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HIGHWAY TRANSPORT IN COMMUNIST CHINA 1950-58

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CENTRAL INTELLIGENCE AGENCY

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FOREWORD

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To support its expanding economy, China has relied heavily on highway transport for short hauls and feeder service to the railroad and waterway systems. Highway transport also has been used to extend political and military control in the western provinces and border regions. A more detailed examination of this system is necessary to determine accurately its significance in relation to the total transportation system of China, to assess the gains in performance during 1950-58, and to examine how these gains were made.

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HIGHWAY TRANSPORT IN COMMUNIST CHINA*
1950-58

Summary

Modern highway transport** in Communist China is essentially local in character except in the west, where other types of transportation are undeveloped. In other regions, trucks are used primarily for short-haul and feeder services to the railroads and waterways. Since 1949 these operations have made progressively more effective use of available equipment and facilities, but highway transport still is hampered by poor roads, shortages of trucks, and an inadequate supply of fuel.

During 1949-58, Communist China expanded a badly damaged highway network of 75,000 kilometers (km) of motorable roads to an improved network of 400,000 km.*** This network, however, still is characterized by little surfacing, poor drainage, timber bridges of low capacity, and numerous ferry crossings. Expansion of the network has been accomplished primarily by renovation in the east and by new construction in the west and has been financed by investment funds provided by several levels of government. This expansion, besides considerably improving the roads throughout the country, has strengthened political control and increased military capability, especially in the border regions and the coastal area of Fukien.

During 1950-58 the civilian truck park of Communist China was increased through imports and domestic production from 40,000 to 96,000 trucks, characteristically with capacities of 3 metric tons.**** About half of these trucks are owned by transport agencies of the government and about half by functional government agencies. The military services own and operate a truck park comparable to the total civilian park. Rising domestic production of trucks may soon meet effective demand, but the Chinese Communists will continue to import

* The estimates and conclusions in this report represent the best judgment of this Office as of 15 November 1959.

** The term modern highway transport in this report refers to transportation by motor truck. The performance figures include haulage of freight by truck, trailer, or bus. The term native highway transport refers to all highway transport except motorized transport, including animal-drawn and man-drawn carts, porters, and the like.

*** See the map, inside back cover.

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

trucks of special types and export limited numbers of trucks, primarily to build up political prestige.

During 1950-58 the tons originated by trucks in Communist China increased from 7.45 million to 176.3 million, or about 23 times, and of the total tons originated by modern transport the share contributed by trucks rose from 6.6 percent to 27.9 percent. During the same period the ton-kilometers performed by trucks increased from 373 million to 5.29 billion, or about 13 times, and the share of the total ton-kilometer performance of modern transport contributed by trucks increased from 0.9 percent to 2.3 percent. The performance of truck transport has increased slightly faster than the performance of total modern transport, a trend which may continue until 1962 or 1963. These increases reflect the restoration and expansion of the highway system, additions to the truck park, intensive utilization of equipment, and expansion of all types of transportation. The intensive utilization of equipment will impair the condition of trucks and may negate much of the gain that China could realize through expanding domestic production and retiring its old trucks.

Native land transport in Communist China has an inventory of about 24 million carts of all kinds and a full-time labor force of about 4 million persons. During 1955-58 the tons originated by native land transport increased from 300 million to 529 million, or about 76 percent, and ton-kilometer performance increased from 1.9 billion to 3.3 billion, or about 74 percent, during the same period. Because of excessive labor costs, at least 10 times as high as in truck transport, no sharp expansion of this sector seems likely, but native land transport will continue to provide a flexible means by which highway transport may be expanded quickly with small capital outlays. Native land transport will continue to form an integral part of the economy of China for some time to come.

I. Introduction

The Chinese did not place great emphasis on highway transport before the Communist seizure of power in 1949 but relied heavily on railroads and waterways for long-haul freight movements and on traditional native carts for short hauls. During the period when motor transport was developing rapidly in other nations, China was engaged in civil and international wars.

The Chinese Communists acquired an underdeveloped, badly damaged highway system when they seized power in 1949. Starting from a small

base, the Chinese made impressive gains in highway transport during 1950-58 by utilizing native types of transportation and technological advancements in the modern sector. An assessment of these gains without consideration of the unique conditions of this period, however, would distort the facts.

II. Truck Transport

A. Highway Network

1. Growth and Development

The Chinese Communists in 1949 acquired a badly damaged highway network concentrated mainly in the densely populated eastern coastal regions. Sparsely populated western China was isolated from central and eastern China with only the Lan-chou - Sinkiang road in the north and the Burma road in the south providing motorable links to the western borders of the country. In spite of the existence of this northern route, the highway network of Sinkiang was oriented toward the USSR. The Burma road provided no east-west connection with China's western provinces. In the northeast, some highway routes ran parallel to the rail lines providing supplementary service, but most of the roads were intended to provide short-haul connections with the railroad and water networks. Few good roads existed in the north between Peking and the Yellow River, but the highway network became more dense to the south. Possibly the best developed portions of the highway network were centered in the area of the middle and lower Yangtze River. Most of these roads were narrow and of poor quality, and their usefulness was limited by timber bridges of low capacity and by ferries. Surfacing, where it existed, consisted of a layer of gravel, crushed rock, or packed earth, with some small sections of pavement in and adjacent to the major urban centers. Low standards of construction resulted in frequent closing or damage to roads during periods of inclement weather.

Major emphasis has been placed on the extension of the highway network of Communist China to the border areas of the country, where only primitive means of communication formerly existed. Construction of roads in these areas has furthered the economic and cultural development of districts having racial minorities and has tied these districts more closely to the central government. Roads provide the only means of direct surface transportation between China and Tibet and between China and the neighboring countries of Laos, Burma, and India as well as the Soviet Central Asian republics. Because of the intense Chinese interest in Tibet and the Chinese policy of strengthening border positions, truck transport has been considerably expanded in these areas. A further stimulus to truck transport has resulted

from the increased tempo of construction in areas not serviced by rail -- for example, the western oilfields. 50X1

a. Types of Highways

The Chinese Communists have been busily constructing and repairing roads throughout the country, but precise information on these activities is unavailable. Although the Chinese place motorable roads in six classes for administrative purposes, they rarely refer to these definitions in their announcements and do not even consistently distinguish between new construction and the repair of existing roads.**

b. Length

Statistics released by the Chinese Communists concerning the total length of their highway network are contradictory and often confused. Table 1*** gives the total length of all highways as officially announced. Additions to the highway network in Communist China have been erratic, the largest being made in 1956 and 1958. Of the total 120,400 km added during the First Five Year Plan (1953-57), it appears that the central government added only about 12,000 km, or 10 percent.**** The large addition made in 1956 may have been the result of a number of earlier projects having been rushed to completion when congestion and the upsurge throughout the economy began to affect highway transport. The largest increments coincide with the years when highway transport experienced serious congestion, and it is believed that most of the addition announced in 1958 represents roads of dubious quality which were not counted earlier in the national total.† It seems conceivable that the authorities, faced with serious operational difficulties, added these roads statistically to compensate partly for other shortcomings.

The most recent Chinese Communist announcement stated that 40,000 km of highways were rebuilt during 1958; that 20,000 km of native roads were improved to make them passable in rainy seasons; that 10,000 km with tight curves, narrow stretches, and steep gradients were improved; and that 25,000 km were surfaced with "waste" materials. Fifty percent of the existing highways, however, were not "completely" passable during rainy seasons. 2/

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** See Appendix A, Tables 8, 9, 10, and 11, pp. 24, 25, 26, and 26, respectively, below.

*** Table 1 follows on p. 5.

**** Roads built by the central government are generally of much better quality than those built with local funds.

† The addition could be the result of a reclassification of "simple" highways as Class VI-B highways (for methodology, see Table 9, Appendix A, p. 25, below).

Table 1

Communist China: Announced Length of the Highway Network and Additions 1949-58

Thousand Kilometers

Year	Length	Yearly Additions a/
1949	75.0 b/	N.A.
1950	102.8 c/	27.8
1951	107.4 c/	4.6
1952	129.6 d/	22.2
1953	138.6 d/	9.0
1954	142.5 d/	3.9
1955	162.5 d/	20.0
1956	227.2 d/	64.7
1957	250.0 d/	22.8
1958	400.0 d/	150.0

a. Derived from the first column.
b. 3/
c. 4/
d. 5/

The quality of the highway network of Communist China, although steadily improving, remains low by Western standards. Most of the roads are of packed earth or of crushed rock, gravel, or sand. Numerous streams, especially in the south and west, are forded or crossed by ferry. Bridges are of poor construction, which limits the number of vehicles and loads that can cross. Generally, roads are better near large urban centers in the eastern provinces. It must be remembered, however, that because the bulk of highway freight is transported by primitive means and because all highway transport in China is essentially local in character, China does not require a modern highway network of the Western type.

c. Maintenance

Communist China relies to a great extent on hand labor to maintain its highway network because "the entire country now has only 1,000 comparatively major road construction machines." 6/ Workers are assigned to a specific section of road and are held responsible for its care, cadres of workers are organized by local authorities, and the Peoples Liberation Army (PLA) maintains and constructs roads in remote regions. All peasants have the duty of repairing roads. 7/

The Chinese Communists have stated that generally each maintenance worker should take care of 2 to 4 km of high-grade road or 1 to 4 km of ordinary-grade road. 8/ A more recent announcement states that each kilometer of road requires one or two persons for constant maintenance. This statement indicates that the more than 400,000 km of highways in China require "several hundred thousand or even a million persons for road maintenance, constituting a serious problem when the 'leap forward' had caused a labor shortage." 9/ Although this system is labor consuming, the existing facilities and roads are kept in fair repair and are gradually improved. It is assumed that the money cost of maintenance is low in Communist China because of the large amounts of corvée labor used.*

2. Investment

The Chinese Communists have placed considerable emphasis on road rehabilitation and new construction, the First Five Year Plan having allocated 581.8 million yuan** for highway construction from the central government, 10/ or about 7 percent of total planned investment in transport and communications. By far the greater part of total road building, mostly on secondary roads, is done by the local governments, capital investment by local governments having been planned to be 297.8 million yuan during the First Five Year Plan. 11/ Actual total investment in highways during the First Five Year Plan was 1.12 billion yuan, of which 704 million yuan were spent by the central government and 414 million yuan by provincial and local authorities. An application of these figures to the total kilometrage added*** gives an average cost per kilometer of about 58,000 yuan for projects financed by the central government and about 3,700 yuan for roads built by provincial authorities. [redacted] The proportion of total investment in roads by the central government probably varies widely by region. In the western provinces, the border regions, and the Fukien coastal area, investment probably is made primarily by the central government, because these highways affect national defense and welfare. In Tibet, almost the entire investment would come from the central government. 50X1

* In addition to corvée labor, it is probable that convict and slave labor is used for road maintenance and construction.

** Except where otherwise indicated, yuan values in this report are expressed in current yuan and may be converted to US dollars at the rate of 2.46 yuan to US $1. This rate of exchange is based on the yuan-sterling rate for telegraphic transfers, which is arbitrarily established and bears no relationship to domestic price levels.

*** Assuming that 12,135 km were added by the central government and 112,598 km by local authorities. 12/

[redacted] 50X1

It thus appears that substantial investments have been made in the highway network by both the national and the local governments in Communist China. Even these amounts may not reflect the true proportion of total investment, because investments by "trade departments,"* hsiens (counties), and commune governments probably are excluded from the total. The heaviest investments by the central government have been in the western provinces, the border regions, and the Fukien coastal area. Local governments have invested heavily in all areas, although the pattern of investment has been uneven, and estimates of actual investment are complicated by the Chinese Communist practice of including highway investment under "investments in communications and transportation" in their announcements.

B. Organizational Structure

Highway transport in Communist China functions under the Ministry of Communications. The Ministry operates under the general direction of the Industry and Communications Staff Office of the State Council. 14/ Wang Shou-tao assumed the duties of Minister of Communications in mid-1957 when the incumbent was purged as a rightist. At the ministerial level the coordination of different communications facilities and the establishment of standards are the principal responsibilities. The Ministry of Communications also exercises direct operational control over highway transport in some areas (for example, the Tibet-Tsinghai Highway Bureau).

It seems likely that a large measure of day-to-day control over highway transport lies with the provincial governments, which in turn are responsible to the State Council. Plans are formulated at the national level, are coordinated with the provinces, and are executed by provincial authorities. The typical province in Communist China probably has 5 to 10 transport groups, each with a repair facility and appropriate functional sections. The entire organization, through the means available to a Communist state, is a closely controlled, efficiently operated economic tool employed to further the economic (and hence the political) and strategic interests of the central government.

C. Performance

1. Tons Originated

Truck transport in Communist China showed a marked increase in tons originated during 1950-58. Total tons originated increased

* Probably a part of the central government.

from 7.45 million tons in 1950 to 176.3 million tons in 1958, or about 23 times, as shown in Table 2.* In the same period the share of trucks in total tons originated by modern transport rose from 6.6 percent to 27.9 percent. These figures reflect the renovation and expansion of the highway network and increases in the size and utilization of the truck park in addition to a general increase in performance by all types of transportation.

The increases in tons originated during 1951 and 1952 probably reflect the restoration of the highway network after the Chinese civil war and the resulting increases in performance by all types of transportation as the economy of Communist China began to expand. The large increases in 1956 and 1958 reflect the increases in over-all transportation performance as well as in truck transport. Except in 1955 and 1957, tons originated by trucks have increased steadily both in absolute terms and in the percentage of total tons originated each year during 1950-58. Truck transport performance in terms of tons originated has expanded at a faster rate than total modern transport, a trend which probably will continue at least until 1962 or 1963.

The Chinese Communist state-owned transport agencies achieved these increases in performance partly by intensive utilization of trucks, which was accomplished by the following measures: (a) firmer administrative control, (b) liberal support to the civilian sector by the PLA, (c) part-time use of trucks belonging to functional government agencies not primarily concerned with transportation, (d) double driver shifts, (e) overloading, (f) use of trailers, and (g) better utilization of available loading space. The use of double driver shifts and the support received from the PLA have been realized by a diversion of resources (fuel and personnel) from other sectors of the economy. Apparently the Chinese considered the demand for transportation to be of sufficient priority during 1958 to divert these resources. It appears that high performance from existing facilities was realized during 1958. Reports of early 1959 indicate that the Chinese plan to increase performance by increased utilization more than by expansion of the sector during 1959.

2. Ton-Kilometers and Average Length of Haul

Truck transport performance in Communist China in terms of ton-kilometers is shown in Table 3.**

* Table 2 follows on p. 9.
** Table 3 follows on p. 10.

Table 2

Communist China: Tons Originated by Truck Transport 1950-58

	Million Metric Tons		Percent	
Year	Tons Originated	Increase Above Previous Year a/	Increase Above Previous Year a/	Share of Total Modern Transport b/
1950	7.45 c/ d/	N.A.	N.A.	6.6
1951	12.6 c/ e/	5.15	69	9.4
1952	20.7 c/ d/	8.1	64	12.3
1953	30.4 c/ d/	9.7	47	14.3
1954	43.5 c/ d/	13.1	43	16.3
1955	50.1 c/ f/ 49.8 g/	6.6	15	17.9
1956	79.1 g/	29.3	59	21.3
1957	101.2 h/	22.1	28	23.6
1958	176.3 i/	75.1	74	27.9

a. Derived from the first column.

b. 15/

c. Tariff tons. The term tariff tons is a term used in Chinese Communist cost accounting. The exact meaning of the term is unknown, but there is very little difference between a tariff ton and a physical (metric) ton.

d. 16/

e. 17/

f. 18/

g. 19/

h. 20/

i. 21/. In March 1959 the Chinese Communists announced that tons originated by truck transport had reached 280 million in 1958. 22/ This figure was tentatively accepted by this Office as the upper limit of performance attainable with the available truck park and a considerable increase in operating efficiency. A hint that the figure of 280 million tons might be revised downward came in a speech by Chou En-lai on 28 August 1959 23/ at a time when other revisions of 1958 data were taking place. A month later the Minister of Communications, without mentioning the figure of 280 million tons or indicating that any revision was taking place, stated that motor trucks had carried 176.3 million tons in 1958. 24/ The revised figure is much more consistent with past performance and with the announced goal for 1959 and therefore has been accepted as the current estimate of 1958 performance.

Table 3

Communist China: Ton-Kilometer Performance of Truck Transport 1950-58

	Billion Ton-Kilometers		Percent	
Year	Performance	Increase Above Previous Year a/	Increase Above Previous Year a/	Share of Total Modern Transport b/
1950	0.373 c/ d/	N.A.	N.A.	0.9
1951	0.503 c/ e/	0.130	35	0.9
1952	0.678 c/ d/	0.175	35	1.0
1953	1.181 c/ d/	0.503	74	1.3
1954	1.87 c/ d/	0.69	58	1.7
1955	2.52 c/ f/ 2.51 g/	0.65	35	2.1
1956	3.49 g/	0.98	39	2.4
1957	3.79 h/	0.30	9	2.3
1958	5.29 i/	1.50	40	2.3

a. Derived from the first column.
b. 25/
c. Tariff tons. The term tariff tons is a term used in Chinese Communist cost accounting. The exact meaning of the term is unknown, but there is very little difference between a tariff ton and a physical (metric) ton.
d. 26/
e. Interpolated between 1950 and 1952 by assuming geometric progression.
f. 27/
g. 28/
h. 29/
i. Estimated.

The largest absolute gains took place in 1956 and 1958, which were years of expansion in all sectors of the economy. The "leap forward" campaign in 1958 resulted in an absolute increase larger than in any previous year, reflecting significant additions to the truck park and intensive utilization. The small gain in 1957 may reflect a leveling off after the large increase made in 1956 and a reduction in imports of trucks, suggesting that 1959 may also show a slight drop in the rate of increase while the Chinese digest the gains made in 1958.

[redacted] the authorities expect an even larger absolute increase in performance in 1959. 50X1

When considered in connection with total modern transport performance, truck ton-kilometer performance does not bulk large in the economy of Communist China but is nevertheless quite important. Truck transport performance includes short-haul feeder service to rail and water transport, which could not be handled by the native sector of highway transport without excessive labor costs, and also the long-haul service of truck transport in western China, which cannot be supplemented by native transport. The average length of haul of truck transport is shown in Table 4.

Table 4

Communist China: Estimated Average Length of Haul of Truck Transport 1950-58

Kilometers

Year	Average Length of Haul	Change from Previous Year
1950	50 a/	N.A.
1951	40 b/	-10
1952	33 a/	-7
1953	39 a/	+6
1954	43 a/	+4
1955	50 a/	+7
1956	44 a/	-6
1957	37 a/	-7
1958	30 b/	-7

a. Calculated by dividing ton-kilometers (see Table 3, p. 10, above) by tons originated (see Table 2, p. 9, above).
b. Estimated.

The average length of haul of truck transport in Communist China in the next few years may level out near 30 km. As the railroad network expands, the longer truck hauls will be eliminated, and trucks will continue to be used on short-haul feeder operations. Because of the poor quality of the road network and continued problems with liquid fuel, no long-haul operations of the common carrier type such as those in the US will be possible for some time. An increase

in the use of native transport for short hauls in 1958 could have increased the average length of haul for motor trucks. The decrease during 1958, however, suggests that the Chinese may have employed motor vehicles on high-priority short hauls in support of industrial production. This use might also account in part for the rapid rise in tons originated during 1958.

3. Commodity Composition

Tentative conclusions regarding the commodity composition of truck transport in Communist China are shown in Table 5. More varieties of goods probably were transported by truck than by other types of modern transportation, but 90 percent of the 176.3 million tons moved by truck were in the specific commodity categories listed in Table 5.

Table 5

Communist China: Estimated Commodity Composition of Traffic Carried by Truck Transport a/
1958

Commodity	Tons Originated (Million Metric Tons)	Percent of Total Truck Transport
Coal	78	44
Mineral construction materials	38	21
Agricultural goods	26	15
Of which:		
Grain	23	13
Cotton	2.5	1
Ferrous raw materials and products	8.9	5
Of which:		
Steel	3.1	2
Timber	5	3
POL	3	2
Other	17.4	10
Total	176.3	100

a. For methodology, see Appendix B.

4. Contribution of the Peoples Liberation Army (PLA)

With a truck park comparable to that of the civilian authorities, the Peoples Liberation Army (PLA) of Communist China makes a small but significant contribution to civilian transport. During 1950-58 the PLA is estimated to have accounted for about 10 percent of total ton-kilometers in truck transport. Much of this support was rendered in the western provinces, where the transport organizations of the PLA function almost as civilian units. A large number of trucks in Sinkiang, Tibet, and Szechwan are under military control, and the rest probably are controlled by agencies directly responsible to the central government.

In addition to furnishing trucks regularly used for civilian transport in Communist China, the PLA has given liberal support to the civilian authorities for specific transportation tasks. In October 1958 it was announced that the PLA had mustered more than 10,000 trucks for use on the "steel-making front." 30/ During 1958, according to a more recent announcement, the PLA turned over "surplus" trucks to civilian authorities, and about 13,000 PLA trucks also were used in support of the civilian authorities. 31/ No data are available concerning the precise contribution made by these vehicles, but the actual number used is equivalent to about 14 percent of the estimated civilian park at the end of 1958. In addition to supplying trucks, the PLA has been integrated to an extent with civilian transport. Unified traffic commands have been set up in certain areas, repair facilities of the PLA have been partly coordinated with those of the civilian authorities, and the PLA provides the civilian transportation authorities with trained personnel.

D. Equipment and Facilities

1. Civilian Truck Park

Estimates of the Chinese Communist civilian truck park* are shown in Table 6.**

The civilian truck park in Communist China is composed of many different makes and models from at least 10 different countries, a situation which seriously complicates maintenance and the obtaining of spare parts. During 1949-56, additions to the park came mainly from the USSR and the European Satellites, especially Czechoslovakia and Hungary. The Chinese curtailed imports in 1957, apparently because of optimism concerning domestic production, a general policy of cutting imports, and a low supply of fuel. Imports increased in 1958, when

* For methodology, see Appendix B.

** Table 6 follows on p. 14.

Table 6

Communist China: Estimated Civilian Truck Park and Additions a/
1950-58

Thousand Trucks

Year b/	Park	Yearly Additions
1950	40	N.A.
1951	44	4
1952	49	5
1953	54	5
1954	59	5
1955	65	6
1956	72	7
1957	80	8
1958	96	16

a. See Table 12, Appendix B, p. 28, below.
b. As of the end of each year.

production did not meet effective demand and the "leap forward" campaign created problems in highway transport. It appears that the Chinese imported more than 20,000 trucks in 1958, the largest number coming from the USSR. 32/

Communist China began limited exports of trucks to Southeast Asia and the Middle East late in 1957, primarily for propaganda and political prestige. The propaganda aspects of such exports are obvious and possibly were reflected in a shipment of 10 trucks to Cambodia via Hong Kong. 33/ The total effect of Chinese exports of trucks probably has been a net gain in political prestige, but the economic effects have been small. Domestic production is rising rapidly, but domestic needs should preclude any large exports in the near future.

In 1956, domestic production of modified ZIS-150 4-ton trucks began at the newly opened First Automobile Plant at Ch'ang-ch'un. Production amounted to 1,654 trucks in that year and was expanded to 7,500 in 1957 and 15,000 in 1958. It is doubtful if the original stated capacity of the Ch'ang-ch'un plant of 30,000 trucks per year will be reached in 1959. The Chinese have stated that the capacity will be raised to 150,000 in 1959, 34/ but production probably will be far short

of this figure. The Chinese also have automobile manufacturing plants at Nanking and Shanghai in addition to a number of new plants under construction. "Leap forward" production of trucks at numerous automobile repair shops in 1958 did not add any significant number to the park. Already lacking adequate repair facilities, the repair shops apparently went too far in trial production during 1958 and were subsequently instructed to "trial produce" only after repair of trucks and other vehicles and manufacture of parts had been accomplished. 35/

No figures are available concerning the rate of retirement of trucks in Communist China, but at the end of 1958 it remained low.* Retirement of the 37,000 pre-1942 trucks (39 percent of the civilian park) will depend on a number of factors. If production rises rapidly, the Chinese no doubt will retire the older trucks or possibly relegate them to other uses -- for example, distribution among the communes. This policy could result in a 1963 park with a lower average age than at present, but the condition of the trucks will be adversely affected by intensive utilization.

The Chinese Communists have the productive capability to triple the existing truck park by 1963. By that time the park will contain few trucks above 13 years of age, and there may be a larger percentage of the total park under 5 years of age. China will continue to import trucks of special types -- for example, heavy-duty semitrailer and tank trucks -- but rising domestic production should cause reductions in imports of standard trucks. Production and allocation of petroleum will determine the number of nongasoline vehicles employed by the Chinese in the future, and the ratio of civilian to military vehicles may change.

2. Facilities

Although little information is available concerning motor truck facilities in Communist China, they are assumed to be scarce but adequate. In most cases, highway freight feeds into the transportation network at railheads or river ports, and terminal facilities probably are provided by the rail or water transportation networks. Maintenance and repair facilities for motor vehicles are relatively scarce in China, but the existing shops are capable of performing extensive repairs. Minor repair and maintenance are done by the local transportation authorities, and major repairs and overhauls are done at the "automobile repair shops." Because of the mixed nature of the park, these shops are equipped with foundries and machine tools to manufacture parts not

* A recent release stating that the 1957 "road department park" was 38,580 and that 12,000 trucks were added during 1958 for a park of 49,000 at the end of the year indicates a retirement rate of 4 percent for 1958. 36/

readily available. Information concerning the location of these shops is fragmentary. Kwangtung Province, with five repair garages late in 1957, 37/ probably is better provided with such facilities than most provinces. In contrast, Tibet had no repair facilities until a garage was constructed at Lhasa in 1957, vehicles being towed 2,000 km to Lan-chou in Kansu Province or to Urumchi in Sinkiang Province for repair before 1957. 38/ Even in the more densely populated eastern provinces, much time is lost in hauling vehicles to the repair shops and in repairing the vehicles. In 1956 the Chinese Communists complained that on the average 25 percent of the trucks were under repair, some of them in the shops for as long as 1 or 2 months. 39/ Recently the authorities stated that the "leap forward" had caused a serious shortage of parts. Of the 19,000 motor vehicles in Yunnan, Kweichow, and Szechwan Provinces, nearly 6,000 were out of service because they could not be repaired. 40/ [redacted] continued intensive utilization during 1959, and the cumulative effect of this policy may cause even more difficulties for the repair shops. 50X1

Expansion of the existing truck facilities in Communist China entails considerable investment because of the mixed nature of the park and the resulting need for extensive facilities and skilled labor. To provide facilities for the expected tripling of the existing park and to compensate for intensive utilization, China will have to invest heavily in repair shops. The expanding production of "Liberation" trucks should result in more widespread standardization of parts and thus should partly alleviate the supply problem.

E. Operating Efficiency

1. Utilization of Trucks

Along with a drive to bring all trucks under government ownership, the Chinese Communists have attempted to utilize the idle capacity of government-owned trucks. During 1956 it was found that the trucks belonging to state-owned transport agencies attained a utilization rate of 75 percent, whereas those of the functional government agencies had utilization rates of only 43 percent.

The importance attached to this discrepancy in utilization was emphasized by a directive issued early in May 1957 by the State Council of Communist China concerning the use of trucks belonging to functional government agencies. According to this directive, it was necessary to exploit fully the potential of existing trucks. The number of trucks owned and used by functional government agencies, organs, and enterprises was said to be nearly equal to the total number engaged in public transportation under the management of state-owned transport agencies. Each government unit having trucks was

instructed to send balance sheets to the proper transport agency, showing the capacity of its trucks and the legitimate requirements for transportation and thus indicate the extent to which these vehicles could be employed by the transportation agency. In this way the available transport capacity would be placed at the disposition of the official transport agency. 41/

It is not possible to state just how this shift of control was to be effected. It may be assumed, however, that a number of trucks belonging to Chinese Communist government organs are used on a part-time basis by transport agencies. The directive of May 1957 stated that the production targets should not be set too high nor the controls made too stringent. 42/ Enterprises owning trucks were asked to "strengthen their concept of socialist entity and overcome narrow and self-interested departmentalism ideology." 43/

Such measures no doubt have made contributions to the rise in rates of utilization of trucks in Communist China. The Communists claimed that by September 1958 about 20,000 trucks had been "pulled out" of various organs and industries to assist the transportation authorities. 44/ Although the work of each government agency or organization was to take priority over its obligation to loan trucks to other agencies and some were specifically excluded from this directive (for example, oil storage and refrigeration cars as well as vehicles belonging to industrial and mining enterprises and surveying teams), 45/ there seems to be little doubt that the transport agencies have received increased support from the functional government agencies. Because the functional government agencies have a park roughly equal to that of the transport agencies, even part-time support could improve materially the over-all performance of truck transport.

2. Overloading

Another method used to increase the utilization of the truck park in Communist China has been the overloading of available vehicles. In view of the way in which the Chinese Communists solved this problem with railroad cars (by merely raising the capacity), it is reasonable to assume that overloading also has been increased in truck transport. Late in 1956 the Ministry of Communications stated that trucks were overloaded an average of from one-half to 1 ton per vehicle and that all trucks should be thus overloaded. 46/

Most of the truck park in Communist China consists of vehicles with load capacities of between 3 and 4 tons. Several circumstances assist the authorities in obtaining high load factors with these vehicles. First, much of the freight carried by trucks in China,

such as coal, construction materials, grain, ferrous metals, and timber, is of high load density. Second, because of the scarcity of motor trucks, freight pickup stations probably are established along the routes over which common-carrier vehicles are operated. The freight is assembled at these points, and truck transport takes what it can, the rest being transported by native means. Such procedures could virtually eliminate truck operations with less than full loads.

3. Use of Trailers

The use of trailers, pulled behind conventional trucks, made a significant contribution to increased highway transport performance in Communist China, especially during late 1958. China had only 4,700 trailers in June 1958, but the Chinese have announced that by late 1958 this number had increased to more than 32,000, which in terms of load capacity was equivalent to adding about 24,000 trucks. 47/ The Chinese claim that by the addition of trailers they have increased the ton-kilometer performance of individual trucks as much as 60 percent and have reduced fuel consumption per ton-kilometer as much as 17 percent. 48/ Although these figures probably represent the upper limits of the gains realized, the over-all average also must be impressive. The Chinese cited numerous examples of trailer usage during 1958, including such extravagant claims as 46 trailers with 140 tons of material being hauled by 1 truck. 49/ Although many such accounts are obviously propaganda, there is little doubt that the use of trailers has contributed a good deal to the increase in truck transport performance, particularly during the latter months of 1958, when truck transport faced serious problems. The use of trailers, if properly developed, also could do much to solve the problem of a high fuel-to-cargo ratio in western China, where trucks at times must carry enough fuel to travel thousands of kilometers.

Most of the trailers used by the Chinese Communists are produced domestically by semihandicraft methods, although it seems probable that a number of heavy-duty trailers and trailers of special types have been imported from other countries of the Sino-Soviet Bloc. Even though of doubtful quality, locally produced trailers have had a marked effect on truck transport in China by introducing a flexibility that importation and manufacture have failed to achieve up to the present time. The use of trailers may be a major and relatively cheap means of partly solving the shortage of truck transport and to some extent the shortage of liquid fuel in China.

4. Double Driver Shifts

Another important means of increasing utilization has been the contribution of double-driver shifts to the rise in truck transport

performance in Communist China. This use of double drivers, previously restricted by fuel shortages and lack of trained personnel, became more widespread late in 1956, when transportation tasks increased. Some reports give 60 to 70 percent as the rate of increase in transportation capacity through the use of two shifts. By early March 1957 the Chinese Communists claimed that about 4,000 trucks were operating on two shifts 50/ and by the end of 1958 they claimed that 26 percent of the trucks "in operation throughout the country" were working on double shifts. It is not clear whether the Chinese meant 26 percent of the 96,000 trucks in the civilian park -- that is, 25,000 trucks -- or 26 percent of the 49,000 trucks operated by the state-owned transport agencies -- that is, 13,000 trucks. 51/ Late in 1958, as transportation tasks became heavier, the Chinese recruited skilled workers in Hong Kong, "among whom a considerable number" were "motor car drivers." 52/ A substantial amount of the increase in performance is attributable to this change in operations, but the increase has been restricted by shortages of fuel and trained drivers. Some of the same liabilities applying to other means of increased utilization apply to this measure. The effect on the condition of trucks, on repair and maintenance, and on requirements for fuel and personnel is obvious.

5. Gasoline Consumption and Requirements

It is estimated that in 1957 civilian trucks in Communist China consumed about 400,000 tons* of the 610,000 tons of gasoline available. By the end of 1958 the total amount of gasoline available increased to 726,000 tons, or by 19 percent. During the same period, ton-kilometer performance of truck transport increased from 3.79 billion to 5.29 billion, or by about 40 percent. Viewed thus, the 1958 performance figure appears improbable, but there may have been a reduction in the percentage of total gasoline allocated to the military services, and part of the total performance may have been accomplished by trucks that did not burn gasoline. It is likely that the 1958 performance was near the limit possible with the available fuel, thus pointing once more to a serious fuel problem. The effect of petroleum shortages on expansion and performance will depend on a policy decision by the authorities. If necessary, however, China can provide the petroleum necessary to operate a park of 288,000 trucks by 1963.

In 1952 the Chinese Communists announced that the rise in road standards had increased performance per truck from 8.05 km (5.0 miles) per US gallon of fuel to 13.156 km (8.2 miles) per gallon. 53/

* The estimated total amount of gasoline available (610,000 tons) less the estimated military consumption (157,500 tons) gives 452,500 tons. A portion of this amount, however, would be consumed by buses, automobiles, and other nonmilitary consumers.

Fuel consumption in some areas, particularly western China, is considerably greater than is indicated in the Communist announcements. 54/ In Sinkiang, 60 percent of the vehicles could not keep within the fuel quota during the second quarter of 1957. 55/ [redacted] tend to discredit the Chinese claims of average fuel consumption. 50X1

The improvements in road standards as well as drivers and equipment no doubt have been accompanied by savings in fuel. No official announcements have been made regarding the actual average consumption of fuel except the stated goal of 19 liters per 100 km.* This amount is considered to be beyond the capabilities of Chinese Communist truck transport. An estimate of 10 to 12 km (6.2 to 7.5 miles) per gallon of fuel seems reasonable.

III. Native Land Transport

A. Performance

Data concerning the performance of native land transport in Communist China are scattered, and it is not possible to project performance beyond 1958. Performance during 1955-58 is shown in Table 7.**

The importance of native land transport to the Chinese Communist economy has often been underestimated, not only by foreign observers but also by the Chinese leaders. One of the major causes of the transportation difficulties in 1956 was the shrinkage of native transport resulting from the rapid collectivization of agriculture in late 1955 and early 1956. The Chinese leaders began to awaken to the importance of native transport in mid-1956, and since that time there has been a steady flow of directives urging fuller utilization of this great reservoir of transport capacity. In addition, the planners have been taking steps to increase the efficiency of native transport and in 1958 claimed that the shoulder pole was "virtually eliminated." 56/ The carters and porters also have been organized into cooperatives; operations have been "rationalized" to get the most service out of available equipment; extensive drives have been staged to equip all carts with ball bearings; and, in 1958, administrative control was extended.

Congestion in 1956 in rail and water transport, which also affected the highway system, probably was partly a result of the

* At 3.785 liters per US gallon the rate of consumption would be 20 km (12.4 miles) per gallon.

** Table 7 follows on p. 21.

Table 7

Communist China: Estimated Performance of Native Land Transport 1955-58

Year	Ton-Kilometers (Billion Metric Tons)	Tons Originated (Million Metric Tons)	Average Length of Haul a/ (Kilometers)
1955	1.90 b/	300 c/	6.3
1956	1.80 d/	298 e/	6.0
1957	2.45 f/	366 g/	6.7
1958	3.33 h/	529 i/	6.3 c/

a. Unless otherwise indicated, ton-kilometers divided by tons originated.
b. Announced to be 43 percent of total highway ton-kilometers (truck and native combined). 57/
c. Estimated.
d. Announced to be 34 percent of total highway ton-kilometers. 58/
e. Announced to be 79 percent of total highway tons originated. 59/
f. 60/
g. 61/
h. Tons originated times average length of haul.
i. 62/

shrinkage of native land transport performance from 1.9 billion ton-kilometers in 1955 to 1.8 billion in 1956 and of the decline in the average length of haul from 6.3 km in 1955 to 6.0 km in 1956. The Chinese Communist attempts to prevent any further recurrence of the problems of 1956 are reflected in the increases in performance by native transport from 1956 to 1958. Heavily dependent on native land transport to support the 1958 "leap forward" campaign, the authorities paid close attention to this sector of transportation.

The rise in performance of native land transport in Communist China that occurred during 1958 may begin to level off as the modern transport sector expands. The increase in native performance probably was partly a reflection of increased statistical data made available because of firmer administrative control over this sector of transportation in 1958. A number of exhortations to increase native transport capability during 1959, together with statements that expansion of the modern transport sector cannot compensate for the increased demands on all transportation, indicate that the authorities will again use millions of people to make up the deficiency in transportation that the

modern sector cannot handle. Apparently, transportation is considered to be of sufficient importance to divert human resources from other sectors of the economy.

Native land transport is more flexible than other sectors of transportation. Extensive terminal facilities are not required, and with very small capital investment the inventory of carts and the network on which the carts operate can be expanded rapidly. The principal controlling factor in expansion of native land transport is labor. It is estimated that native land transport is at least 10 times as labor intensive as truck transport in Communist China.*

B. Equipment

Statistics concerning the inventory of animal-drawn and man-drawn carts, pack animals, and porters in Communist China are few and conflicting, but it is agreed that the numbers are large. According to a Chinese statement, in 1958 there were more than 1.07 million animal-drawn and man-drawn carts in the country. 63/ Incomplete statistics also indicated that 737,000 animals were used exclusively for transportation work. 64/ A more recent statement claimed that there were 584,000 carts engaged exclusively in transportation (140,000 animal-drawn carts and 444,000 man-drawn carts) in addition to 23.8 million engaged in part-time transport (5.8 million animal-drawn carts and 18 million man-drawn carts). 65/ An estimate of bullock carts in India, a country comparable to China, placed the number at nearly 10 million in 1957. 66/ An estimate of more than 24 million carts of all kinds seems reasonable.

C. Prospects

Native transport forms an integral part of the Chinese Communist economy and will continue to do so for some time. The Chinese appear to have a clear understanding of its importance, and they plan to add 20 million wheelbarrows and animal-drawn transport vehicles in 1959. This appears to be more a modernization than an expansion of native transport. China relies heavily on its native transport for short-haul, low-priority freight and will continue to do so.

* For methodology, see Appendix B.

APPENDIX A

STATISTICAL TABLES

Table 8

Communist China: Highway Classification Selection by Functional Use 1958

Functional Description	Class of Highway
Important international highways; highways that connect with important political, economic, and cultural centers; important interprovincial highways; and highways that connect with important mines and industrial and/or transportation centers.	I, II, and III
Highways of secondary importance that connect with localities of the categories mentioned above as well as those connecting with large farms and ranches, important harbors and riverports, railroad stations, and airfields.	II, III, and IV
Highways that connect with the seats of government of special districts, hsiens (counties) and municipalities, mines, enterprises, farms, and transportation centers of medium importance.	IV, V, and VI
Highways of general serviceability that provide communications between hsiens, between hsiens and communes, between communes, and within communes.	V and VI

Table 9

Communist China: Highway Specifications a/
1958

Specification	Unit	Class of Highway b/ I	II	III	IV	V	VI-A	VI-B
Designed speeds c/	Miles per hour	75	62	50	37	25	16	16
Number of lanes	Each	4	2	2	2	2	2	1
Width of each lane d/	Feet	11	11	11	11	11	11	10
Width of road surface e/	Feet	46	23	23	23	23	20	10 to 15
Width of roadbed f/	Feet	75	39	36	33	30	26	15 to 21
Minimum radius of curvature g/	Feet	1,968	1,312	820	410	164	66	49 h/
Unobstructed vision								
Stopping	Feet	492	410	328	246	164	115	82 h/
Passing	Feet	N.A.	820	656	492	328	230	N.A. h/
Maximum grade i/								
Level land	Percent	3	4	4	4	5	5	5
Mountainous	Percent	N.A.	N.A.	5	6	7	8	9

a. 67/. The figures given are those prescribed for roads in level areas and mountainous areas only. For other types of terrain, modifications of the above specifications may be used.
b. See Table 8, p. 24, above.
c. The speeds given are the speed limits for light cars. The speeds of truck-trailer trains are to be somewhat lower.
d. The width of each lane is considerably greater than that formerly regarded as sufficient, in order to provide more space for truck-trailer trains.
e. On Class V highways with only light traffic, the width of the road surface may be reduced to 21 feet. Where a road is about to cross a ford, the cross-section slope of the road surface should not exceed 3 percent.
f. Under certain conditions the width of the roadbed may be less than the above specifications by about 3 feet. On single-lane highways the road surface should be somewhat widened at intervals of 656 to 1,640 feet to facilitate vehicles passing each other. On roads where there is much native cart traffic, it is advisable to widen the roadbed and to strengthen the shoulders or even to build a separate road or an additional lane.
g. No change has been made in the radius of curvature of hairpin bends, but the road surfaces should be widened at those points. The minimum distance between adjacent hairpin bends should be 66 feet. Where a curved road also dips downward to cross a valley or ravine, the minimum radius of the curvature should be 656 feet.
h. In the case of Class VI-B (simple highways), where traffic is light and construction difficult, if money-saving specifications are followed with reference to radius of curvature and length of unobstructed vision, the speed should be reduced, even though the highways may be used by truck-trailer trains.
i. At individual points on Class III and Class IV highways that cross mountain ranges involving engineering difficulties, the grade may be increased by 1 percent. Grades of 5 percent in level areas or 8 percent in mountains should not be more than 984 feet long. Continuous grades of greater than 6 percent in mountainous areas should not be longer than 2,625 feet. Where animal-drawn traffic is heavy, grades should not be longer than 1,640 feet. If the upgrade is very long, it should be interspersed with stretches not less than 262 feet long with grades not more than 3 percent. These grades should be suitably reduced for curved roads and for roads on elevated plateaus.

Table 10

Communist China: Highway Classification Selection by Density of Traffic a/
1958

Traffic (Vehicles per 24 Hours)	Class of Highway	
	Level Terrain	Mountainous Terrain
More than 5,000	I, II	III
3,001 to 5,000	II, III	III, IV
1,501 to 3,000	III, IV	IV
801 to 1,500	IV	V
301 to 800	V	V, VI
300 or less	V, VI	VI

a. 68/. See Table 8, p. 24, above.

Table 11

Communist China: Truck Performance with Which Highway Specifications Should Comply a/
1958

Terrain	Type of Truck	Load (Tons)		Average Speed (Kilometers per Hour)	Trailer Capability (Units)	
		Gross	Net		4-Ton Trailers	Equivalent Alternative
Level	Liberation	30	20	More than 25	4	5 (3-ton)
	IFA H6 b/	45	30	More than 25	6	4 (6-ton)
Mountainous	Liberation	20	12	15 to 20	2	3 (3-ton)
	IFA H6 b/	30	20	5 to 10	3	2 (6-ton)

a. 69/. Tonnages are given in metric tons in this table.
b. East German-made, 4 x 2 drive, 6.5-ton, 120-horsepower diesel truck. (The expression 4 x 2 indicates that the truck has four wheels, two of which are driven.)

APPENDIX B

METHODOLOGY

1. Truck Park

The estimates in this report on the truck park in Communist China are for freight trucks only and exclude all other vehicles (for example, three-wheeled vehicles, buses, and automobiles). The term combined park is used to designate the total truck park, including both civilian and military trucks. The term civilian park refers to the sum of two distinct truck parks, both of which are state owned, the first of which is operated by state-owned transport agencies and the second of which is owned and operated by functional government agencies and/or industries. The military park does not have a similar division and is referred to by the term military park.

The method used to estimate the civilian park is essentially historical. If complete data were available concerning retirement, imports, and the allocation of additions to the civilian and military parks, this method alone would yield reliable estimates. Unfortunately, information on retirement rates is almost nonexistent, data on imports are incomplete, and little is known about allocations. To compensate for this lack of material, a deductive method of weighing estimates of the civilian park against performance figures has been used. The estimates of the park have given a residual figure representing the additions to the park. This residual figure represents imports plus domestic production less retirement.

Estimates of the civilian park are based on reported data (which are assumed to be firm) for 1950 and 1956. The difference between these two figures indicates an average annual rate of growth of 10.3 percent. This average rate of growth was used to obtain estimates of the park for 1951-55. The results then were compared with import requirements, with an assumed retirement rate, and with performance figures. The results appear to substantiate the estimates of the park that are shown in Table 12.*

The Chinese Communist civilian truck park is estimated to have been 40,000 units in 1950. 70/ The 1956 estimate of 72,000 trucks is based on an official statement that the "number of trucks owned by government organizations and enterprises totals more than 35,000, a figure comparable to the total number of trucks owned by highway motor organizations

* Table 12 follows on p. 28.

Table 12

Communist China: Estimated Total Civilian Truck Park, a/ Additions, and Performance 1950-58

	Thousand Trucks				Performance	
Year	Park b/	Additions	Production	Import Requirements c/	Billion Ton-Kilometers d/	Average Ton-Kilometers per Truck e/ (Thousand Metric Tons)
1950	40 f/	N.A.	0	N.A.	0.373	9
1951	44	4	0	4.8	0.503	12
1952	49 g/	5	0	5.9	0.678	15
1953	54	5	0	6.0	1.18	23
1954	59	5	0	6.1	1.87	33
1955	65	6	0	7.2	2.51	40
1956	72 h/	7	1.65	8.1 i/	3.49	51
1957	80 g/	8	7.50	6.4 i/	3.79	50
1958	96	16	15.0	11.7 j/	5.29	58 k/

a. Truck park of state-owned transport agencies plus truck park of functional government agencies (see p. 27, above).
b. As of the end of each year.
c. Unless otherwise indicated, annual additions plus park retirements at the rate of 2 percent of the previous year's park.
d. See Table 3, p. 10, above.
e. Unless otherwise indicated, total performance divided by midyear civilian park.
f. 71/
g. [redacted] "more than 20,000" vehicles for "before 1953" and "more than 44,000" vehicles for 1957. 72/ The state-owned transport agency park of 38,580 trucks plus 5,600 buses for 1957 gives a total transport agency vehicle park of 44,180. Thus it is believed that [redacted] refers to the state-owned transport agency vehicle park only, excluding the functional government agency park.
h. 73/
i. Additions to the park plus retirements at the rate of 3 percent per year based on the previous year's park less one-half domestic production (see also p. 29, below). The assumption is made that available additions would be equally divided between the military and civilian parks. The mechanics of distribution -- for example, new vehicles allocated to the military park which in turn might transfer older vehicles to the civilian park -- do not affect this assumption.
j. Additions to the park plus retirements at the rate of 4 percent per year based on the previous year's park less one-half domestic production (see also p. 29, below).
k. Average civilian park of 88,000 trucks plus 3,250 to adjust for the 13,000 military trucks used during the fourth quarter of 1958 to give an average estimated midyear civilian truck park of 91,250. Total ton-kilometer performance for 1958 (5.29 billion divided by 91,250) gives an average vehicle performance of 58,000 ton-kilometers for 1958.

50X1
50X1

throughout the country."* 74/ These estimates are confirmed by the statement in 1956 that "the number of passenger cars and lorries in the country is 40 percent more than in 1952 ... ."** 75/ The authorities, in a statement concerning older trucks, also stated that their older trucks were responsible "for the same transport quota (calculated at 50,000 ton-kilometers a year) ... ." 76/ An application of this quota to the 1956 performance figure gives an average park requirement of 69,800 trucks.*** Because of road conditions, shortages of fuel, and other inhibiting factors, this method of estimating the civilian park would not be applicable before 1956.

Early in 1959 the Chinese Communists announced that the number of trucks "under road departments" was 38,580 in 1957 and 49,000 in 1958. 77/ An announced addition of 12,000 trucks**** in 1958 78/ indicates a retirement rate of 4 percent for 1958. In computing the import requirements, this figure has been used for 1958, a 3-percent retirement rate for 1956-57, and a 2-percent rate for the years before 1956. The statement that 37,000 trucks are more than 17 years of age 79/ indicates that 4 percent may be too high a rate for the period before 1958. The figures of 2 and 3 percent have been chosen and assigned arbitrarily. These older trucks, representing 39 percent of the 1958 civilian park, should prevent the retirement rate from dropping below 4 percent in the future.

In September 1958 the Chinese Communists also announced that there were "... more than 47,000 trucks belonging to government organs and enterprises ... ." 80/ On the assumption that because of urgent transportation requirements no additional trucks were allocated to the functional government agency park, the civilian park at the end of 1958

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* "More than 35,000" is construed to mean about 36,000. A "comparable" number owned by highway transport organizations also is construed to be about 36,000.

** This statement, made in October 1956, probably would refer to an end-of-1955 or mid-1956 park. On the assumption that the growth of passenger cars would have only a slight effect on the total percentage increase, the statement would indicate a truck park of 68,600. Based on Table 12, p. 28, above, the mid-1956 park would be 68,500.

*** Performance of 3.49 billion ton-kilometers divided by 50,000 ton-kilometers per truck. Because the statement refers to average performance, the 69,800 represents the average (or near midyear) park. The same procedure applied to the 1957 performance indicates an average (or near midyear) park of 75,800 trucks. Based on Table 12, the mid-1957 park would be 76,000 trucks.

**** This announcement refers to the addition to the transport agency park. The addition to the functional government agency park was 4,000 trucks.

was not less than 96,000 trucks.* This procedure gives estimates of 36,000,** 38,580,*** and 49,000*** for the state-owned transport agency parks for 1956, 1957, and 1958, respectively. The functional government agency park would be 36,000** in 1956 and 47,000 in 1958. Choosing the midpoint between these two figures gives a government agency park for 1957 of 41,500 trucks. The latter figure added to the figure of 38,580 for the state-owned transport park for 1957 gives a civilian park for 1957 of 80,000 trucks. The relative ratio of growth in the civilian parks for 1957 and 1958 is thus 1 to 2, or 8,000 trucks added in 1957 to 16,000 added in 1958. This estimate appears to be correct in view of the production ratio of 1 to 2 for 1957-58 and press announcements concerning increased imports during 1958.

Based on estimates in Table 12,**** total import requirements for 1951-55 (until domestic production began) were 30,500, or an average of about 6,100 trucks per year. In late 1957 the Chinese Communists stated that "heavy motor trucks with a total capacity of more than 40,000 tons" had been imported "during the past few years." 82/ On the assumption of an average truck capacity of 3 to 4 tons, biased toward the lower figure, the number of trucks would be 10,000 to 13,333. Although the 13,333 trucks represent a total slightly less than in any period of more than 1 year immediately before 1957, the statement does not detract from the validity of the estimates shown in Table 12.

These estimates and the procedure by which they were derived allow for error at almost every juncture. The scattered bits of information appear to substantiate the estimates, however, and the analysis, examined in its entirety, shows increases consistent with official Chinese Communist announcements regarding the growth and performance of truck transport in China.

2. Commodity Composition of Truck Transport

The main source for deriving the estimates shown for truck transport in Table 5† is a Chinese Communist press statement that the transportation of steel, coal, grain, and cotton generally accounts for approximately 60 percent of the total volume of highway transport in the country. 83/ The estimated amount of steel (crude, finished, and imported) transported is shown in Table 5 to be 3.1 million tons, or about 2 percent of the total tons originated by truck transport.

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* A state-owned transport agency park of 49,000 trucks plus a functional government agency park of 47,000 trucks.

** See the first footnote on p. 29, above.

50X1

**** P. 28, above.

† P. 12, above.

Because of the considerable degree of integration in the Chinese steel industry, only a little of the modern production of crude and finished steel had to be moved for the next stage of processing. The estimate of 3.1 million tons consists of 1 million ton of crude steel, most of which was native production; 1.6 million tons of finished steel, most of which moved from modern steel plants to machine-building plants; and about 0.5 million ton of steel imports distributed by truck. Cotton moved by truck probably was more than equal to the total government procurement of ginned cotton (about 2 million tons) because it possibly would be moved to ginning plants by truck and probably would be moved by truck from the plants to railroads or waterways and again by truck to spinning and weaving factories. This movement is therefore assumed to be about 2.5 million tons, or about 1 percent of the figure for total highway transport.

Grain, according to a Chinese Communist periodical published in 1957, accounted for 13 percent of the volume of highway transport. 84/ Without more recent information, this percentage was applied to 1958, giving a figure of 23 million tons of grain originated by truck transport. The figure for coal, then, is the difference between the sum of the percentages for steel, cotton, and grain and the quoted 60 percent, or about 44 percent of the total. Although 44 percent appears to be a large proportion of the total to devote to the movement of coal, the absolute amount, 78 million tons, is small when considered in connection with the amount of coal to be hauled. Production of coal in 1958 was about 280 million tons, of which about 208 million tons were produced in modern mines. Of the 208 million tons of modern mine production, it is estimated that 10 percent were consumed at the mines, leaving nearly 190 million tons to be moved from the mines. The railroads transported about 150 million tons, according to the Minister of Railroads, and inland waterways are estimated to have transported a little less than 20 million tons. Therefore, trucks must have been used to transport the other 20 million tons from the modern mines. Even though some of the modern mines are served mainly by inland waterways or railroads, trucks are used to haul coal from the mines to the railroads or waterways. Again, in the distribution of some of the coal to the consuming factories, trucks have to be used. The limitation of this traffic to a total of 78 million tons originated by motor vehicles must have been difficult and probably was done only because of the lack of truck transport capacity.

The estimates of truck movements of timber and POL in Communist China were derived, taking into consideration the geographic location of the areas of production, consumption, or processing; the availability of modern transport; and the degree of modernization of the industries. Although truck transport of these two commodities is exceedingly important to the industrial sector of the economy, timber

accounts for only about 3 percent and POL for only 2 percent of the tons originated by truck.

The total of ferrous minerals and metals moved by truck is shown on Table 5* to be 8.9 million tons, or about 5 percent of the highway tons originated. Besides the 3.1 million tons of steel discussed above, about 1 million tons of pig iron, most of which was native production, probably moved by truck to steel plants. The amount of agricultural goods moved by truck, other than government-procured grain and cotton, is believed to have been small, less than 1 million tons. Although some vegetable oils, sweet potatoes, leafy vegetables, and the like probably moved on commune trucks, these are goods which could easily have been moved by native transport while the trucks were diverted to the iron and steel drive and to the establishment of commune industry and commune construction.

The total percentage devoted to the categories discussed above (agricultural goods, 15 percent; coal, 44 percent; ferrous materials, 5 percent; timber, 3 percent; and POL, 2 percent) amount to 69 percent. The only important category of highway transport not yet discussed is that of mineral construction materials. It is estimated that, of the 31 percent remaining, at least 10 percent would be occupied by other miscellaneous items carried by truck, leaving 21 percent for mineral construction materials.

3. Labor Costs in Native Land Transport

The Chinese Communists have recently announced that at the end of 1958 there were about 24.4 million carts throughout the country engaged exclusively or part time in transportation. 85/ The Minister of Communications also announced in September 1959 that there were about 7.9 million persons, 3.58 million vehicles of various sorts, and 100,000 boats engaged in short-distance transportation. 86/ On the assumption of 1 person per cart, the figures indicate 3.58 million to 24 million persons engaged in native land transport at some time during the year. An application of the lower range (that is, 3.58 million persons) to the estimated labor force of 400,000 in truck transport in 1958 indicates that native land transport is about 9 times as labor intensive, but this figure does not take into account persons engaged part time in transportation. The performance of various types of native land transport, derived from scattered Chinese statements, is shown in Table 13.**

* P. 12, above.

** Table 13 follows on p. 33.

Table 13

Communist China: Comparison of Performance of Native Land Transport and Truck Transport 1958

Type of Transportation	Ton-Kilometers Per Year	Percent of Average Performance per Truck a/	Labor Required to Replace One Truck b/ (Persons)
Porter	490 c/	0.8	118
Three-wheeled hand cart	3,780 d/	6.5	15
Animal-drawn cart	9,000 e/	15.5	6

a. Percent of estimated average performance of 58,000 ton-kilometers per truck in 1958.
b. Truck performance of 58,000 ton-kilometers divided by native performance.
c. Derived annual performance. 87/
d. Derived annual performance. 88/
e. Estimated annual performance, on the assumption of a 1-ton load carried 30 kilometers per day.

Because the most efficient type of native land transport -- that is, animal-drawn carts -- requires six persons to replace one truck and because the available animal-drawn carts represent only 24 percent of the total number of carts available,* it is estimated that native land transport is at least 10 times as labor intensive as truck transport. Based on this assumption, the labor force of 400,000 in truck transport** for 1958 has been multiplied by 10 to yield an estimate of 4 million persons engaged in native land transport during 1958. This figure is an approximation and is intended only to indicate the magnitude of labor supply necessary to native land transport.

* See p. 32, above.
** This figure represents only operating personnel. Workers engaged in road construction and maintenance would serve both sectors of highway transport.

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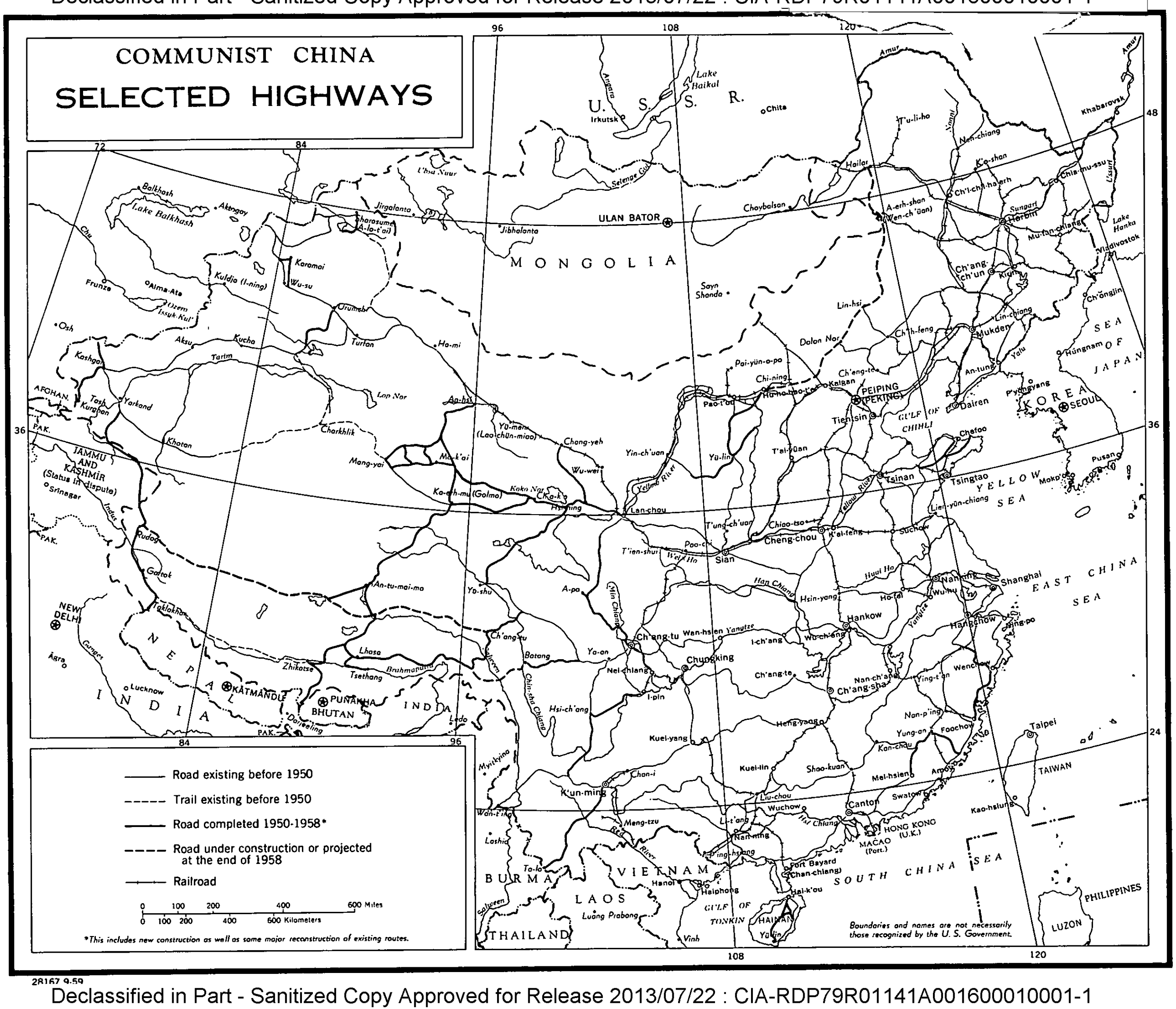

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