 tons of cement and to increase production to more than 1 million tons by 1961. 97/ Based on the expansion of existing capacity and the addition of new capacity represented by the two plants under construction, it is estimated that this increase in production can be achieved by 1961.

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APPENDIX A

STATUS OF SELECTED CONSTRUCTION PROJECTS IN NORTH KOREA
1956

Table 7

Map Key Number	Plant	Location	Type of Construction	Status at End of Year 1956 ^{a/}	Source of Aid	Type of Aid Reported ^{b/}
Heavy Industry						
1	Songnim Steel Mill	Songnim	Rehabilitated	Under way	USSR	T M E
2	Kangsong Steel Works	Kangso	Rehabilitated	Under way	USSR	T M E
3	Songjin Steel Mill	Songjin	Rehabilitated	Under way	USSR	T M E
4	Hwanghae Iron Works	Songnim	Rehabilitated	Under way	USSR East Germany	T M E T E
5	Kimch'aek Iron Smelter	Ch'ongjin	Rehabilitated	Under way	USSR Communist China	T M E T
6	Namp'o Smelter	Chinnamp'o	Rehabilitated	Under way	USSR	T M E
7	Smelter	Munp'yong	Rehabilitated	Under way	USSR	T M E
8	Hungnam Fertilizer Plant	Hungnam	Rehabilitated	Under way	USSR East Germany Communist China	T M E T Labor
9	Chemical and Fertilizer Plant Sunch'on	Sunch'on	Rehabilitated	Under way	Hungary	T

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Table 7
(Continued)

Map Key Number	Plant	Location	Type of Construction	Status at End of Year 1956 ^{a/}	Source of Aid	Type of Aid Reported ^{b/}
10	Pongong Chemical Plant	Hungnam	Rehabilitated	Under way	USSR East Germany	T T
11	Sungho-ri Cement Plant	Sungho-ri	Rehabilitated	Completed	USSR Communist China	T E T
12	Chonnae-ri Cement Plant	Chonnae-ri	Rehabilitated	Under way	USSR Communist China Czechoslovakia East Germany	T T T T
13	Komusan Cement Plant	Komusan	Rehabilitated	Completed	USSR	T E
14	Haeju Cement Plant	Yongdangp'o	Rehabilitated	Under way	USSR Communist China Czechoslovakia	T T T
15	Ku-Madong	Madong	Rehabilitated	Under way	USSR Czechoslovakia	T M T E
16	Sin-Madong	Ch'ongnyong-ni	New	Under way	USSR	T M E
17	Unsan Cement Plant	Unsan	New	Under way	Rumania	T
18	Namp'o Glass Factory	Chinnamp'o	Rehabilitated	Under way	Communist China	T M E
19	Prefabricated Construction Materials Factory	P'yongyang	New	Under way	USSR East Germany	T T
20	Prefabricated Construction Materials Factory	Hamhung	New	Under way	East Germany	T M
21	Asbestos Cement Pipe Factory	P'yongyang	New	Under way	USSR East Germany	T T

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Table 7
(Continued)

Map Key Number	Plant	Location	Type of Construction	Status at End of Year 1956 ^{a/}	Source of Aid	Type of Aid Reported ^{b/}
22	Lumbering Tools Plant	P'yongyang	New	Under way	Bulgaria	T
23	Machine Tools Plant	Huich'on	New	Completed	USSR Czechoslovakia	T M E
24	Machine Tools Plant	Kusong	New	Completed	Hungary	T M E
25	Farm Implements Factory	P'yongyang	New	Completed	USSR	M E
26	Textile Machine Factory	P'yongyang	Rehabilitated	Completed	USSR East Germany Communist China	T M E M E M E
27	Locomotive Plant	P'yongyang	Rehabilitated	Under way	USSR Czechoslovakia Poland	T T T
28	Tractor Repair Plant	Sariwon	New	Under way	USSR	U
29	Rail Tie Preservatives Factory	Kilchu	Unknown	Under way	USSR	T
30	Auto Parts Factory	Huich'on	New	Completed	USSR Czechoslovakia	E T M
31	Precision Instruments Factory	P'yongyang	New	Under way	Hungary	T M E
32	Namp'o Pulp and Paper Mill	Chinnamp'o	Unknown	Unknown	Bulgaria	T M E
33	Pulp and Paper Mill	Kilchu	Rehabilitated	Completed	USSR	U
34	Pulp and Paper Mill	Sinuiju	Rehabilitated	Under way	USSR	T
35	Plywood Mill	Kilchu	New	Under way	USSR	T M

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Table 7
 (Continued)

Map Key Number	Plant	Location	Type of Construction	Status at End of Year 1956 ^{a/}	Source of Aid	Type of Aid Reported ^{b/}
Light Industry						
36	Textile Mill	P'yongyang	Rehabilitated	Under way	USSR	T M E
37	Textile Mill	Chongjin	Rehabilitated	Under way	East Germany USSR	T M
38	Enamelware Factory	Sinuiju	New	Completed	Communist China	T M E
39	Furniture Factory	P'yongyang	New	Under way	USSR	T E
40	Fish Cannery	Sinp'o 	Rehabilitated	Under way	USSR	T E
41	Meat Processing Plant	P'yongyang	New	Completed	USSR	U

a. Only parts of most plants are operating. Some plants are under limited expansion.
 b. T: Technicians.
 M: Materials.
 E: Equipment.
 U: Unknown.

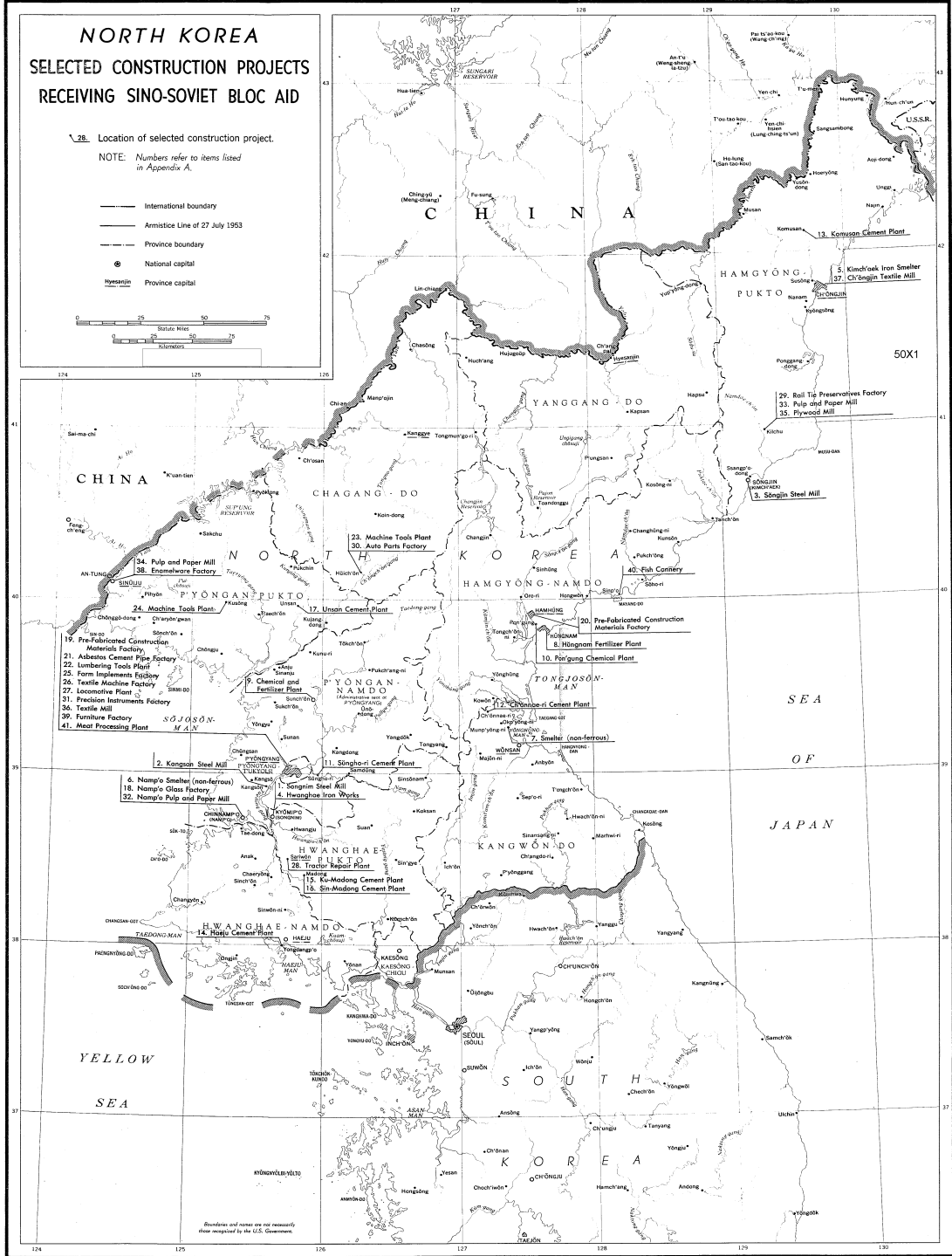
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Figure 1



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