PROVISIONAL INTELLIGENCE REPORT

PROGRESS OF THE CONSTRUCTION INDUSTRY IN COMMUNIST CHINA 1953-56

CIA/RR PR-159
15 May 1957

CENTRAL INTELLIGENCE AGENCY

OFFICE OF RESEARCH AND REPORTS

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(ORR Project 47.1580)

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CIA/RR PR-159
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PROGRESS OF THE CONSTRUCTION INDUSTRY IN COMMUNIST CHINA* 1953-56

Summary

During the first 4 years of the First Five Year Plan (1953-57) the construction industry of Communist China has shown a rapid rate of growth both in the volume of output and in the variety of projects handled, although it has often committed blunders and suffered from inefficient organizational policies and antiquated working methods. Progress has been considerable in spite of the fact that China has had to rely greatly on the Soviet Bloc for assistance in the construction of the large-scale and complex projects.

Since 1953 the organization of the industry has been modified along more efficient lines (see the chart, Figure 1**). In 1954 its financial structure was strengthened by the creation of the Peoples Construction Bank. The importance of construction materials and urban development led to the creation of the Ministry of Construction Materials and the Ministry of City Construction in 1956. Waste, confusion, and duplication of effort were reduced by better coordination and planning.

During 1955 the construction industry cut back on nonproductive investment*** projects and stressed economies in construction. The impetus of the effort provided by construction activity in the first 2 years of the First Five Year Plan was somewhat slowed. A quite discernible acceleration of construction in all sectors was evident, however, in 1956 -- many large projects were completed a year or more in advance of scheduled target dates, and many scheduled to be started in the Second Five Year Plan (1958-62) were begun. Other trends which developed in the first 4 years of the First Five Year Plan were as follows: (1) a reduction of construction time on many projects; (2) an increased use of standardized designs; (3) an improvement in

* The estimates and conclusions contained in this report represent the best judgment of ORR as of 15 March 1957.

** Following p. 2.

*** All references to investment in this report are to investment by the state.

new techniques, particularly in the widespread use of prefabrication plants; (4) increased mechanization; and (5) a better over-all capability on the part of the labor force. Initial construction targets for new railroads and highways have been surpassed, as have targets for construction of new housing, for water conservancy, and for agricultural projects. Even with these achievements, however, construction has not been sufficient to keep these sectors from lagging behind the needs of the economy. The production of cement, one of the most important ingredients for most types of construction, surpassed its goal of 6 million metric tons* for 1957 by 400,000 tons 1 year ahead of schedule. In spite of this considerable overfulfillment, there was a shortage of cement throughout 1956.

The construction industry must continue to grow in 1957 and thereafter if Communist China is to fulfill the goal for capital investment in the Second Five Year Plan, which provides for doubling the 42.74 billion yuan** planned in the First Five Year Plan.

I. Introduction.

Po I-po, currently head of the National Economic Commission of Communist China, stated in a speech of 1 July 1955: "Basic construction is the most important factor in the realization of Socialist industrialization of our State and in the solution of our economic problems for a long period of time." 1/*** The emergence of China as an industrial power in the Far East will depend as in the past to a great extent on its construction industry.

During the first 4 years of the First Five Year Plan (1953-57) the construction industry of Communist China has shown a rapid rate of growth both in the volume of output and in the variety of projects handled, although it has often committed blunders and suffered from inefficient organizational policies and antiquated working methods. Progress has been considerable in spite of the fact that China has had to rely greatly on the Soviet Bloc for assistance in the construction

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* Tonnages are given in metric tons throughout this report.

** Equivalent to US $17.4 billion at an exchange rate of 2.46 yuan equal to US $1. This yuan-dollar ratio has been used in computing all yuan estimates in this report.

*** For serially numbered source references, see Appendix B.

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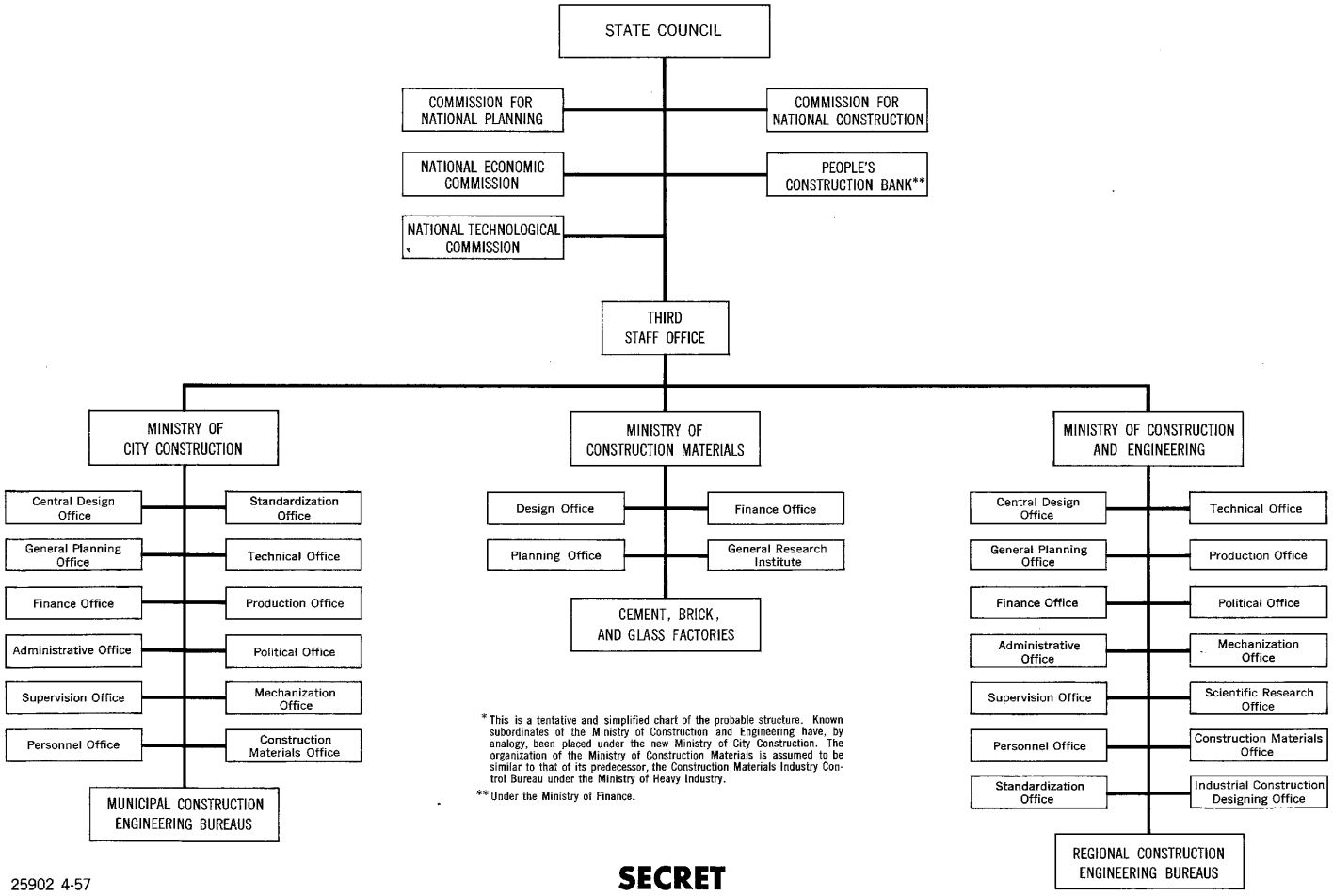
Figure 1

COMMUNIST CHINA: PRINCIPAL CONSTRUCTION ORGANIZATIONS*

1 JANUARY 1957



* This is a tentative and simplified chart of the probable structure. Known subordinates of the Ministry of Construction and Engineering have, by analogy, been placed under the new Ministry of City Construction. The organization of the Ministry of Construction Materials is assumed to be similar to that of its predecessor, the Construction Materials Industry Control Bureau under the Ministry of Heavy Industry.

** Under the Ministry of Finance.

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of the large-scale and complex projects. Further progress in 1957 and thereafter will be necessary if the sizable goals of the Second Five Year Plan (1958-62) are to be accomplished. Chinese announcements indicate that the total amount of investment in capital construction will double the planned 42.74 billion yuan of the First Five Year Plan. 2/

Because the recording and reporting of statistics in Communist China are still in the formative stage, little aggregative data on the construction industry have been published. Economic indicators on construction activity (for example, changes in labor productivity and construction costs) have not been published in any detail. The Chinese Communists, lacking previous experience in large-scale construction, have relied greatly on the USSR for assistance at all levels. Even the planned percentage relationships of the primary components of capital construction (construction-installation work and machinery and equipment) in the First Five Year Plan probably were based on Soviet experience. The Chinese Communists have noted that in the USSR investment in construction-installation work constitutes about 60 percent, and investment in machinery and equipment from 30 to 32 percent, of total investment in capital construction. 3/ In China, however, there is some divergence from the Soviet model. The First Five Year Plan stated that about 38 percent of total investment in capital construction would go to purchases of machinery and equipment. 4/ From this figure it may be estimated that about 52 percent would go to construction-installation work.

Expenditures for construction materials in Communist China generally make up 40 percent of the costs of construction-installation work 5/; transportation makes up 23 percent of such costs 6/; and wages, profits, and taxes are represented in the remaining 37 percent. The importance of the materials component can be illustrated by the fact that expenditures on construction materials are planned to be about 20 to 25 percent of total investment in capital construction in the First Five Year Plan. 7/ In the absence of aggregative indexes, this report is based on an analysis of the organization of the construction effort, current trends in major sectors, and the contribution made by construction to selected sectors.

II. Organization of the Construction Effort.

The national, regional, and local organization of construction activity in Communist China has improved considerably since 1953. Before that year the construction industry consisted of small private contracting firms and brigades of masons, carpenters, and other skilled artisans

which went from job to job as one unit. The construction firms had little experience in large-scale modern building techniques, equipment usage, planning, and organization. 8/ In late 1952, concomitant with the creation of the Ministry of Construction and Engineering, the central government established state-operated construction companies. The growth of these companies, distributed throughout the economy on both the national and local levels, was as follows 9/:

Year	State-Operated Construction Companies
1953	402
1954	421
1955	530

These state-operated construction companies worked by contract. There were also numerous self-operated construction companies which initiated and carried through work on their own installations. The percentages of the total amount of construction work completed and of the total labor force in construction in 1955 accounted for by the state-operated contract construction companies and the self-operated construction companies were as follows 10/:

Construction Companies	Percent of Total Labor Force in Construction	Percent of Work Completed
State-operated (contract)	63.6	66.1
Self-operated	36.4	33.9

The construction goals of the First Five Year Plan necessitated more efficient organizational practices at all levels. The Ministry of Construction and Engineering was further developed in both its staff and functional aspects. In 1954 a Peoples Construction Bank and a Commission for National Construction were established. 11/ In 1956, two new ministries, the Ministry of City Construction and the Ministry of Construction Materials, were set up to meet the increased requirements of these growing economic sectors. 12/ Construction and

design components of the various industrial ministries were improved, as was interministerial coordination of construction projects.

Although organization is still unwieldy and in need of streamlining -- a result of too-rapid growth of the sector -- it is much better than that which existed in 1953. The current and future goals for construction will be met more adequately as waste, confusion, and duplication of functions are reduced and the organization is more precisely geared to the construction effort.

The Peoples Construction Bank was established in September 1954 to supervise the allocation of funds for capital construction. Most of the accounts of various construction units and enterprises originally held by the Bank of Communications have been transferred to this bank, which is directly under the Ministry of Finance. 13/ The effect of the change appears to be to create closer high-level control over investment funds. The new bank has branches in all the leading cities.

The Commission for National Construction was established in September 1954, probably as a result of the rapidly developing construction sectors in various ministries. 14/ Although its exact functions are not known, it probably coordinates construction plans of the various industrial ministries and their subordinate organs; the numerous local and provincial construction enterprises; and the Ministries of Construction and Engineering, City Construction, and Construction Materials. It also probably assists the Commission for National Planning in detailed planning of the capital construction program and in establishing national construction norms.

The Third Staff Office, 1 of 8 staff offices of the State Council, was established in September 1954. It supervises, coordinates, and reviews the work of ministries in the construction field as well as those in the heavy industrial and machine building fields. 15/ Along with the Commission for National Planning and the Commission for National Construction, it exercises a broad coordinating and supervising function over the national construction effort.

The Ministry of Construction and Engineering was originally established to handle civil construction such as schools, hospitals, some housing, and other public structures. In 1955 its 29 companies, which often worked under contract to other ministries, were able to move into the industrial construction sphere. 16/ Currently it has several

regional construction engineering bureaus, which oversee numerous construction and installation companies. This ministry has central design and administrative offices, and the counterparts of these are found under the functional regional engineering bureaus. It also controls some plants which produce prefabricated construction parts. Construction matters and problems of various state organs are arbitrated and coordinated by this ministry.

The Ministry of City Construction was established on 12 May 1956, succeeding the Urban Construction Bureau. 17/ As its name implies, the new ministry is responsible for urban development, civil and public utilities construction, and some housing. Its enlarged status may be a result of the shift of the Ministry of Construction and Engineering from housing and civil construction to the field of industrial construction.

The Ministry of Construction Materials succeeded the Construction Materials Industry Control Bureau of the Ministry of Heavy Industry on 12 May 1956. 18/ It is responsible for insuring an adequate amount of construction materials to meet the national construction goals. In December 1956 there were about 8,000 construction materials enterprises and 900 hardware plants in Communist China, with a total of nearly 400,000 workers and staff employees. 19/

Nearly every state ministry has construction components responsible for construction in their respective sectors. Some are highly developed and extensive -- for example, those under the Ministry of Metallurgical Industry and the Ministry of Railroads. Others are small and merely subcontract work to elements of the Ministry of Construction and Engineering or to others. Construction organs of the Peoples Liberation Army have furthered the construction effort, particularly in railroad and other construction in peripheral areas such as the Northwest and Southeast.*

Since 1952 the number of local, municipal, and provincial government construction enterprises has increased greatly. At the beginning of 1955 there were 183 local construction companies, 8 installation companies, 50 planning and drafting units, and 178 other local enterprises in the construction industry. 20/ At Wu-han in June 1956 there were construction units of the central government, of Hupeh Province,

* The names of geographic areas employed in this report are those of the Chinese Communist Administrative Divisions as of March 1956 (see CIA map 25333, 3-56).

and of Wu-han municipality at work. Nearly every central government ministry was represented; provincial units represented were the highway, education, health, and broadcasting departments and the inland shipping, culture, and forestry bureaus; and included among the municipality units were the water conservancy, physical culture, labor, and public utilities bureaus. 21/ Such a profusion of construction units serving under three jurisdictions at one site points up the need for efficient organization and coordination. Also under provincial and local organizational control are the millions of workers engaged in part-time water conservancy and road maintenance construction activities.

III. Trends in Construction.

The character of the construction industry in Communist China may be revealed by analyzing various trends prevailing in 1956 which can be expected to develop further in subsequent years. Such data support the estimate of an improved capability in construction in 1956-57 above that which existed in 1953.

A. Acceleration of Construction.

Economy in construction-installation work characterized the construction industry in Communist China in 1955, and an acceleration of activity was its chief characteristic in 1956. The metallurgical industry continued to receive large investments for construction purposes. In 1956, An-shan, the national economic model, planned an increase of 22 percent in capital construction above the level of 1955. 22/ The total area of capital construction to be undertaken in 1956 at Pao-t'ou was planned to be four times that of 1955. 23/ Preliminary work continued at Wu-han, and Lung-yen and Pen-ch'i saw considerable expansion. 24/ New construction on the iron plant at Ma-an-shan began in July 1956. 25/ In the Northwest the construction which began on the Second Sinkiang Iron and Steel Plant would on completion increase its capacity five times that of the existing plant and make the province self-sufficient in this respect. 26/ In the Southwest a new metallurgical complex based on the existing Chungking Iron and Steel Company was in the design-survey stage. 27/

In the machine building industry, 98 construction projects, including 2 factory buildings at Lo-yang, were scheduled to be completed ahead of the plan in 1956. 28/ Because the needs of economic expansion require the construction of even more facilities than were scheduled in

the original Plan, some projects of the Second Five Year Plan are being moved forward to 1956 and 1957. The Ch'eng-tu Cutting Tools and Measuring Instruments Plant, designed to be larger than its counterpart at Harbin, was begun in May 1956. 29/ It was not mentioned in the First Five Year Plan and probably is an example of one such plant moved forward. The result of increased construction in machine building enterprises is that Communist China is now able to produce motor vehicles, ships, large machine tools, generators, precision electric instruments, and textile machinery, some of which it is now exporting to other countries.

The total number of construction completions in the petroleum industry in the first half of 1956 increased by 71 percent above the level of the first half of 1955. 30/ The number of drilling and survey teams in May 1956 was roughly 20 times the 1950 figure, and the total footage of drilling in oil prospecting in 1956 was planned to be 11.6 times the total of the 42-year period from 1907 through 1948. 31/ The largest refinery in Communist China, to be located near Karamai in Sinkiang Uighur Autonomous Region, is under survey currently. 32/

In the electric power industry the volume of capital construction completed in the first half of 1956 increased by 51.8 percent compared with the first half of 1955. 33/ Thirty-three projects for which construction was scheduled to begin in 1956 were begun in 1955, and 10 of the 100 projects under way in 1956 were originally scheduled to begin construction in 1957-58. 34/ Construction and expansion of 27 thermal and hydroelectric power stations were completed in the first 11 months of 1956, adding 500,000 kilowatts (kw) to the total capacity of Communist China.* 35/ In 1957, capacity will be increased by more than 400,000 kw when some of the 60 plants now under construction go into operation. 36/

In 1956 in the coal industry, 24 mines with a designed capacity of 7.7 million tons were put into operation. 37/ Forty other mines with a designed capacity of 10.8 million tons were planned for completion in 1957. 38/ Four preparation plants will also be built. 39/ The majority of the mines currently under construction are located in the jurisdiction of nine new coal areas. It is planned that the majority of these bases will be completed before 1962, and each will have an annual output of from "several millions to around 10 million tons." 40/

* These capacity figures presumably are only for state facilities. Additional capacity will be added by local and provincial enterprises.

The Ministry of Light Industry has announced that the construction of new factories has been accelerated so that its obligations under the Plan can be fulfilled ahead of schedule. In 1956, work was scheduled to start on 18 major projects originally planned to be built after 1957. 41/ Twenty-five projects scheduled for completion in 1957-58 are to be finished ahead of schedule. 42/ The output in 1956 of paper, rubber products, salt, medicine, and cigarettes is planned either to approach or to surpass the planned level for 1957. 43/

It was announced that basic construction in the textile industry in 1956 would be 74 percent higher than in 1955. 44/ The number of plants to be constructed in 1956-57 will be twice the number constructed in 1953-55. 45/ Four of the 16 large mills under construction currently will go into operation in 1957, 1 year ahead of schedule. 46/

B. Reduction of Construction Time.

There has been a concerted effort by the Chinese Communists to shorten the time period of construction for various projects. The building process could be accelerated with rational planning, designing, and coordination, as well as more efficient use of labor, materials, and equipment. There is a definite need for this acceleration. A construction period of 4 years was required for the surveying, designing, and over-all construction of the small-scale Shou-wang-kung copper mine. 47/ A small ore dressing plant in Kan-chou required more than 3 years to construct, and the construction of a "small" cement plant also required 3 years. 48/ The renovation of a blast furnace with a capacity of 900 cubic meters (cu m) requires 10 to 13 months in China, whereas in the USSR the building of a new blast furnace with a capacity of from 1,000 to 1,300 cu m requires only 4 to 6 months. 49/ The construction of a new thermal electric power station of 50,000 kw capacity requires 20 to 22 months in China, whereas in the USSR it requires only 18 months. 50/ The building of a new fertilizer plant of 50,000 tons capacity requires 30 months in China, whereas in Bulgaria it requires only 14 months. 51/

Some progress already has been made. The construction time necessary to dig a pair of vertical coal shafts has been reduced by 6 to 12 months, and construction of a chemical fertilizer plant, a nonferrous metal processing plant, and a high-grade steel plant have all been reduced, in some instances by 12 months. 52/

Other instances of shortened construction periods are as follows 53/:

Type of Construction	Construction Time (Months) 1953-55	1956
Textile mill (100,000 spindles)	18 to 20	13
Motor workshops at Lo-yang Tractor Plant	6 to 8	2
Installation of two sets (25,000 kw each) in hydroelectric station	24	16 to 18
Large-scale powerplants	16 to 18	12 to 14
Medium-scale powerplants	14	Less than 12

C. Improvement of Designing and Standardization.

The State Statistical Bureau recently announced that Communist China has established more than 140 designing organizations, having more than 100,000 employees. 54/ Less than half of this number, however, are trained technicians.

The national construction norms for construction and installation projects adopted 1 May 1956 indicate that designing work is becoming more efficient. 55/ As early as 1951 the Chinese Communists began drawing up standard designs for civil construction. In 1953 and 1954, housing built in the Northeast with standard designs accounted for 75 percent and 88 percent, respectively, of new housing constructed. 56/ The 1956 national norms cover industrial as well as civil construction.

From 1954 through 1956, approximately 40 percent of the blueprints designed were used on more than 1 project. 57/ The reuse of blueprints (the Ch'eng-tu Cutting Tools and Measuring Instruments Plant is using the Soviet-designed blueprints previously used at its Harbin counterpart) and existing structures and machinery, plus progressively better designing, has contributed to an increased over-all efficiency.

Even with the increased capability in designing there still remains ample room for improvement. At least 10 percent of all the blueprints in the period 1954-56 were completed behind schedule, and many were returned to the designers for correction of imperfections. 58/

D. Technology.

Along with improvement in designing there has been considerable technological progress in the construction industry in Communist China. Prefabricated concrete plants, chiefly of a temporary type, have been established at all the major construction sites. These plants produce reinforced-concrete and concrete components for speedy assembly at the site. This process reduces costs and saves materials. Plans are being proposed currently which would increase the number of such plants throughout the country. Although there are permanent prefabrication plants at An-shan, Ch'ang-ch'un, Harbin, Fu-la-erh-chi, and Pao-t'ou, the trend toward construction of temporary plants may be expected to continue because of the temporary need for prefabricated products at a given site and also because temporary plants with the same capacity as permanent plants can be built at half the cost of the latter. 59/

Other new techniques have been widely heralded and are being introduced. The use of bamboo instead of steel rods in reinforced concrete, which saw widespread use in 1956, was reported to have reduced reinforcement costs 45 percent.* 60/ Bamboo substituted for wood in roof supports is gaining acceptance. In erecting electric transmission lines, reinforced-concrete towers have been substituted successfully for steel towers. In 1956 this substitution was planned to effect a saving of 7,000 tons of steel. 61/ Newly designed steel frames have replaced conventional frames for certain types of buildings, with a consequent saving of steel. 62/ In some Karamai test wells a loess-and-mud paste was used instead of reinforced concrete. 63/ Finally, cinders as a substitute for sand have been used satisfactorily in making concrete. 64/

E. Mechanization and Construction Equipment.

More and better construction equipment has permitted a reduction of building costs and the completion of a larger volume of work in Communist China. The increase in the number of important types of construction equipment available to the state-operated contract construction companies was as follows 65/:

* See IV, B, p. 23, below.

Equipment	1953	1954	1955
Cranes, derricks, and the like	513	955	1,379
Power shovels	45	112	159
Concrete mixers	1,676	2,249	2,443
Dump trucks	3,237	5,238	5,871

In 1952 the An-shan Iron and Steel Construction Company had only 551 sets of mechanized equipment, but by October 1955 this figure had risen to 5,600. 66/ By the latter date, work in concrete mixing was entirely mechanized -- 33 percent of the earthwork was done mechanically compared with 13 percent in 1952, 84 percent of the lifting work was done by cranes, and 58 percent of the transport facilities were operated mechanically. 67/ It was planned that 5.4 million cu m of earthwork would be moved by machinery in the entire country in 1955 compared with 3 million cu m moved by machinery in 1954. 68/

Although An-shan is not typical of most construction sites, it is likely that it will be used as a model for others to emulate. Improved equipment and a better equipment utilization rate are illustrated in the Chinese Communist announcement that the utilization rate of an excavator with a capacity of one-half cubic meter per day had increased by October 1955 more than 15 times above the level of 1952. 69/

Domestic plants are now turning out construction equipment in increasing numbers. Among these are excavators, bulldozers, cranes, rollers, scrapers, autoloaders, and derricks. 70/ In early 1956, An-shan was designing more than 40 light construction machines for use in places where regular equipment could not be used. 71/ Even with the increased production of construction equipment, the supply in 1956 was inadequate for construction requirements. 72/

The relatively low rate of utilization of construction equipment is almost as formidable a problem as is the inadequacy of the existing stock of such equipment. In 1955 in the Ministries of Construction and Engineering and of Heavy Industry the rate of utilization of major types of construction equipment was generally less than 50 percent. 73/ As the number of trained workers increases, the utilization rate of equipment will rise, but at present it remains one of the chief problems confronting the industry.

F. Labor Force.

Because of inconsistencies between reports and official announcements in Communist China, little definitive intelligence emerges from an analysis of available information on the labor force in construction. The most reasonable listing of the growth in numbers is as follows 74/:

Year	Construction Labor Force (Million Workers)
1951	0.60
1952	1.02
1953	1.54
1955	1.60
1956*	1.80

These figures do not necessarily represent a stable construction industry. Those workers engaged in producing construction materials and the millions of workers in construction on water conservancy and military projects are not included in the totals. Temporary workers make up a sizable proportion of the whole. In 1952-53, approximately 70 percent of the construction workers in the Northeast were hired on a temporary basis. 75/ In January 1953, Chia T'o-fu, then a vice-chairman of the National Committee on Financial and Economic Administration, announced that recruitment of permanent construction workers would be temporarily suspended because of confusion resulting from competition among various agencies in recruiting workers. Chia T'o-fu said that in the future permanent construction workers would be limited to skilled or semiskilled artisans, totaling 40 to 50 percent of the construction labor force. 76/ Laborers and others would be hired on a temporary or contractual basis. His words appear to be borne out by figures as of early 1956 for the An-shan Iron and Steel Construction Company and the Liaoning Municipal Construction Bureau, which had proportions representing temporary workers of 30 to 40 percent and 50 percent, respectively. 77/

* Wang Ho-shou, Chairman of the Commission for National Construction, announced in June 1956 that the number of workers engaged in construction and installation work was 1.41 million. This figure, however, does not include staff and administrative workers. Po I-po's figure (in the tabulation) is assumed to include these persons.

Additions to the construction labor force are being made at a rapidly increasing rate. In 1953-54, more than 4,300 architects, engineers, and technicians graduated from colleges and joined the Ministry of Construction and Engineering. 78/ In 1955, construction began at Sian on the largest independent college of architecture and civil engineering in Communist China, which was to have a student body of 8,000. 79/ The number of students studying engineering in colleges and universities was as follows 80/:

Year	Enrollment (Thousand Students)
Highest before 1949	27.6
1949/50	30.3
1950/51	38.5
1951/52	48.5
1952/53	66.6
1953/54	80.1
1954/55	95.0
1955/56	109.6

In 1956, roughly 62,890 new students, 37.7 percent of the total new enrollment, were expected to enroll in engineering courses in colleges. 81/ On-the-job training courses at An-shan, Pao-t'ou, Wu-han, and other major sites are contributing some measure of skill to the construction force. Leading cadres are sent to the USSR for study in the best institutions of that country.

The construction worker, as he has gained skill and techniques, has become more productive. Construction and installation workers engaged in industrial capital construction were scheduled to increase their labor productivity by 72 percent (an average of about 11 percent per year) from 1953 to the end of 1957. 82/ Although there is a lack of information on labor productivity, scattered references indicate that progress is being made. For instance, in 1955, construction workers at An-shan planned to raise their labor productivity 90 percent above the level of 1952. 83/ Labor productivity in construction and installation enterprises was 27 percent higher in 1954 than in 1953 84/ and 17 percent higher in 1955 than in 1954. 85/ Recently it was announced that the labor productivity of construction and installation workers under the Ministry of Construction and Engineering

had increased 67 percent above the level of 1953. 86/ Increased worker training coupled with shortened construction periods and reduced construction costs indicates that labor productivity in industrial construction probably will meet its Five Year Plan goals.

IV. Construction in Selected Sectors.

A. Transport Facilities.

1. New Trunk and Branch Railroad Lines.

a. Performance in 1953-56.

The Chinese Communists have surpassed most of the aggregate annual goals as well as the First Five Year Plan goals for construction of new railroad lines* (see the map, Figure 2**). This is also true of goals for individual lines. In terms of goals, construction of new lines has been and probably will continue to be one of the strongest areas of the construction sector. This is because of (1) the high priority given railroad construction by the Chinese Communists and (2) the high return on the funds invested in railroad construction compared with most industrial construction projects.***

Under the First Five Year Plan the original goal for the construction of new lines was 4,084 kilometers (km). 87/ Annual performance has been as follows 88/:

Year	Completion of Tracklaying (Kilometers)	Increase Above the Level of the Preceding Year (Percent)
1953	589	23
1954	831	41
1955	1,222	47
1956****	1,700	40
Total	4,342	

* The phrase construction of new railroad lines as used by the Chinese Communists includes both new trunk and new branch lines but excludes double tracking and other improvements.

** Following p. 16.

*** The required mixture of construction machinery and labor (both skilled and unskilled) is more easily achieved in railroad construction than in most industrial construction.

**** Announced to be "over 1,700 km."

Although they have been successful in fulfilling earlier goals, the Chinese Communists have lagged considerably in meeting revised goals. In early 1956 the original First Five Year Plan goal of 4,084 km was revised upward to 7,592 km. 89/ Several revisions of the 1956 Plan, however, reduced the planned length of lines totaling 2,136 km to "about 1,800 km" 90/ and indicated that construction of new lines was not proceeding according to the revised Plan. The 1957 Plan called for the construction of only 600 km of new lines. 91/ This significant reduction was prompted by the need to alleviate congestion on several key lines and to raise the freight-carrying capacity of existing lines and by a nationwide shortage of critical construction materials. If construction is kept at this planned level in 1957, new lines construction in the period of the First Five Year Plan will total about 5,000 km, in contrast to the original planned total of 4,084 km.

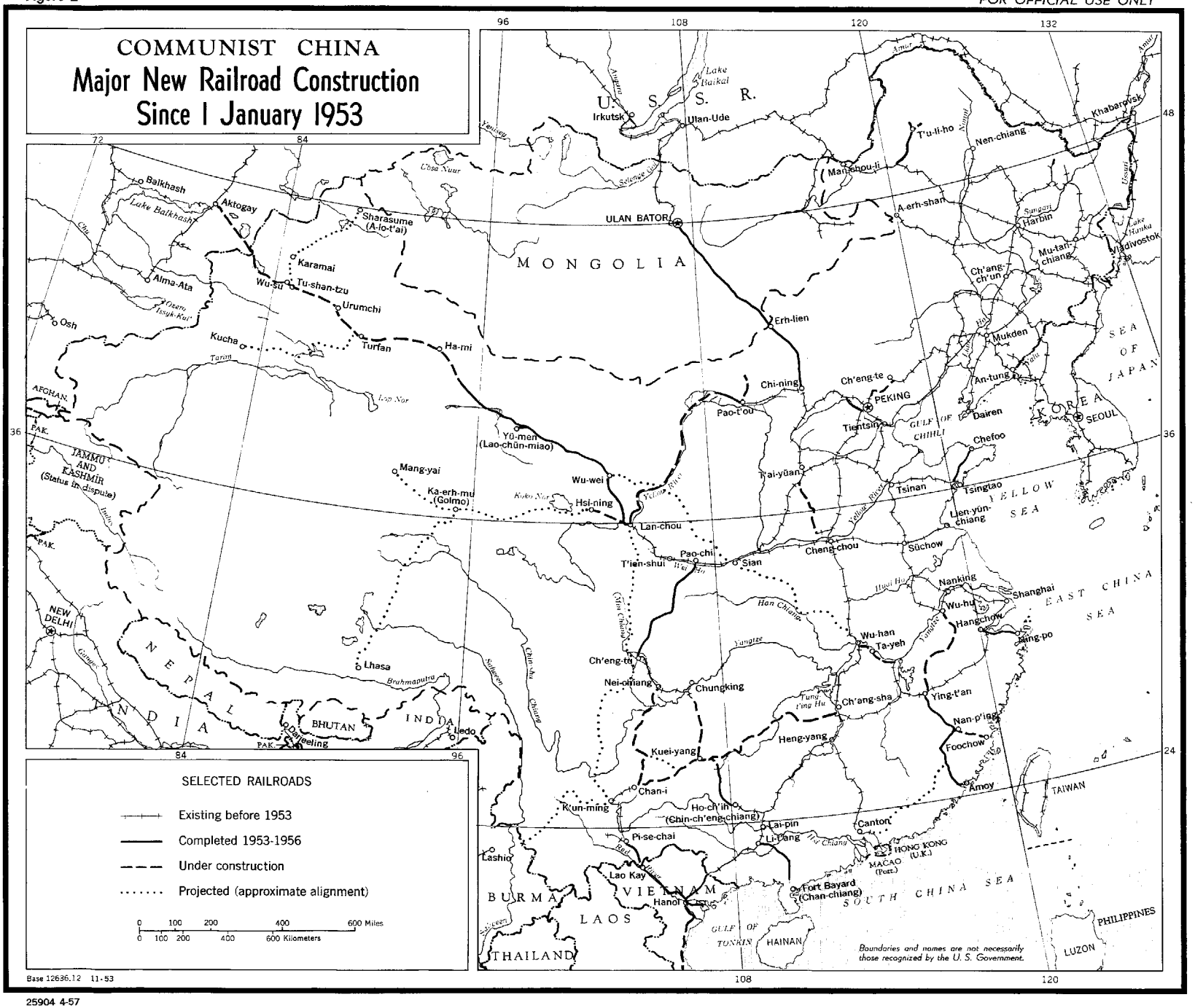
Although accelerated work on some lines has caused defects (a notable example is the Pao-chi - Ch'eng-tu line 92/), the Chinese Communists have greatly improved their techniques and standards of railroad construction. The USSR has aided materially in this process. Standardized plans and designs, better organization at the site, advanced work methods in excavation and blasting, and fuller mechanization in tracklaying have given the railroad construction force a much greater capability than that which existed in 1953. 93/

b. Construction of Individual Lines.

By the end of 1956 the following railroad lines, for which the bulk of the work was carried out in the First Five Year Plan, were completed in Communist China 94/:

Railroad Line Terminals	Total Length (Kilometers)	Year Completed
Chi-ning - Erh-lien	337	1955
Feng-t'ai - Huai-lai	106	1955
Hsiao-shan - Ning-po	140	1956
Lan-ts'un - Chefoo	183	1955
Li-t'ang - Fort Bayard	314	1955
Pao-t'ou - Pai-yu-no-po	148	1956
Ying-t'an - Amoy	700	1956

Figure 2



The 678-km Pao-chi - Ch'eng-tu line, nominally completed in 1956, is undergoing general repairs to correct defects caused by accelerated construction and landslides. The remedying of these defects should be completed in 1957. 95/ Tracklaying on the 2,400-km Trans-Sinkiang Railroad has progressed to the Kansu-Sinkiang border area, roughly 1,250 km from the Sino-Soviet border. 96/ It is estimated that tracklaying will be completed in 1958. 97/ Other important lines which will be completed in 1957 or during the Second Five Year Plan follow 98/:

Railroad Line Terminals	Total Length (Kilometers)
Chan-tien - Chi-hsien	363
Ch'eng-tu - K'un-ming	1,060
Ho-chih - Kuei-yang	440
Hunan-Kweichow	850
Lan-chou - Pao-t'ou	1,100
Lan-chou - Tsinghai	1,400
Nan-p'ing - Ma-wei	196
Nei-chiang - K'un-ming	789
Pi-se-chai - Ho-k'ou	177
Szechwan - Kuei-yang	340
Tu-shan-tzu - Sharasume	500
Turfan-Kucha	600
Wu-han - Ta-yeh	83

c. Problems and Prospects.

The First Five Year Plan of Communist China stated that the Ministry of Railroads was to invest 41.7 percent (or 2.36 billion yuan) of its total capital investment in the construction of new lines. 99/ The actual portion going to the construction of new lines in 1953-55 was 47.8 percent.* 100/ In March 1956, T'eng Tai-yuan, the Minister of Railroads, stated that total investment in capital construction for the railroad industry would be increased 38.3 percent above the original goal of 5.67 billion yuan to a total of 7.84 billion yuan. 101/ He estimated that the original planned investment of 5.67 billion yuan would be reached by 31 March 1957. 102/

* It is assumed that this percentage is an average of the 3 years rather than the level reached at the end of 1955.

Although data on costs of constructing new railroads are insufficient, it is clear that cost reductions have been and probably will continue to be made in the First Five Year Plan. Analysis before the announcement of the kilometrage planned for 1957 indicated that feasible reductions in costs would not be sufficient to permit the achievement of the revised goal of 7,592 km within the limits of the 38.3-percent increase in total capital investment in railroads -- the revised goal would have to be underfulfilled or could be achieved only at the cost of increasing the investment for construction of new lines. Planned and actual investments and costs in the construction of new railroad lines in Communist China in 1953-57 are shown in the table.*

The estimated actual cost per kilometer for construction of new lines** in 1953-55 was 564,000 yuan, which is a reduction of about 3 percent from the estimated average cost of 578,000 yuan originally planned for the 5-year period. 103/ The attainment of the estimated average cost of 494,000 yuan necessary to achieve the goals of the revised Plan (see the table), however, would require a 15-percent reduction from the estimated average cost set forth in the original Plan. In view of performance in the first 3 years, such a reduction over the 5-year period appears improbable. This is borne out by the following two factors: (1) the average cost in 1956-57 would have to be reduced 19 percent compared with the estimated average cost in 1953-55 if the average cost over the 5-year period is to be reduced to 494,000 yuan per kilometer,*** 104/ and (2) the 2,642 km constructed in 1953-55 were achieved at an estimated cost per kilometer of 564,000 yuan rather than the 494,000 yuan planned. This is shown by the fact that the planned portion of total capital investment in railroads going to construction of new lines, 41.7 percent, had to be raised to 47.8 percent in order to achieve the kilometrage goal. 105/

The drastic cutback in construction of new lines in 1957 indicates that the planned 38.3-percent increase in capital

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* The table follows on p. 19.

** Hereafter the cost per kilometer of new lines is referred to as simply cost.

*** According to the revised Plan, estimated investment in the construction of new lines is to be 3.75 billion yuan. In the first 3 years an estimated 1.49 billion yuan was invested, leaving 2.26 billion yuan to be expended in 1956-57. Of the revised kilometrage goal of 7,592 km, 4,950 km remained for completion in 1956-57. The achievement of this kilometrage with an investment of 2.26 billion yuan would require an average cost of 457,000 yuan per kilometer in 1956-57, which would represent a reduction of 19 percent from the average cost established in 1953-55.

Table

Planned and Actual Investments and Costs in the Construction of New Railroad Lines in Communist China 1953-57 a/

Period	Total Capital Investment under the Ministry of Railroads (Billion Yuan)	Percentage of Total Capital Investment for Construction of New Lines b/	Investment in Construction of New Lines (Billion Yuan)	Length of Track Completed (Kilometers)	Estimated Average Cost of Construction per Kilometer of Track (Thousand Yuan)
Original First Five Year Plan, 1953-57	5.67	41.7	2.36	4,084	578
Actual, 1953-55	3.11 c/	47.8	1.49	2,642	564
Revised First Five Year Plan, 1953-57	7.84	47.8 d/	3.75	7,592	494

a. 106/
b. These relationships are presumed to be averages for the given periods.
c. 107/
d. This figure was obtained by applying the percentage of total capital investment going to construction of new lines in 1953-55 to the entire 5-year period.

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investment for the railroad industry has itself been revised downward.* Because the average cost would have been less than 564,000 yuan per kilometer, more than 2,300 km of new lines could have been built in 1957 within the limits of the 38.3-percent increase in capital investment in railroads.** Thus about 6,660 km -- contrasted with the 5,000 km presently planned -- could have been built in the First Five Year Plan. The fact that new lines construction has been reduced indicates that the Chinese Communists have renounced their option of a large overfulfillment of kilometrage in favor of improving existing lines. The apparent cut in the total investment in railroads follows the nationwide move to cut 1957 investment as a result of materials shortages. Also, because the growth of the railroad sector has exceeded that of every other economic sector since 1953, it is likely that funds previously destined for railroads have been cut back in favor of a closer balance in sectoral growth rates.

The Second Five Year Plan calls for the construction of 8,000 to 9,000 km of new lines while at the same time carrying forward an intensive program of rehabilitation of existing lines. 108/ Although new lines construction in 1957 will be kept at a minimum, the recent completion of aerial surveying of 2,000 km and the initiation of aerial surveying of another 3,000 km indicate a continuation of large-scale activity in railroad construction. 109/

2. Highways.

Construction of highways in Communist China has taken place chiefly in the coastal and peripheral areas. Statistics on the construction of highways are ambiguous and confusing. The Chinese Communists distinguish among the following 4 types of overland transportation routes: (a) motor highways of 6 categories, depending on the traffic they are capable of accommodating; (b) secondary highways; (c) cart roads; and (d) pack transport roads. 110/

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* The announcement concerning the reduction in construction of new lines in 1957 implied that about 35 to 40 percent of total capital investment would be allocated to construction of new lines. To build only 600 km of new lines with this portion -- roughly equivalent to the original share of 41.7 percent for the 5-year period -- strongly suggests that a substantial reduction in total capital investment in railroads has been made.

** Assuming that the 47.8-percent portion of total investment allocated to construction of new lines in 1953-55 remained unchanged.

The First Five Year Plan provided that 10,100 km of motor and secondary highways were to be constructed, restored, or repaired with state funds. 111/ Of this total, motor highways amounted to 7,782 km, out of which new construction projects were to total 4,866 km and the remainder was to be in restoration-repair projects. 112/ Local government organs were to provide for the construction of 15,000 km of secondary roads in the 5-year period, of which 6,409 km were to be new projects. 113/

In mid-1956, Li Fu-chun, a vice-premier of the State Council, reported that state-financed highways constructed or repaired in 1953-55 totaled 9,053 km. 114/ In addition, 4,611 km were planned for 1956. 115/ The achievement of this planned kilometrage in 1956 would represent an overfulfillment of the Five Year Plan by 35 percent in 4 years. In 1953-55, 13,000 km of highways (predominantly secondary) were constructed or restored by local government organs with provincial funds and corvée labor. 116/ In March 1957 it was announced that 9,271 km of new motor roads would be completed by the end of 1957 -- an increase of 91 percent above the 4,866 km planned for the period 1953-57. 117/

In 1956 it was announced that 560 counties in Communist China had no highways. 118/ The Second Five Year Plan, in which 15,000 to 18,000 km of motor highways are to be constructed or restored (nearly double the planned amount in the first Plan) has as its aim the linking up by motor and secondary highways of all the county seats in the country. 119/

B. New Housing.

An economy cannot maintain sustained growth unless at least a minimum standard of living is made available to the labor force. On the basis of the First Five Year Plan of Communist China, which called for the construction of 46 million square meters (sq m) of new housing, performance thus far has been impressive. The actual performance in 1952 and in the first 4 years of the Plan was as follows 120/:

Year	Housing Constructed* (Million Square Meters)
1952	6.5
1953	12.0
1954	13.0
1955	14.0
1956	20.0
Total 1953-56	59.0

Even with this excellent performance, however, the problem of providing adequate housing both in point of quantity and quality continues to harass the Chinese Communist planners. The failure of housing construction to keep pace with the growth of the economy as a whole indicates that the goals for housing construction initially were pegged too low.

A Chinese broadcast of 25 June 1956 noted, "The shortage of residential houses is a very serious problem for workers at present." 121/ A week before, Li Fu-chun stated that the construction of living quarters was "somewhat neglected" in 1955. 122/ Such a statement regarding a year in which planned housing construction was overfulfilled by 3 million sq m directly implies that the goals established by the regime have been so low that, although they are overfulfilled, the housing problem is not being satisfactorily solved. It is estimated that, in mid-1956, 900,000 families engaged in mining, forestry, new industry, and geological surveying were without adequate housing. 123/

The accomplishment in 1956 of 20 million sq m, 6.9 million sq m above the planned 13.1 million sq m, does not solve the existing housing shortage. 124/ The inadequacy of the 1956 goal is exemplified by the situation in Shanghai. By 1956 the population had risen from a 1937 figure of 3.8 million to more than 6 million. 125/ During World War II, part of the existing housing stock was destroyed, and little was rebuilt. Since 1949 a total of approximately 2.5 million sq m has been constructed by the state and by the people themselves. 126/ The 1956 Plan called for 280,000 sq m -- enough to provide housing for only 37,000 persons -- to be constructed with a total investment of 15 million yuan. 127/ With the increase in population of more than 2 million,

* It is probable that some capital repair is included in these amounts.

there are, by Chinese Communist admission, more than 1 million persons in Shanghai at present without adequate housing. 128/

Various measures have been instituted to help solve the problem. Surplus funds of various ministries as well as state and trade union loans to individuals will help to alleviate the situation. 129/ Also, the proposal by the Ministry of Construction and Engineering that bamboo be used as a substitute for steel in reinforced-concrete house construction, thus reducing costs by saving steel, probably aided in substantial overfulfillment of the 1956 Plan without any increase in the state funds allocated to housing construction. 130/ The North China, Central-South China, and Northwest China Construction Engineering Bureaus planned to use bamboo-reinforced concrete instead of steel-reinforced concrete in 400,000 to 500,000 sq m of civil construction from June through December 1956. 131/ In the future this type of construction can be expected to increase. Even with these measures, however, adequate housing will remain a problem for the indefinite future.

C. Water Conservancy.

Construction activity using chiefly hand labor has been impressive in the period of the First Five Year Plan. In order to utilize better the water resources of Communist China, construction targets were enumerated for the Huai, Yellow (Huang), and Yangtze Rivers, together with their tributaries. The following projects have been completed (see the map, Figure 3*):

Huai River: The large Fo-tzu-ling, Mei-shan, Po-shan, and Nan-wan reservoir dams have been completed, and construction has been started on the Hsiang-hung-t'ien and Mo-tzu-t'an reservoirs. 132/ By August 1955, more than 3.9 billion cu m of earthwork were moved in constructing these reservoirs and 15 associated flood detention projects, 160 gates and culverts, and 6,303 km of channel and in repairing 2,840 km of dikes. 133/

Yellow River: The first phase of construction of this long-range project will be completed in 1967. About 46 dams, many reservoirs, and 2 hydroelectric power stations, each having a capacity of 1 million kw, are planned. 134/ By mid-1955, more than 130 million cu m of earthwork were moved and 1,800 km of dikes repaired. 135/ The site for the Liu-chia dam has been selected, and work is expected to start in 1957. 136/ In February 1957 the huge San-men Gorge project was scheduled to come under construction. 137/

* Following p. 24.

Flood diversion projects such as the Ching-chiang project on the Yangtze River, the Kuan-t'ing reservoir and a flood escape channel 40 km long on the Yung-ting, and the Shih-men reservoir in Hupeh Province are other examples of major construction projects successfully completed before the end of 1956. 138/ The large Ta-huo-fang reservoir currently under construction near Fu-shun 139/ on completion will help to prevent flooding in that area.

The total physical accomplishment in construction for water conservancy in Communist China in 1953-55 was as follows 140/:

	Million Cubic Meters		
Year	Earthwork	Masonry	Concrete
1953	1,000.0	N.A.	N.A.
1954	650.0	8.79	0.19
1955	1,400.0	14.0	0.6
Total	3,050.0	22.79	0.79

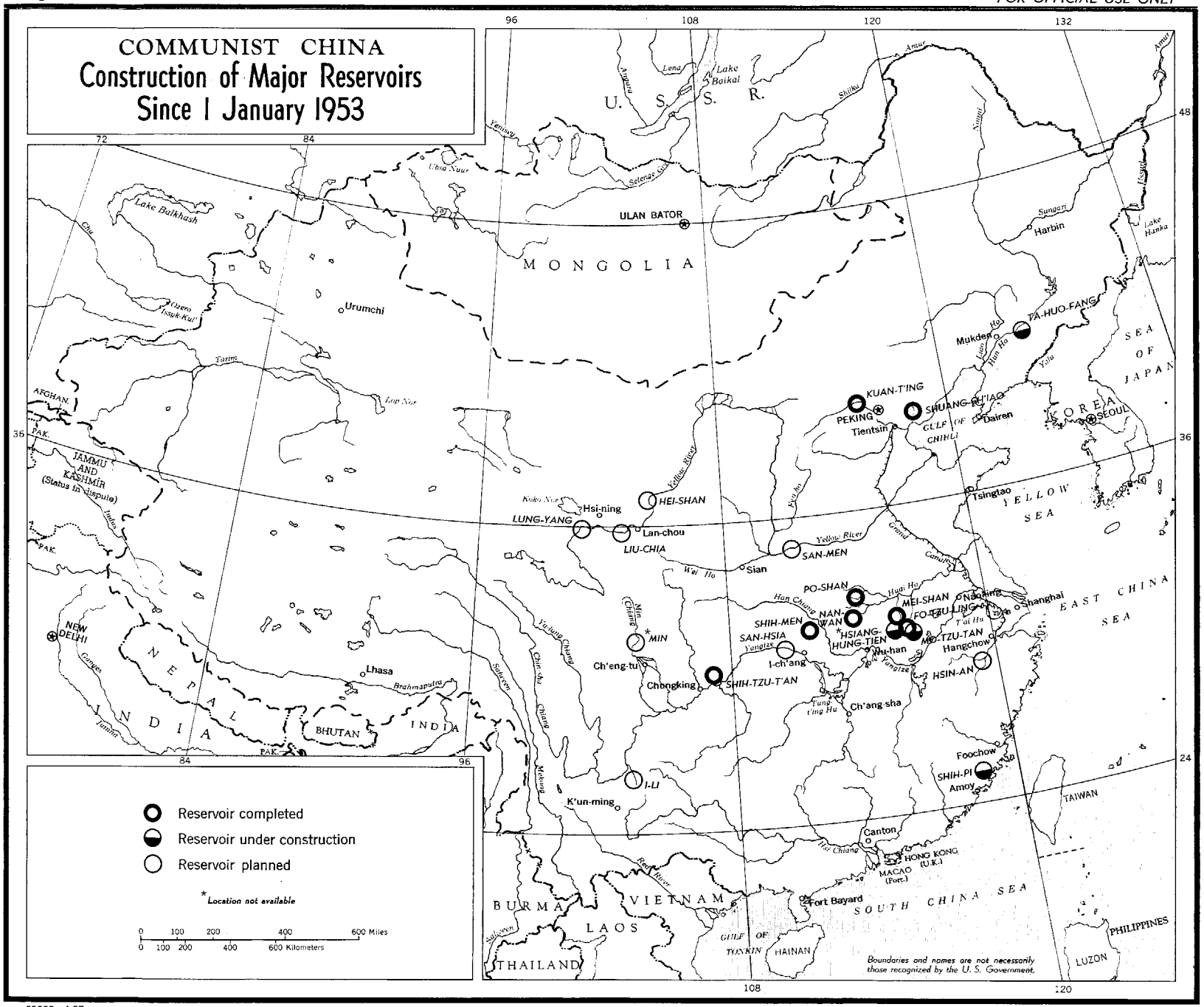
The total state allocation for water conservancy was 770 million yuan in 1950-52 and was planned to be 2.49 billion yuan over the period of the First Five Year Plan. Actual (1953-55) and planned (1956) allocations were as follows 141/:

Year	Investment* (Million Yuan)
1953	376
1954	219
1955	402
1956 (Plan)	844
Total	1,841

The First Five Year Plan called for an expansion of the irrigated area by 4.8 million hectares. The increase in irrigated area in the first 4 years was as follows 142/:

* The investment for housing construction is not included.

Figure 3



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Year	Irrigated Area (Million Hectares)
1953	0.61
1954	0.78
1955	1.26
1956	10.00
Total	12.65

The irrigated area in 1956 was double the irrigated area in the preceding 6 years. 143/ Thus the First Five Year Plan goal of 4.8 million hectares was fulfilled more than 250 percent in the first 4 years of the Plan. This increase is so large that it must be assumed that drainage improvement and well projects are being included in the totals. Most of the construction work involved in irrigation is small scale and is done by the peasants themselves. Much of it, however, is of a temporary nature and requires continuing maintenance.

D. Agriculture.

Construction for agriculture in Communist China has not been restricted to water conservancy alone. In organizing mechanized state farms and machine tractor stations, investment has been channeled into the sector for the construction of garages, granaries, repair shops, powerplants, dormitories, and offices. Because of the large amount of capital required, the number of these units has not been large. 144/ Their growth indicates, however, an increasing tendency toward collectivization in the countryside. The growth of these agricultural functions is shown as follows 145/:

Year*	Total Tractors (15-Horsepower Units)	Total State Farms	Total Machine Tractor Stations
First Five Year Plan	8,416	91	194
1953	1,627	N.A.	N.A.
1954	3,013	97	89
1955	5,216	106	138
1956 (Plan)	11,912	152	275
1957 (Plan)	N.A.	N.A.	437

* End-of-year totals.

By the end of 1956 the 275 machine tractor stations were to service an area of 1.1 million hectares, or 5 times the area of 1955. 146/ The mechanized state farms serviced 190,000 hectares in 1954 and 270,000 hectares in 1955 and were planned to service 510,000 hectares in 1956. 147/

The Soviet Aid Friendship State Farm in Heilungkiang, although larger than most state farms, provides information on construction activity in this sector. By the end of 1955, permanent buildings with a total floorspace of 45,000 sq m had been built. 148/ The Plan for 1955 called for 60,000 sq m of floorspace to be constructed, or one-half of the total basic construction (presumably 120,000 sq m of floorspace). 149/ Construction in 1955 was to require 40,000 cu m of stone, 9 million bricks, 9,000 cu m of wood, and 80 motor trucks. 150/

V. Cement Industry.*

The cement industry, which produces one of the most important inputs of construction, is fundamental to the industrialization program of Communist China. The growth in the production of cement provides a rough index to the growth of the over-all construction program.

Annual production in the first 4 years of the First Five Year Plan was as follows 152/ (see the chart, Figure 4**):

Year	Production (Million Metric Tons)
1953	3.9
1954	4.6
1955	4.5
1956	6.4

Much of the addition to production capacity for 1949-54 was obtained by investment in the rehabilitation and reconstruction of facilities fairly well developed before World War II. The relative ease with which production capacity was expanded by rehabilitation

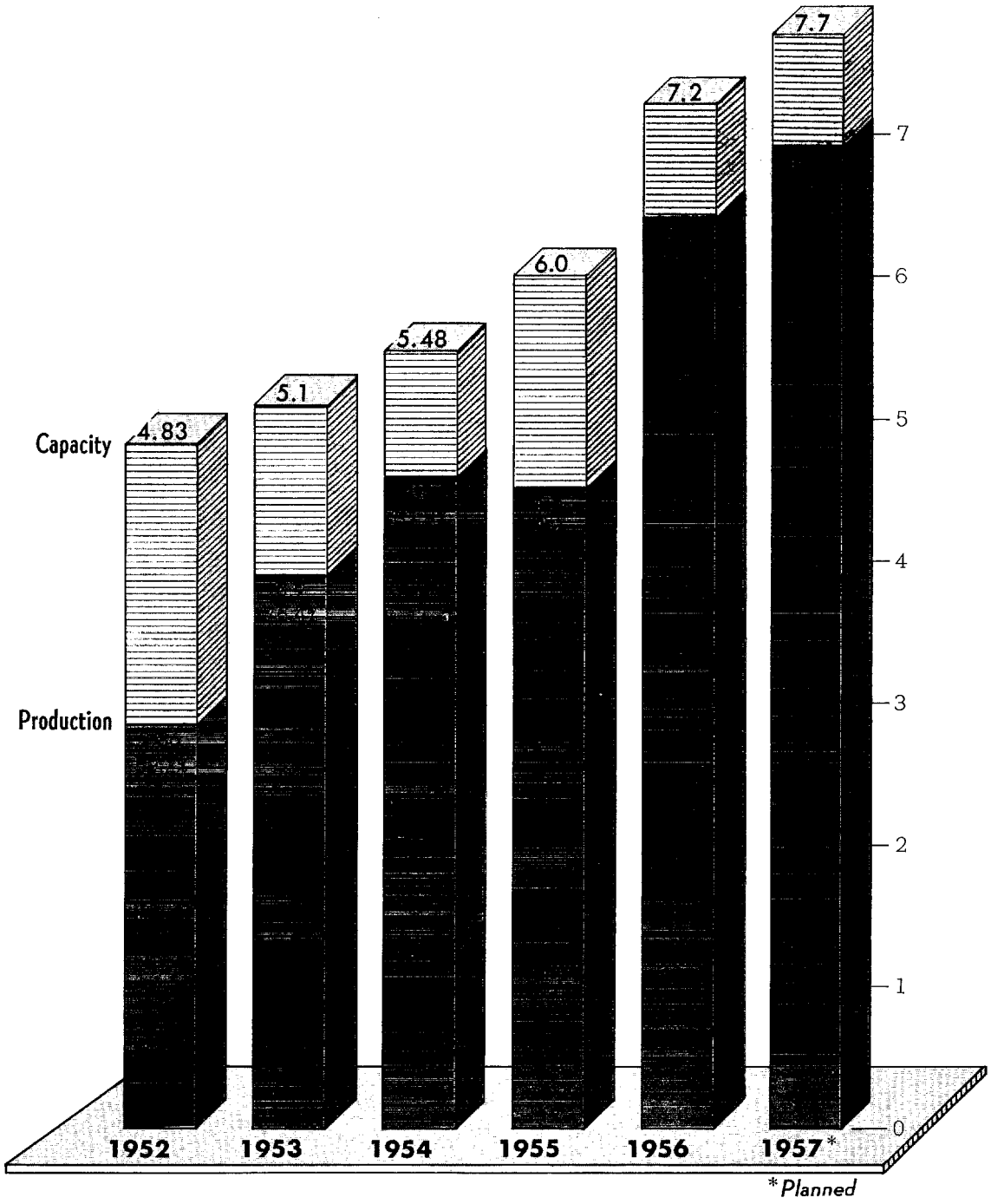
* The basic study on this subject is source 151/. This section is a synthesis of that report in which figures up to the end of 1956 have been incorporated.
** Following p. 26.

Figure 4

COMMUNIST CHINA

CEMENT PRODUCTION, PRODUCTION CAPACITY, AND OPERATING RATES, 1952-57

(Millions of metric tons)



in 1949-52 and the rapid improvement in the rate of utilization of capacity in 1953 and 1954 were primarily responsible for the rapid increase in the production of cement from 660,000 tons in 1949 to 4.6 million tons in 1954. 153/

The pattern for 1955-57, however, is one in which the construction of new facilities predominates, thus requiring greater expenditures of time and investment funds per ton of increase in production capacity. The First Five Year Plan called for the production of 6.0 million tons of cement in 1957. In 1956, 6.4 million tons were produced. 154/ Further increases in the rate of utilization of capacity, from an estimated 84 percent in 1954 to a probable 89 percent in 1956, have aided in this overfulfillment 1 year ahead of schedule. 155/ The achievement in 1956 implies that the increase in annual production capacity planned by the industry under the First Five Year Plan (2.36 million tons above the 1952 production capacity) may already have been reached. 156/

The drop in production of cement from 4.6 million tons in 1954 to 4.5 million tons in 1955 was the result of reduced requirements for cement under the economy program in the last half of 1955. The Chief of the Construction Materials Industry Control Bureau announced in early 1956 that the total production plan in 1955 had been reduced by nearly 25 percent to bring production more closely in line with actual requirements. 157/ Thus the industry probably could have produced about 5.5 million tons in 1955.

Li Hsien-nien, a vice-premier of the State Council, in his 1956 Budget Report called for a 40-percent increase in the production of cement in 1956 above the level of 1955. 158/ Even in surpassing this goal (the increase was actually 42 percent), the domestic supply of cement in 1956 failed to keep pace with industrial requirements for it. From 1953 through 1955 the development of the cement industry exceeded or at least kept abreast of industrial expansion. But in 1956, a year of accelerated construction, widespread shortages of cement became noticeable. The 42-percent increase in production in 1956 over 1955 fell under the anticipated increase in demand of 59 percent. 159/ It appears probable that a part of the shortage resulted from exports to the USSR. In 1956 a threatened shortage of more than 1 million tons of cement at construction sites in the USSR was announced. 160/ Communist China -- adequately endowed with the natural formations necessary for the production of cement -- probably has helped to make up this deficit, especially in the eastern regions

of the USSR. Such exports during the present period of rapid expansion of construction activity put an additional burden on the cement industry.

Schedules for cement projects were accelerated in 1956 in order to meet requirements. In the first 8 months, capital construction in the cement industry was 47 percent greater than in the same period of 1955. 161/ In addition to the Kung-yuan plant, which was reconstructed from a pre-World War II annual capacity of 170,000 tons to one of 450,000 tons, 3 other plants are being expanded, and 6 new plants are being constructed. 162/ Three of the new plants probably will go into full operation before the end of 1957 163/ and the remaining 3 new plants probably in 1958.

Four of the 6 new plants can be identified as follows 164/:

Plant	Estimated Annual Capacity (Metric Tons)
K'un-ming	300,000
Ta-t'ung*	480,000
Urumchi	150,000
Yung-teng*	450,000

There have been reports which stated that plants are being constructed at Pao-t'ou and Hsiang-t'an. 166/ A report of 3 January 1957 states that construction has begun on a plant in western Szechwan with a planned output 3 times that of the cement plant at Chungking, or an annual production of more than 300,000 tons. 167/ This plant, which is probably not one of the six mentioned above, is scheduled for completion in 1959. 168/ Construction of another new plant to be located near Sian with a planned production capacity of 680,000 tons of "high quality" cement annually has begun. 169/ Still another plant is scheduled to be built at Ku-shan in Anhwei Province. 170/

The Second Five Year Plan proposals announced at the Eighth Party Congress put the 1962 production goal of cement at 12.5 million to 14.5 million tons, more than twice the production originally planned for 1957. 171/ This goal parallels the proposal to double investment

* The Ta-t'ung plant began trial operation in December 1956, and the Yung-teng plant is reportedly near completion. 165/

in capital construction during the period of the Second Five Year Plan. Although the goal of 12.5 million to 14.5 million tons is within the capabilities of the cement industry, it may be short of planned requirements. The rate of utilization of existing capacity is rapidly approaching the optimum, and new plants must be constructed and those currently under construction must be expanded if even the lower range of the goal is to be met.

APPENDIX A

GAPS IN INTELLIGENCE

1. Construction Portion of Investment in Capital Construction.

Aggregative indexes of the volume of construction put in place in Communist China are not available. Lacking these, it has not been possible to determine precisely the relative share of construction-installation work and machinery and equipment in capital investment.

2. Construction Costs.

Very little aggregative cost data have come to hand. Because of this lack of information, changes in construction costs from 1953 through 1956 could not be assessed accurately.

3. Physical Volume of Construction.

Although sporadic announcements have been made on construction of buildings in terms of square meters of floorspace constructed, the data have been neither systematic nor thorough. The same holds true for excavation work in terms of cubic meters. An estimate of the physical volume of construction in various sectors using either of these gauges, even if data were available, would still be tenuous because of the possibility of repair and maintenance figures being included in the totals. Such data would be of value, however, even without a detailed breakdown.

4. Organization of the Construction Effort.

The internal organization of the principal construction organs is not known. Operating procedures and jurisdictions have not been announced, and the lines and limitations of state control are known only generally. Considerable information is needed before more than a tentative charting of the effort can be made.

5. Reduction of Construction Time.

There is great ambiguity in the reports on construction starts and completions. Some officials treat preparatory work as precedent to the start of formal construction; others do not. On some projects, substantial construction is performed before it is announced publicly. On others the date that a plant goes into operation is often reported as the date on which construction was completed. The discrepancies in time are often so confusing as to suggest that the root cause is poor reporting practices rather than designed misrepresentation. Because of these factors, the exact construction time for many projects cannot be ascertained, and comparisons cannot be made with construction periods of similar plants.

6. Labor Force.

Data on the size of the labor force in the construction industry are scarce. Information on the ratio of permanent to temporary, skilled to unskilled, and staff to manual workers in the construction labor force is not available in any depth. Details on labor productivity in the industry are likewise lacking.

7. Construction of New Railroad Lines.

Information on the actual proportion from year to year of capital investment for railroads which is represented by construction of new lines, as differentiated from renovation and repair and rolling stock, is not available. Data on the construction of new lines are uneven and often misleading. Goals, revisions, and percentage increases announced at different times have often been contradicted by coincident or subsequent announcements.

8. Construction of Highways.

The profusion of types and classes of highways and the ambiguity of official claims make analysis on construction of highways difficult. Extremely few usable data are available.

9. New Housing Construction.

Official announcements do not separate new housing constructed privately from that constructed by the state. The amount of repair in total square meters constructed has not been indicated. Present

housing stocks of major cities remain unknown. Information on living space per person is not consistent. A breakdown of the ratio of dormitories to single family units has not been made.

10. Construction for Agriculture and Water Conservancy.

Data on the agriculture and water conservancy sectors are sparse and, when available, are of a descriptive form not readily usable as a guide with which to gauge the contribution made by construction.

11. Additions to Cement Plant Capacity.

The proportion of additional capacity furnished by new construction and reconstruction of cement plants as opposed to increased labor productivity, higher utilization rates, and technological progress is not known. Very often Chinese Communist reports do not differentiate between capacity, either immediate or ultimate, and output -- which only increases the difficulty. Also, much additional information is required on the capacity and output of individual plants, especially the smaller ones.

APPENDIX B

SOURCE REFERENCES

The quantity and quality of reporting on Communist China has improved considerably in the past year. To the extent that such reporting may in the future be more sharply focused on gaps such as those cited in Appendix A, further improvement in the intelligence product may be expected.

Evaluations, following the classification entry and designated "Eval.," have the following significance:

Source of Information	Information
Doc. - Documentary	1 - Confirmed by other sources
A - Completely reliable	2 - Probably true
B - Usually reliable	3 - Possibly true
C - Fairly reliable	4 - Doubtful
D - Not usually reliable	5 - Probably false
E - Not reliable	6 - Cannot be judged
F - Cannot be judged	

"Documentary" refers to original documents of foreign governments and organizations; copies or translations of such documents by a staff officer; or information extracted from such documents by a staff officer, all of which may carry the field evaluation "Documentary."

Evaluations not otherwise designated are those appearing on the cited document; those designated "RR" are by the author of this report. No "RR" evaluation is given when the author agrees with the evaluation on the cited document.

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