

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
MINISTRY OF TRADE AND INDUSTRY MONGOLIA

THE STUDY
ON
THE IMPROVEMENT PLAN
FOR
TRANSSHIPMENT FACILITIES
AT ZAMYN-UUD STATION
IN
MONGOLIA

FINAL REPORT
VOL. 2
MAIN TEXT

MARCH, 1993

JAPAN RAILWAY TECHNICAL SERVICE
PACIFIC CONSULTANTS INTERNATIONAL

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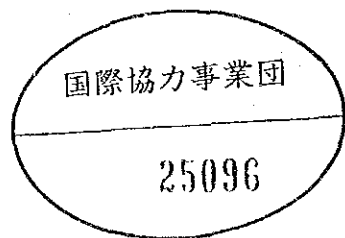
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PREFACE

In response to a request from the Government of Mongolia, the Government of Japan has decided to conduct a study on the improvement plan for transshipment facilities at Zamyn-Uud station and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Mongolia a study team headed by Mr. Masaaki Fujimoto, Japan Railway Technical Service, and composed of members from Japan Railway Technical Service and Pacific Consultants International, three times between August 1992 and February 1993.

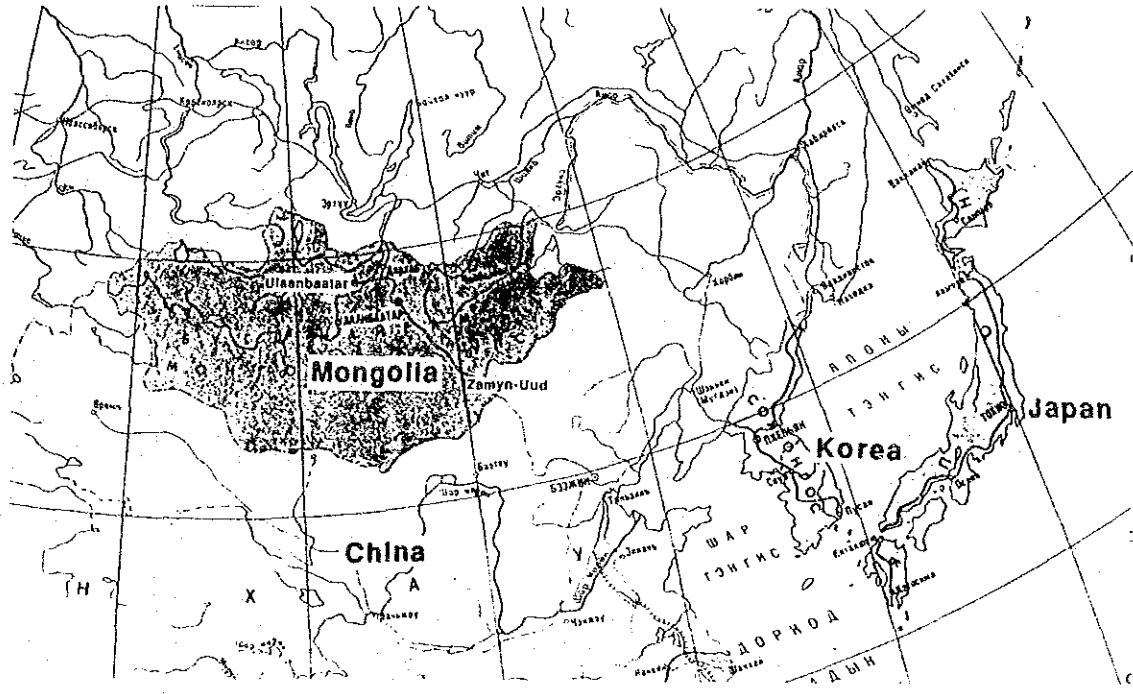
The team held discussions with the officials concerned of the Government of Mongolia and conducted field surveys at the study area. After the team returned to Japan, further studies were made and the present report was prepared.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

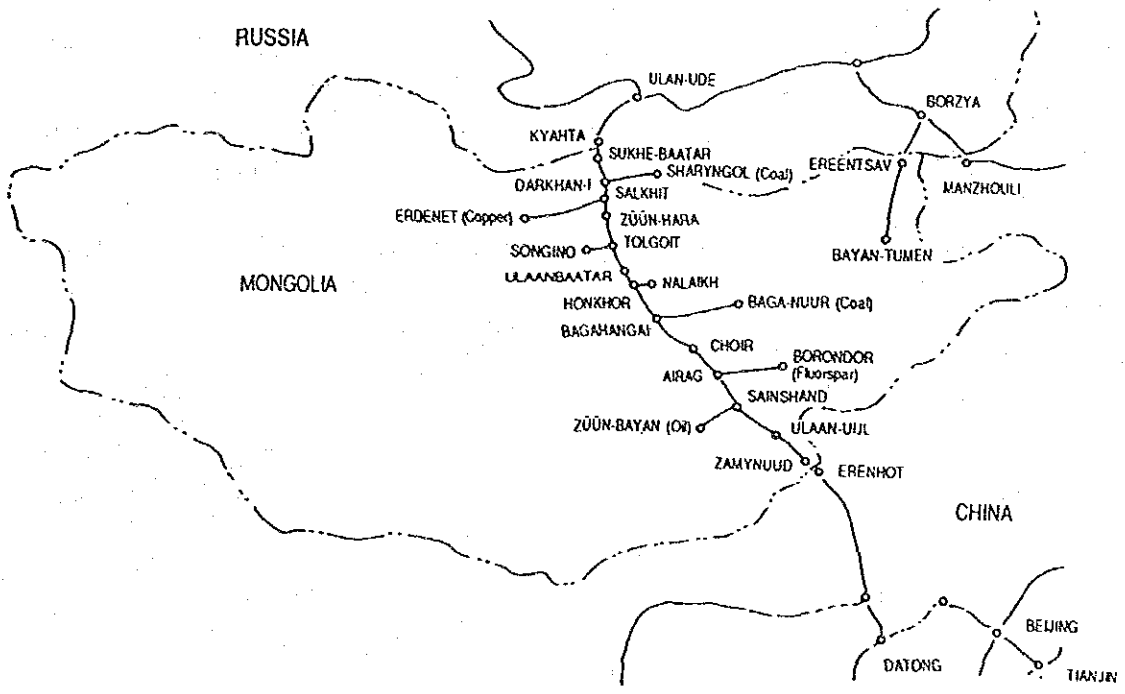
I wish to express my sincere appreciation to the officials concerned of the Government of Mongolia for their close cooperation extended to the team.

March 1993

Kensuke Yanagiya
President
Japan International Cooperation Agency



Mongolia, Asia



Railway Network in Mongolia

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SUMMARY

Since the railway track gauges of Mongolia and China are different, 1,520 mm in Mongolia and 1,435 mm in China, the Mongolian Railway necessitates cargo transshipment facilities near the border with China. The Government of Mongolia, therefore, requested the Government of Japan in November, 1990, to make a feasibility survey of the cargo transshipment facilities at the border station of Zamyn-uud. In this context, Japan International Cooperation Agency (JICA) made a full-scale survey from August 1992 to February 1993 and established a short term cargo transshipment facilities improvement plan for the station based on the Scope of Work agreed upon between the Government of Mongolia and JICA.

Democratization of Mongolian has been accelerating since the middle of the 1980s. As a result, all the trade shifted from a barter basis to a foreign currency trade basis. In short, Mongolian economy is now in a period of transition from a planned economy to a market economy. Though about 80 percent of Mongolia's trade had been with the former Soviet Union in the past, the northbound trade significantly decreased in 1991 in the wake of the collapse of the USSR and the stagnating economies of East European countries. The democratization of Mongolia also caused a marked reduction in the amount of assistance it had been receiving from these communist countries.

The former Soviet Union made a feasibility study of cargo transshipment facilities at Zamyn-uud station in the past. This feasibility study covered transport demands, transport planning, facilities of track, cargo handling, telecommunication, signal and rolling stock maintenance, architecture and other various fields. On the basis of this feasibility study, construction of 1,435 mm tracks had been promoted until four tracks were completed in 1990, when it was suspended due to the changes in the political and economic situation in the Soviet Union. Since Mongolian economy has undergone drastic changes after this feasibility study was implemented, most of the proposals made in the study report require modifications more or less under the present circumstances.

The Railway is the most important means of freight transport in Mongolia, sharing about 70 percent of the total transport demands in ton-kilometer recorded in export, import and land bridge transport in 1991. The financial status of Mongolian Railway seems to have been sound so far in that its operation has been managed on a profit basis. However, it is now worsening and further deterioration is anticipated in the near future under the severe economic situation of the country, including the effect of everlasting inflation, pressure of increase in the personal cost and other expenditures that are indispensable for its operation.

From 1985 through 1989, the transit freight between Russia and China occupied 95 % of the total volume of freight that passed Zamyn-uud station. After that, the volume of transit freight substantially decreased to 14 % in export and 4 % in import from the levels in 1985. On the other hand, the volume of freight transported between Mongolia and China originating or terminating in Mongolia is steadily increasing. Compared with 1985, 1991 recorded a 303 % level in export, mostly by fertilizer and copper concentrate, and a 788 % level in import, mostly by cereals and fruits.

Mongolia, once plunged into economic confusion in the wake of the collapse of the Soviet Union, is now vigorously trying to vitalize the economy. It is believed, therefore, that the railway will play a vital role in

the long distance freight transport and that the reconstruction of economy will lead to an increase in the transport volume in the future.

The target year of the demand forecast in this study was set at the year 2000. The estimated freight volumes of export, import and transit and those classified by commodity are all adopted after due consultation with Ministry of Trade and Industry and Mongolian Railway. The future economic indices including GDP, population and amounts of export and import are the statistics obtained from the State Department for National Development. The future growth rates of export and import were determined by the growth rate of GDP from 1995 to 2000 after a consultation was made with Ministry of Trade and Industry and Mongolian Railway.

As for the transport volume of petroleum, it was assumed that the volume of import from Russia would increase by only 10 % from the present level and the balance would come from China. The volume of transit freight in the year 2000 was estimated by applying the logistic curve to the estimated value for 1991. Through deliberate discussions, the volumes to be transshipped at Zamyn-uud station in the year 2000 were estimated as 448,800 tons of import from China, and 355,200 tons of transit from China, or 803,900 tons in total, which were only 100,900 tons including 81,200 tons of import and 19,700 of transit in 1991.

According to the minutes concluded with the Ministry of Trade and industry, Mongolia, the study team planned the cargo transshipment facilities to handle only the cargos arriving in Mongolia from China in line with the following priority order of category-wise cargo set forth in the said minutes.

- (1) Package cargos of food and consumer commodities
- (2) Containers
- (3) Petroleum
- (4) Others

As for the commodities carried by containers and wagons in common, calculations were made for three cases where containerization ratios estimated to range from 20 to 80 %, out of which the most appropriate case was adopted for further calculations. The numbers of necessary cars were calculated based on the estimated containerization ratios and also on the types of cars for different commodities and the average freight loads per car.

Zamyn-uud station consists of eleven divisions for train operation, rolling stock maintenance, power generating, track maintenance, signal maintenance, hospital, fire prevention, customs clearance procedures and other related businesses. The station has a power generation plant in the compound equipped with diesel engine power generators, from which power is being supplied to the station compound and the whole community of the area.

In planning the cargo transshipment facilities at Zamyn-uud station, a major point was the choice of the gantry crane or the combination of reach stackers and truck cranes to handle containers and cargos in gondola cars, which shall be determined taking into consideration not only the advantages and dis-

advantages from the technical viewpoint but also the results of economic and financial analyses of the facilities.

As for the cargos in wagons, introduction of cargo handling equipment is limited due to the space constraint in the wagon so that forklifts and belt conveyors will be used together with manual work. Cargos in gondola cars can be handled with a truck crane or a reach stacker.

As the main cargo handling equipment, Plan 1 adopts the gantry crane and Plan 2 the reach stacker. Both Plans necessitate the same amounts of investment for signal, tele-communication, power supply equipment and forklift / conveyor for the transshipment work of cargo in wagons. Plan 1 needs more funds for the crane foundation and less for the platform pavement. As a result, there is only a small difference of the cost for civil structure and architecture work between the two Plans. On the other hand, the cost of cargo handling equipment in Plan 1 is more than twice the cost in Plan 2. Consequently, the cost of Plan 1 is about 10 percent larger than the cost of Plan 2. From the viewpoint of the investment costs, therefore, Plan 2 is more advantageous than Plan 1.

The economic analysis covered a period of 30 years from the start of construction. If the present practice to transship cargos at Erenhot, the Chinese border station, is suspended for some reason, it may be possible that the cargos bound for Mongolia must be received at Erenhot, transported across the border by Mongolian trucks and transshipped to Mongolian freight cars at Zamyun-ud. Thus, the benefit calculation was made by taking into consideration the additional investment and charges related to the truck transportation. The economic analysis indicates that the EIRR of Plan 2, 26.28 %, is far larger than that of Plan 1, 8.88 %. This means that Plan 2 has larger benefit from the viewpoint of national economy.

In the financial analysis, it was assumed that the most favorable loan is available for this project from a foreign source with an interest rate of 0.75 % per annum and a 40-year equal installment for repayment including a 10-year grace period, and that domestic funds are provided at the interest rate of 2 % per annum. It was also assumed that the transshipment fee will be twice as much as the existing rate from 1993 onward and will be raised further by 25 % once in every three years, i.e., in 1996, 1999 and 2002. The financial analysis has proved that the cargo transshipment facilities using reach stackers as the main cargo handling equipment (Plan 2) with an FIRR of 1.91 % is more advantageous in various aspects, particularly when the financial burden on Mongolian Railway is taken into account. Thus, this report adopts the cargo transshipment improvement plan based on the use of reach stackers.

In addition to the cargo handling equipment, the team planned efficient track and civil structures trying to utilize as many existing facilities as possible. At the same time, the team reserved allowance for expansion in the future. In case the train operation and the wagon movement management are in disorder, the team planned two sheltered warehouses to store valuable cargos.

The team also planned installation of a relay interlock system with a signal switchboard and power-operated points in the yard. The team also proposes to introduce radio communications equipment for the yard work and between shunting locomotive drivers and the ground crew. The team also planned to introduce a digital exchange to accommodate 500 subscriber lines. The power generating plant should be reinforced with new

generators. A necessary lighting system with mercury floodlamps will be provided at the yard, platforms and warehouses.

The team planned efficient management offices and crewhouses, utilizing as many existing facilities as possible. In planning these facilities, the team observed the convenience for future expansion, and also paid due attention to preserve good environmental conditions.

Based on some preconditions and aiming at a minimum construction cost, an urgent project was prepared by selecting part of the facilities and layout envisaged for the year 2000 with a construction cost of US\$ 15,200,000 in foreign currency and US\$ 2,480,000 in domestic currency or US\$ 17,680,000 in total, which is recommended to be implemented as early as possible with the grand aid or soft loans from developed countries.

After the cargo transshipment facilities are commissioned, cargo transshipping work can be done by Mongolia according to the international rule, thereby making Mongolia stand at an equal footing with China. Commissioning the cargo transshipment facilities in Mongolia will also eliminate the freight cars now stagnating at Erenhot in China, to smoothen the rotation of freight cars leased from Russia and save the rental charges Mongolia is now paying to Russia in foreign exchange. The construction work and operation of the cargo transshipment facilities at Zamyn-uud will create employment opportunities and contribute to a reduction of unemployment in Mongolia.

Eventually, the implementation of the project will lead to the development of industries, improvement of living standards, vitalization of national economy, and enhancement of Mongolia's position in the international society. Thus, it is recommended to urgently promote the project with assistance including grant aid from developed countries.

Chapter 1

CHAPTER 1 INTRODUCTION OF THE STUDY

1-1 Background

Since the railway track gauges of Mongolia and China are different, 1,520mm in Mongolia and 1,435mm in China, the Mongolian Railway necessitates cargo transshipment facilities near the border with China.

In this context, the Government of Mongolian requested the Government of Japan in November, 1990 to make a feasibility survey of the cargo transshipment facilities at the border station of Zamyn-Uud. Thus, Japan sent a project formation survey team to the country, in July 1991, and a mission of Japan International Cooperation Agency (JICA) in April, 1992 to discuss the scope of work of a full-scale survey. According to the results of these surveys, the Governments of Mongolia and Japan concluded an agreement on the Scope of Work for a full-scale survey to establish a short term cargo transshipment facilities improvement plan.

1-2 Objectives

The objectives of this study are to survey the conditions for the transshipment facilities at Zamyn-Uud station on the border between Mongolia and China and to establish a short term cargo transshipment facilities improvement plan for the station based on the Scope of Work agreed upon between the Government of Mongolia and JICA.

In the course of this survey, the survey team tries to facilitate technology transfer to the Mongolian counterparts on the survey method, cargo transshipment facilities and related technologies. In addition, the team pays due attention to the preservation of the environment of the area.

1-3 Study Methodology

The team made a survey to establish a short term cargo transshipment facilities improvement plan for the Zamyn-Uud station in the fields of:

- 1) Freight transportation
- 2) Roadbed and structures
- 3) Yard layout
- 4) Signal and communication systems
- 5) Cargo transshipment equipment and rolling stock
- 6) Management and financial analysis
- 7) Estimate of transportation demand and economic analysis
- 8) Civil work design
- 9) Electrical equipment design
- 10) Mechanical equipment design

The team analyzed relevant materials readily available and collected up-to-date information and data in Mongolia. These materials form the basis of the blue print of the transshipment facilities of Zamyn-Uud station.

The team also surveyed the current operational conditions at Zamyn-Uud station and the natural conditions of the site. The team estimated transportation demands, particularly those with China, up to the year of 2000, which the team incorporated into the cargo transshipment facilities improvement plan. In establishing the plan, a priority was placed on the utilization of existing facilities as far as possible to minimize the construction costs. The team also discussed an optimal management system of the station and evaluated the effects of the project as a whole.

According to the results of the first phase field survey, the team framed the short term cargo transshipment facilities improvement plan for Zamyn-Uud station, in which an optimal urgent project plan was incorporated. The team summarized the work up to the end of the first phase work in Japan in the interim report before explaining and discussing it with the Ministry of Trade and Industry and the Mongolian Railway on the occasion of the second phase field survey. Taking into account the responses from Mongolia for the interim report, the team will comprehensively evaluate the short term cargo transshipment facilities improvement plan for Zamyn-Uud station to draft the final report in the second work in Japan. The team also prepared the basic design for the urgent project. The team visited Mongolia with a draft of the final report including the above basic design for the urgent project to have discussions with the Government of Mongolia including the Ministry of Trade and Industry and the Mongolian Railway in the third phase field survey. The team submits the final report by the end of this fiscal year after making modifications where necessary as the result of the third phase field survey.

The schedule of the above work is as follows.

- (1) Preparatory Work in Japan
 - 1) Collection and analysis of available data and information
 - 2) Decision of methodology, itinerary and procedures for the survey
 - 3) Summarizing the inception report
- (2) First Phase Field Survey
 - 1) Explanation and discussions on the inception report
 - 2) Collection and/or study of relevant data and information
- (3) First Phase Work in Japan
 - 1) Estimate of transportation demand (up to the year of 2000)
 - 2) Layout and scale of the transshipment facilities
 - 3) Establishing the short term cargo transshipment facilities improvement plan
 - 4) Selection of the urgent project
 - 5) Finalizing the interim report

(4) Second Phase Field Survey

- 1) Explanation of the interim report and discussions with the Government of Mongolia including the Ministry of Trade and Industry and the Mongolian Railway
- 2) Supplementary survey where necessary

(5) Second Phase Work in Japan

- 1) Basic design of the urgent project
- 2) Overall evaluation and proposal on the following.
 - Short term cargo transshipment facilities improvement plan
 - Urgent project
- 3) Drafting the final report

(6) Third Phase Field Survey

In the third phase field survey, the team explained the draft of the final report to the Government of Mongolia including the Ministry of Trade and Industry and the Mongolian Railway and received their comments.

(7) Third Phase Work in Japan

In the third phase domestic work, the team reviewed the comments of the Government of Mongolia including the Ministry of Trade and Industry and the Mongolian Railway before finalizing the final report for submission to JICA.

Chapter 2

CHAPTER 2 ANALYSIS OF PRESENT STATUS

2-1 Social and Economic Conditions

2-1-1 Overview of Mongolia

(1) Location

Mongolia (longitude 88-120 degrees east and latitude 42-52 degrees north) is landlocked between the former Soviet Union to the north and northwest and China to the south. Mongolia has a total land area of about 1,566 million square kilometers, or about four times that of Japan, about one-fifteenth that of the former Soviet Union, and about one-sixth that of China. Mongolia is on a large plateau with an average elevation of 1,580 meters. The northwest, a mountainous region with inland lakes and rivers, has at a maximum altitude of 4,374 meters above sea level. The south-east, a desert region and plain, is located at a relatively low altitude with a minimum elevation of 560 meters. Ulaanbaatar, the capital, is 1,351 meters above sea level.

Table 2-1-1 Land Profile of Mongolia

Length of Boundary Line of National Land	8,152 km
Land Area	1,566,500 km ²
Average Elevation	1,580 m
Maximum Elevation	4,374 m
Minimum Elevation	560 m

Source: Anniversary Statistical Yearbook 1991

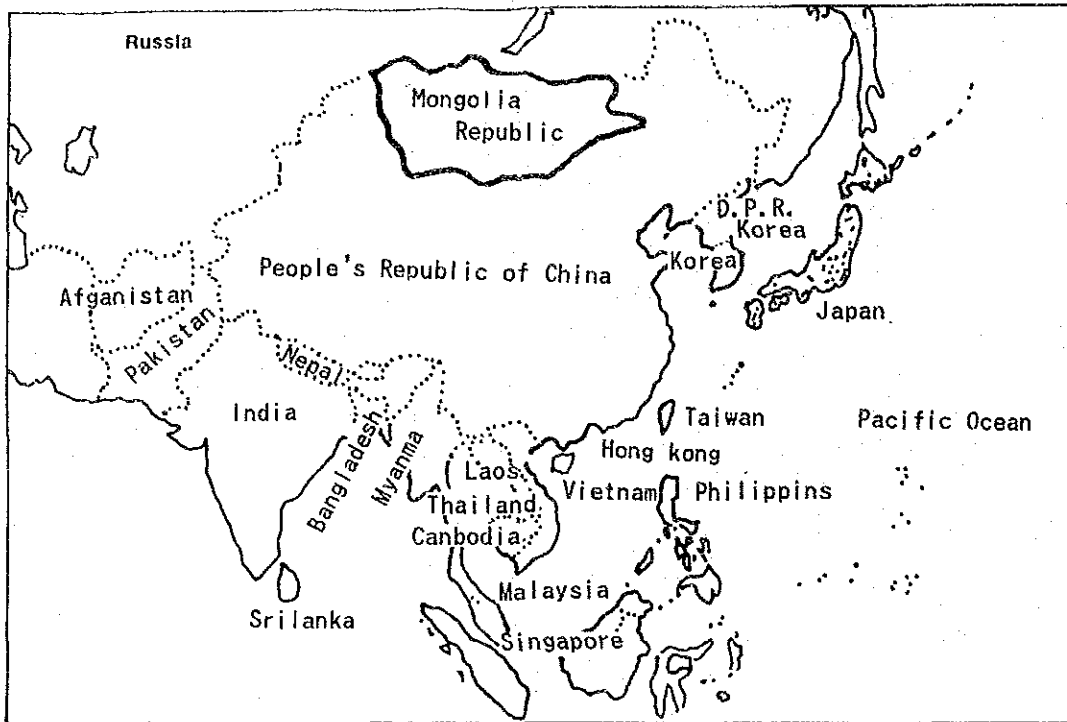


Fig. 2-1-1 Map of Mongolia

(2) Climate

Mongolia has a typical continental climate, with extremes of hot and cold weather spanning the year but with little precipitation.

The average temperature from July to August, Mongolia's summer, is 15 ~ 16°C, while the average from November to February, Mongolia's winter, dips to -15 to -20°C. January is the coldest month, with temperatures plunging to as low as -40°C.

With the annual precipitation being only about 300 millimeters, the air is dry; precipitation occurs only from July through August.

Table 2-1-2 Temperature, Humidity and Precipitation on Ulaanbaatar

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Average of Year
Temperature (°C)	-20.9	-17.1	-8.0	1.5	9.8	14.3	16.7	15.1	8.8	1.1	-11.6	-17.3	-0.6
Humidity (%)	81	77	66	52	52	58	65	70	65	64	72	81	67
Precipitation (mm)	2.4	2.4	6.6	5.8	14.6	55.6	64.0	92.7	26.9	12.0	5.4	4.8	293.2

Source: Institute of Climate July 1991

(3) Population

Mongolia's population, about 2.154 million in 1991, has been growing at a relatively high rate of 2.8% per year since 1985.

Although the population pyramid in 1991 clearly shows that the 0-9 age cohort was the biggest group in absolute terms, the growth rate declined to 1.0% in 1991 over the previous year's level. This happened because of the withdrawal of former Soviet troops (Mongolia's population figures include former Soviet troops).

Table 2-1-3 Growth of Population and Population Density

Item	Year	1985	1986	1987	1988	1989	1990	1991
Population (1000)		1,900.6 (100)	1,940.2 (102)	1,992.1 (105)	2,044.0 (108)	2,095.6 (110)	2,149.3 (113)	2,154.6 (113)
Population Density (per km ²)		1.21	1.24	1.27	1.30	1.34	1.35	1.37

Source: 1985 ~ 1990: Mongolia Railway Statistics
1991: Mongolia National Statistics

Note: Value in () is % value normalized to 1985 data

Table 2-1-4 Population by Ten-year Age Group and Sex

Years Old	Total (1000)	Male (1000)	Female (1000)
0 ~ 9	600.0	303.3	296.7
10 ~ 19	477.2	241.3	235.9
20 ~ 29	375.6	186.3	189.3
30 ~ 39	227.9	113.9	114.0
40 ~ 49	138.7	71.2	67.5
50 ~ 59	105.6	52.7	52.9
60 ~ 69	67.8	32.0	35.9
70 over	51.2	20.1	31.1

Source: Anniversary Statistical Yearbook 1991

As Table 2-1-5 shows, the population of Mongolia's three principal cities decreased in 1990. The population of the mining city Darkhan was 85,000, while that of Erdenet, the production center for copper and molybdenum, was 52,000. The population in Ulaanbaatar was about 562,000 in 1991, or one-fourth of Mongolia's total population. Mongolia's population is therefore concentrated around the city of Ulaanbaatar.

Table 2-1-5 Growth of Population on Principal Cities of Mongolia

City	Year	1985	1986	1987	1988	1989	1990	1991
Ulaanbaatar		503.3 (100)	515.1 (102)	528.0 (105)	548.4 (109)	560.6 (111)	575.0 (114)	562.6 (111)
Darkhan		73.1 (100)	77.5 (106)	79.7 (109)	85.7 (117)	87.4 (120)	80.1 (109)	85.4 (116)
Erdenet		52.1 (100)	47.1 (90)	50.9 (98)	56.1 (108)	57.1 (110)	48.5 (93)	52.3 (100)

Source, 1985 ~ 1990: Mongolia Railway Statistics
1991: Statistics of M. of Trade & Industry

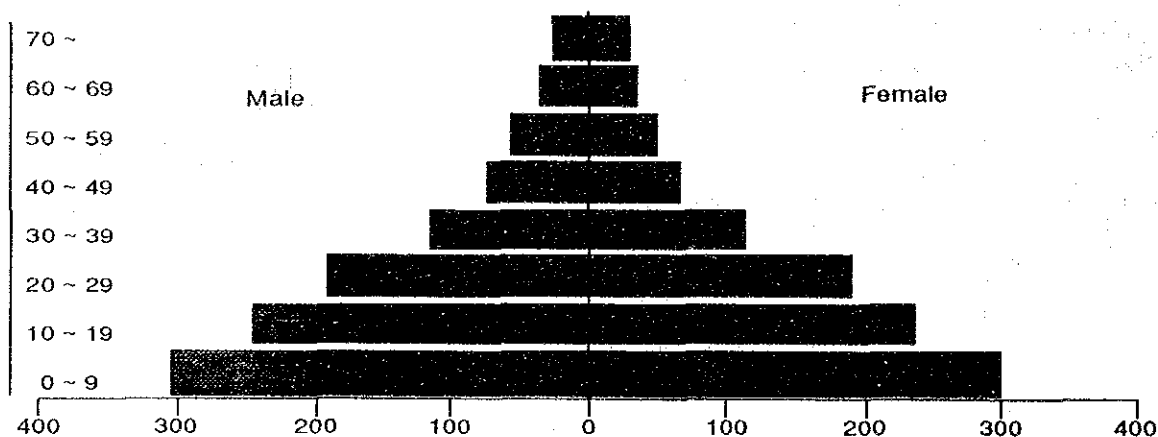


Fig. 2-1-2 Population Pyramid

(4) Government and Administrative Organs

The National Assembly, until 1990, comprised an Upper House and a Lower House. The Upper House used to appoint the president and vice president. The main changes effected in July 1990 were: 1) the role of the president and that of the Upper House were clearly defined; 2) the president was given the power to appoint his ministers including the prime minister; 3) the role of the Upper House as a lawmaking body was clearly defined; and 4) the Lower House was abolished.

As part of the government organization, five new ministries -- Ministry of Administration, Ministry of Construction, Ministry of Geology and Mineral Resources, Ministry of Culture, and Ministry of Transport & Telecommunication -- were added to the existing 12 ministries.

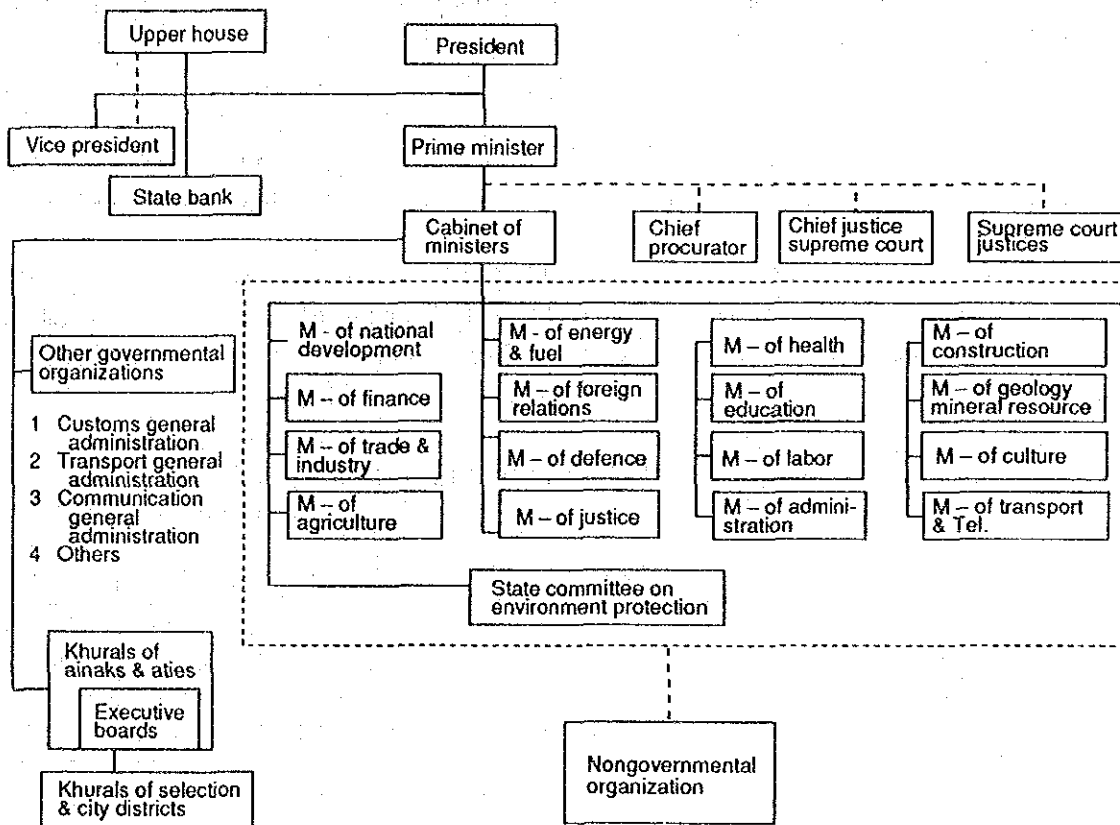


Fig. 2-1-3 Structure of Government

2-1-2 Socio-economic Indicators

Democratization of Mongolian politics, triggered by the Mongolian version of perestroika, has been accelerating since the middle of the 1980s. Amid this change, reform of the Mongolian economy has also been taking place at an accelerated pace. The program finalized in November 1990 calls for a shift to a market economy within the next three years. The three-year program entails: privatizing Mongolia's enterprises by recognizing the right of private ownership and distributing two-thirds of all national property among the Mongolian people; promoting international trade; and reforming the banking system.

As a result of these reforms, all trade shifted from a barter basis to foreign currency trade, triggering considerable confusion in the supply of parts and fuel. Mongolia today can be said to be in a period of transition from a planned to a market economy.

(1) GNP

A glance at Mongolia's year-on-year GNP shows that the country registered a huge loss in both categories in 1990 but bounced back strongly in 1991, registering a growth of 80-90% over the previous year.

The distribution ratio of the principal industries in 1991 is shown in Table 2-1-7. For example, industry accounted for 36.0 percent, agriculture and stock raising 20.70%, and construction 5.5%. However, a significant part of industry is in textile and foodstuffs derived from agriculture and stock raising.

Table 2-1-6 Gross National Product

(at current prices mln. togrog)

	1985	1986	1987	1988	1989	1990	1991
Gross national	8155.3	8052.1	8350.7	9013.1	9544.9	9295.3	17960.8
Product	-	-1.3	3.7	7.9	5.9	-2.6	93.2
Per capita	4475	4301	4349	4582	4728	4479	8436
	-	-3.9	1.1	5.4	3.2	-5.3	88.3

Source: Statistics of M. of Trade & Industry

Note: Unit of per capita is togrog

Table 2-1-7 Produced National Income by Branches

(at fixed prices mln. togrog)

		1985	1986	1987	1988	1989	1990	1991
Total		6776.7	7153.5	7400.7	7712.6	8461.9	8143.9	6988.9
		-	5.6	3.5	4.2	9.7	-3.8	-14.2
Cont.	Indu.	2390.0	2442.8	2511.3	2604.6	2902.3	2892.8	2514.7
	Agri.	1348.1	1426.6	1335.7	1367.1	1556.3	1525.6	1448.4
	Const.	382.0	423.1	503.8	563.1	617.2	462.3	383.4
	Trans.	658.5	740.8	750.8	786.3	774.3	703.7	397.1
	Commu.	93.6	104.4	110.3	119.6	129.5	137.6	105.3
	Tec. su	1770.8	1865.2	2036.2	2129.9	2327.4	2280.5	1987.6
	Others	133.7	150.6	152.6	142.0	154.9	141.4	152.4

Source: Statistics of M. of Trade & Industry

(2) Trade

1) Trade balance

The amount of trade has been falling since 1989, and in 1991 plunged by almost 50%. Moreover, the balance of trade is constantly in the red.

As a result of a large decrease in economic assistance from the former Soviet Union, medical supplies and other daily necessities, fuel for industrial use, and the like are in short supply, thus severely affecting people's livelihood and restricting economic activities.

Table 2-1-8 Trend on Balance of Foreign Trade

(thous. mln. togrog)

	1985	1986	1987	1988	1989	1990	1991
Exports	2.05	2.13	2.14	2.20	2.15	1.97	1.37
Imports	3.26	3.40	3.29	3.32	2.87	2.75	1.90
Balance	-1.21	-1.27	-1.15	-1.12	-0.72	-0.78	-0.53

Source: 1985~ 1990: Mongolia Railway Statistics
1991: Statistics of M. of Trade & Industry

2) Export commodities

The principal export commodities are coal, fluorite and other mineral products. But as a result of economic confusion and other factors, exports of such minerals as coal and fluorspar have declined sharply, and except for skin goods and goat down goods, exports of such products as wool and camel wool have also plummeted.

Table 2-1-9 Quantity of Exports by Principal Commodities

Commodity	Unit	1985	1986	1987	1988	1989	1990	1991
Coal	thous.	225.0	300.0	610.7	1040.8	776.0	490.2	120.8
	ton	100.0	133.3	271.4	462.6	344.9	217.9	53.7
Fluorite	thous.	783.6	571.9	537.3	653.9	668.0	632.4	-
	ton	100.0	73.0	68.6	83.4	85.2	80.7	-
Cement	thous.	-	132.5	216.8	156.5	175.0	95.4	-
	ton	-	100.0	163.6	118.1	132.1	72.0	-
Timber	thous. ms	58.7	39.0	39.4	19.8	31.4	19.9	-
	100.0	100.0	66.4	67.1	33.7	53.5	33.9	-
Sawn wood	thous. ms	136.1	121.3	126.1	93.6	71.1	42.5	90.2
	100.0	100.0	89.1	92.7	68.8	52.2	31.2	66.3
Scoured wool	thous.	5.7	5.1	5.0	4.9	3.5	2.8	2.2
	ton	100.0	89.5	87.7	86.0	61.4	49.1	38.6
Camel wool	thous.	2.6	2.7	2.2	2.4	2.1	1.9	0.1
	ton	100.0	103.8	84.6	92.3	80.8	73.1	3.8
Goat down	thous.	0.6	0.4	0.4	0.5	0.2	0.4	0.6
	ton	100.0	66.7	66.7	83.3	33.3	66.7	100.0
Horse skins	thous.	0.6	0.6	0.6	0.6	0.7	0.5	-
	ton	100.0	100.0	100.0	100.0	116.7	83.3	-
Sheep skins	thous.	280.2	278.4	275.0	253.5	289.0	130.0	131.0
	piece	100.0	99.4	98.1	90.5	103.1	46.4	46.8
Goat skins	thous.	526.2	240.7	252.0	214.0	30.0	113.2	101.0
	ton	100.0	45.7	47.9	40.7	5.7	21.5	19.2
Leather clo.	mln.	321.5	281.0	302.4	14821.6	75.3	87.0	10.5*
	togrog	100.0	87.4	94.1	4610.1	23.4	27.1	-
Skin goods	mln.	44.4	50.4	52.6	62.7	58.6	51.6	3.0*
	togrog	100.0	113.5	118.5	141.2	132.0	116.2	-
Woollen fab.	thous. m	34.6	45.0	45.2	45.0	37.2	-	-
	100.0	100.0	130.1	130.6	130.1	107.5	0.0	-
Goat down g.	thous.	236.5	292.7	298.1	291.0	270.6	275.7	26.1
	piece	100.0	123.8	126.0	123.0	114.4	116.6	11.0
Vodka	thous.	350.0	275.0	416.1	220.7	140.8	186.4	-
	ton	100.0	78.6	118.9	63.1	40.2	53.3	-
Livestock	thous.	24.7	30.0	31.3	21.6	21.6	20.8	20.1
	ton	100.0	121.5	126.7	87.4	87.4	84.2	81.4
Horses	thous.	63.1	64.0	64.0	64.0	64.0	42.3	23.2
	head	100.0	101.4	101.4	101.4	101.4	67.0	36.8

Source: Statistics of M. of Trade & Industry
 Note: Upper column; Volume
 Lower column; Index standardized 1985

3) Import commodities

The principal import commodities include machinery, vehicles, chemical fertilizers and consumer durable.

Although livestock is flourishing, Mongolia imports wheat, powdered milk and other products, and the amount of these imports is either increasingly slightly or leveling off. The lack of foreign currency is making it difficult to import these principal products.

Table 2-1-10 Quantity and Value of Imports by Principal Commodities

Commodity	Unit	1985	1986	1987	1988	1989	1990	1991
Machines, etc.	mln.	1182.7	1225.2	1064.4	1002.2	850.6	855.0	...
	togrog	100.0	103.6	90.0	84.7	71.9	72.3	...
Eneroetic e.	mln.	49.8	38.2	7.8	38.7	37.8	46.4	-
	togrog	100.0	76.7	15.7	77.7	75.9	93.2	-
Cranes & trc.	number	223	115	45	149	126	107	17
		100.0	51.6	20.2	66.8	56.5	48.0	7.6
Trucks, b & c	number	2451	2416	2425	2318	1672	1473	179
		100.0	98.6	98.9	94.6	68.2	60.1	7.3
Metals	mln.	935.6	962.1	1012.4	1111.1	783.9	168.2	...
	togrog	100.0	102.8	108.2	118.8	83.8	18.0	...
Gas, etc.	thous.	695.2	711.4	769.9	782.0	713.4	768.9	555.2
	ton	100.0	102.3	110.7	112.5	102.6	110.6	79.9
Chemical fe.	thous.	35.9	33.0	32.4	36.2	36.0	29.0	0.4
	ton	100.0	91.9	90.3	100.8	100.3	80.8	1.1
Cement	thous.	107.4	48.9	46.9	45.7	47.9	38.5	3.8
	ton	100.0	45.5	43.7	42.6	44.6	35.8	3.5
Food r.m.	mln.	46.7	35.1	44.0	3.1	23.6	7.1	...
	togrog	100.0	75.2	94.2	6.6	50.5	15.2	...
Foodstuffs	mln.	204.4	214.6	213.3	237.3	220.0	243.0	...
	togrog	100.0	105.0	104.4	116.1	107.6	118.9	...
Sugar	thous.	34.2	42.2	40.6	42.7	43.8	47.6	-
	ton	100.0	123.4	118.7	124.9	128.1	139.2	-
Rice	thous.	13.0	12.4	15.8	15.5	13.3	19.1	14.7
	ton	100.0	95.4	121.5	119.2	102.3	146.9	113.1
Cotton fab.	mln.	56.3	54.6	57.3	59.5	57.9	57.1	6.8
	togrog	100.0	97.0	101.8	105.7	102.8	101.4	12.1
Ready-made g.	mln.	92.9	100.9	105.9	111.1	27.0	53.6	3.5
	togrog	100.0	108.6	114.0	119.6	29.1	57.7	3.8
Refrig.	thous.	17.3	12.6	14.5	17.8	11.9	1.0	6.7
	number	100.0	72.8	83.8	102.9	68.8	5.8	38.7
Washing m.	thous.	5.0	6.5	5.0	8.2	2.8	5.7	2.4
	number	100.0	130.0	100.0	164.0	56.0	114.0	48.0

Source: Statistics of M. of Trade & Industry

Note: Upper column; Volume

Lower column: Index standardized 1985

4) Trading partners

The ties with the former Soviet Union are so strong that about 80 percent of Mongolia's trade is with it, but trade decreased significantly in 1991. The reason is with the democratization of eastern European countries and the collapse of the former Soviet Union's economy. The democratization of Mongolia also caused a marked reduction in the amount of assistance it receives from these former communist states which used to provide indirect assistance. These developments have also led to a reduction in the amount of trade Mongolia has with the former COMECON nations.

The amount of trade with free nations was about US\$80 million, or only 4.7% of Mongolia's total amount of trade.

Table 2-1-11 Value of Exports and Imports by Country (mln. US\$)

	1985	1986	1987	1988	1989	1990	1991
Total	1784.6	1855.8	1822.5	1852.7	1684.5	1584.7	708.9
	-	4.0	-1.8	1.7	-9.1	-5.9	-55.3
Austria	3.4	5.8	3.5	4.1	11.4	10.0	17.5
Switzerland	7.9	11.6	9.7	11.8	12.0	7.1	7.6
USA	0.1	0.1	0.1	1.5	0.1	0.9	1.6
England	3.5	3.1	4.3	4.5	9.1	5.5	2.7
Belgium	0.1		0.1	0.1	0.1	0.4	0.1
Italy	1.0	0.4	1.6	1.3	6.7	9.1	6.8
Netherland	6.9	5.2	4.7	3.1	5.9	1.6	1.0
Denmark				0.2	1.1	0.1	0.6
France	0.7	0.7	0.6	0.6	0.5	5.1	1.2
South Korea						0.9	7.8
Singapore				0.2	0.4	0.7	1.0
Hongkong				0.1		2.7	4.7
Japan	9.4	9.7	11.1	26.9	31.4	17.4	14.5
Sub percent (Western countries)	1.8	2.0	2.0	2.9	4.7	3.9	9.5
Afganistan					2.7	1.5	4.1
Bulgaria	24.0	29.8	26.0	25.4	35.4	33.7	2.8
USSR	1482.3	1552.1	1523.3	1515.9	1325.6	1233.7	473.5
	83.1	83.6	83.6	81.8	78.7	77.9	66.8
Poland	34.2	31.1	28.5	33.7	30.0	24.4	0.5
Romania	33.9	29.0	25.2	31.7	26.0	16.4	0.7
Germany	54.0	51.9	50.3	47.4	48.4	51.1	22.7
North Korea	10.7	18.7	19.5	15.7	12.1	13.3	2.3
Hungary	27.6	27.0	25.3	27.1	29.8	34.2	12.4
Czechoslovakia	60.5	54.4	50.2	63.7	50.3	63.9	14.0
Jugoslavia	9.6	4.6	6.1	11.8	13.3	11.5	2.7
China	7.6	12.9	19.5	16.0	24.1	33.6	69.1
Sub percent (Eastern countries)	97.7	97.6	97.3	96.5	94.8	95.7	85.3
Others	7.2	7.7	12.9	9.9	8.1	5.9	37.0

Source: Statistics of M. of Trade & Industry

(3) Public Finance

The revenue and expenditure grew steadily until 1988 but declined slightly in 1990 over the previous year's level.

A glance at the balance of revenue and expenditure reveals that the former exceeded the latter until 1988 but the latter exceeded the former in 1990.

The 1990 national budget was 6.5 billion togrog. As in other socialist countries, 85% of Mongolia's revenue came from tax on transactions and income. On the other hand, the breakdown of expenditure shows that the national economic expenditure (manufacturing sector, housing, public works, etc.) was 45%, social and cultural expenditure (education, culture, sports, health, etc.) 43%, defense expenditure 7%, and Diet and administrative expenditure 5%.

Table 2-1-12 Revenue and Expenditure by Principal Items

(mln. togrog)

Item		1980	1985	1986	1987	1988	1990
Revenue	Total	4073.5	5741.6	5897.2	6441.7	6746.6	6494.4
		100.0	141.0	144.8	158.1	165.6	159.4
	Trade taxes	2713.6	3558.9	3894.8	4170.5	4321.0	3479.8
	Receipts receipts for person	968.8	1633.8	1602.3	1683.6	1851.2	2011.8
	Social security premiums	158.5	206.6	213.0	229.0	242.1	243.3
	Taxes on individual	32.9	41.8	39.9	46.3	48.5	50.2
Miscellaneous	199.7	300.5	147.2	312.3	283.8	709.3	
Expenditure	Total	4044.0	5700.9	5875.7	6408.6	6726.5	6812.3
		100.0	141.0	145.3	158.5	166.3	168.5
	National economics	1554.2	2484.5	2307.2	2863.5	3046.5	3032.5
	Social culture	1634.1	2158.9	2345.3	2420.4	2609.0	2913.4
Sudden expenditure	855.7	1057.5	1223.2	1124.7	1071.0	866.4	
Revenue - expenditure		29.50	40.70	21.50	33.10	20.10	-317.90

Source: Mongolia Railway Statistics

(4) Industry

1) Agriculture

From 1940 to 1990, when Mongolia was still under socialism, agriculture was the main industry employing 40% of all workers and gaining 45 percent of the country's foreign currency. But the ratio of its net material product is gradually decreasing.

Mongolia's urban population is increasing rapidly, and as a result of the 1990-1991 crisis, self-sufficiency in agriculture is decreasing. There are about 26 million domestic animals, but Mongolia has to import wheat, butter and other daily food items.

Growth in Mongolia's livestock sector cannot be expected because of its poor regional production facilities.

Most industries in Mongolia are joint undertakings involving the Government and the COMECON countries. Consequently, the private sector consists mainly of small retail-type manual industries.

Industrial production is stagnating due to such factors as obsolete technology, inadequate social capital and lack of modern management and professional skills.

2) Mining

Mongolia is rich in natural resources. The principal ones include coal, iron ore, tin, copper, molybdenum, gold, silver, tungsten, zinc, lead, potassium, fluorite, uranium, oil and semi precious stones. The output of Mongolia's mining industry accounts for about 20% of its GNP.

Copper and molybdenum mines at Erdenet yield most of which are exported. They account for about 35% of Mongolia's total exports.

Fluorite is indispensable for iron manufacture and metallurgy. Mongolia is the world's biggest producer of fluorspar, producing about 15 percent of the world's total production.

Table 2-1-13 Trend on Certain Categories of Industrial Products

Commodity	Unit	1985	1986	1987	1988	1989	1990	1991
Electricity	mln.	2343.2	3169.6	3267.4	3544.1	3568.3	3347.8	2556.7
	kW.h	100.0	135.3	139.4	151.3	152.3	142.9	109.1
Fluorite	thous.	824.1	592.3	538.9	543.1	600.2	512.1	250.8
	ton	100.0	71.9	65.4	65.9	72.8	62.1	30.4
Coal	thous.	6802.2	7064.5	7767.8	8942.5	8350.3	7147.8	7009.3
	ton	143.0	103.9	114.2	131.5	122.8	105.1	103.0
Bricks	mln.	143.0	469.8	161.7	180.6	172.8	149.4	328.1
	piece	100.0	328.5	113.1	126.3	120.8	104.5	229.4
Cement	thous.	150.5	424.7	540.7	502.1	512.6	440.8	226.8
	ton	100.0	282.2	359.3	333.6	340.6	292.9	150.7
Lime	thus.	102.6	106.6	113.4	122.2	95.0	103.0	76.2
	ton	100.0	103.9	110.5	119.1	92.6	100.4	74.3
Sawn wood	thous	686.2	623.7	645.5	640.7	553.1	471.6	276.4
	m ³	100.0	90.9	94.1	93.4	80.6	68.7	40.3
Carpet	thous.	1585.6	-	-	1813.8	2128.1	2017.1	1400.2
	m ²	100.0	-	-	114.4	134.2	127.2	88.3
Leat. fether wool	thous.	3883.4	3149.0	3517.3	3920.6	4140.0	4806.1	4085.9
	pairs	100.0	81.1	90.6	101.0	106.6	123.8	105.2
Leat. coal	thous.	81.0	42.7	49.5	31.4	41.6	35.5	29.9
	piece	100.0	52.7	61.1	38.8	51.4	43.8	36.9
Meat	thus	62.5	63.9	66.5	62.0	61.7	59.0	46.9
	ton	100.0	102.2	106.4	99.2	98.7	94.4	75.0
Flour	thous.	175.7	185.9	191.5	196.4	199.7	187.0	174.4
	ton	100.0	105.8	109.0	111.8	113.7	106.4	99.3

Source: Mongolia Railway Statistical

Note: Upper column: Volume

Lower column; Index standardized 1985

2-2 Railway Transport

2-2-1 Summary

Mongolia has four means of transport: rail, road, air and water.

Rail transport is operated by the Mongolian Railways (MR). MR has a route kilometer range of 1,813 kilometers, consisting of 1,111 kilometers of trunk line and a number of branch lines. The trunk line links Ulaanbaatar, the nation's capital, with the Russian Chinese borders.

The total length of roads is 199,300 kilometers. But the road density is extremely low, providing service to only a fraction of Mongolia's vast 1.56 million square kilometers of land area. The length of paved roads is only 1,024 kilometers.

Mongolia has one international airport, at Ulaanbaatar, and 17 local airports.

Water transport is available on the lakes found in the northwestern district.

Table 2-2-1 Summary of Transport in Mongolia

	Length	Summary
Railway	1,813 km	Sukhe-Baatar ~ Ulaanbaatar ~ Zamyn-Uud 1,111 km Branch line 465 km Ereentsav~Bayantumen 237 km
Road	199,300 km	State roads 9,200 km (with paved length 843 km) Local roads 41,100 km (with paved length 181 km) Internal roads 150,000 km
Airport	18	International Ulaanbaatar Domestic 17
Ship	-	Revolution in Northwestern District Lakes

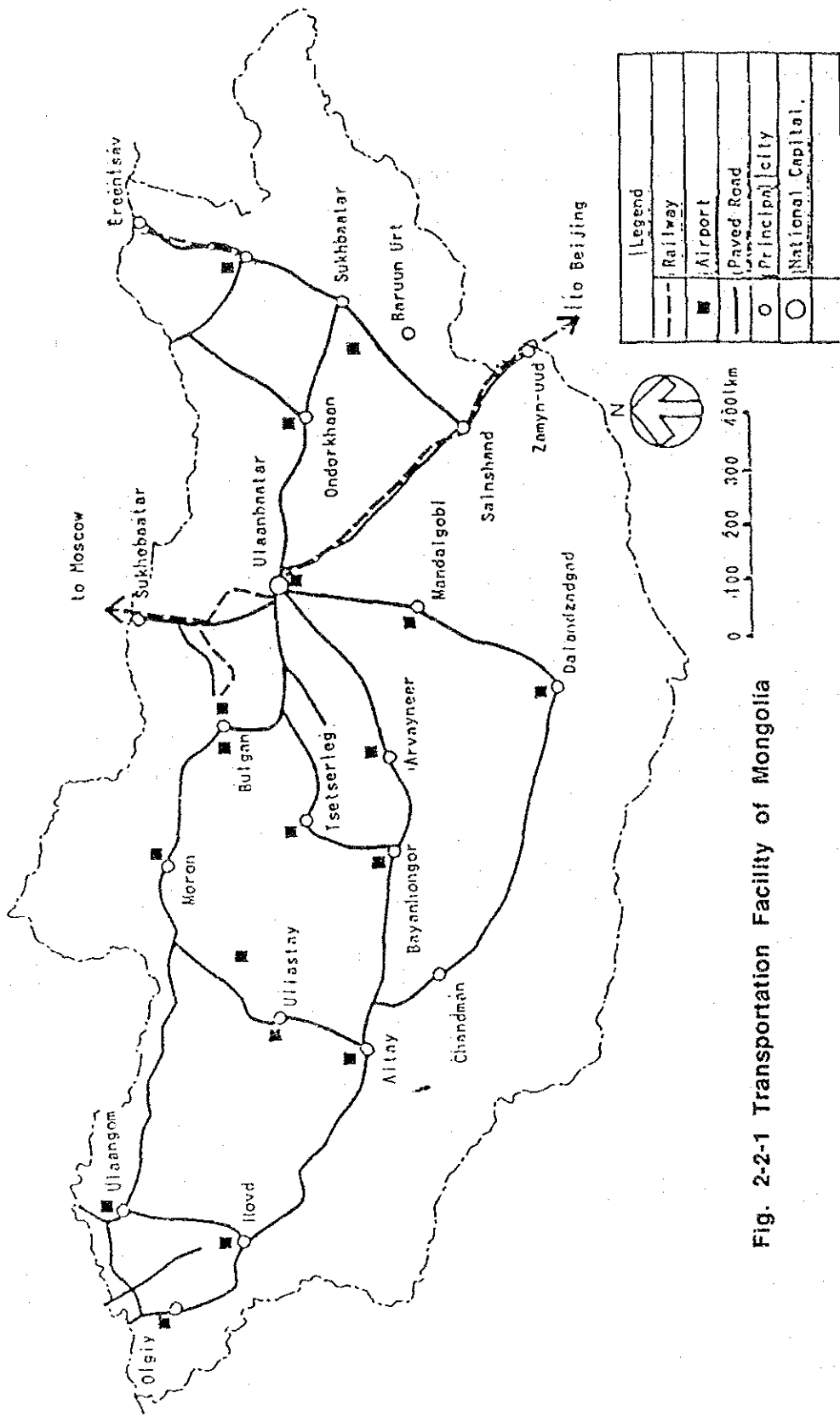


Fig. 2-2-1 Transportation Facility of Mongolia

(1) Railroads

MNR is linked to railroads in China and the Russian Federation.

The centers of Mongolia's key industries -- Ulaanbaatar, Darhan, Erdenet, Boronpor, etc. -- are all connected by rail.

Mongolia and the Russian Federation have the same railway broad gauge, so the routes between the two countries are operated directly. But since China's railways are standard gauge, passengers have to change train trucks and freight trains have to be transshipped at Erenhot Station, in China.

Except for one double track section (5 kilometers), all other lines are single track, and none are electrified.

A map of MR's routes is shown in Table 2-2-2.

Table 2-2-2 Section and Distance of MR's Route

Section	Distance
Sukhe-Baatar ~ Zymyn-Uud	1,111 km
Darkhan-II ~ Sharyn-Gol	63
Salkhit ~ Erdenet	164
Tolgoit ~ Songino	20
Honkhor ~ Nalaikh	14
Bagahangai ~ Baga-Nuur	94
Airag ~ Borondor	60
Sainshand ~ Zuun-Bayan	50
Ercen-Tsav ~ Bayan-Tumen	237
Total	1,813

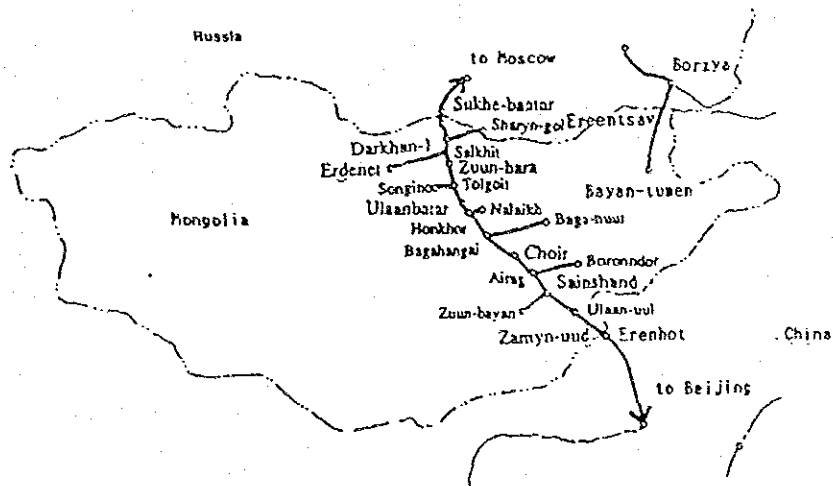


Fig. 2-2-2 Railway Map of MNR

(2) Roads

Roads in Mongolia are divided into State Roads, Local Roads and Internal Roads. The total length of roads is 199,300 kilometers, of which only 1,024 kilometers are paved. Of the latter, 294 kilometers are in Ulaanbaatar. This means only 0.5% of roads in Mongolia are paved, and only 25 kilometers of unpaved roads in the whole country are paved each year. Meanwhile, only 2,740 kilometers, 1.4% of the total length of roads, are randomly paved.

When Mongolia was still a planned economy, about 120 kilometers of roads were built annually. But because of the economic crisis, only about 10 kilometers are being built each year.

Table 2-2-3 Roads of Mongolia

	Total Length (thous. km)	Paved Length (km)	Rate (%)	Blacktop Length (km)	Rate (%)
State roads	9.2	843	9.2	1,880	20.4
Local roads	41.1	181	0.4	860	2.1
Internal roads	150.0	0	0	0	0

Most goods imported to Mongolia are transported by rail. But in July 1992, truck transport was commenced on the basis of an agreement with China concerning road transport. This form of transport, however, is limited to freight transport between China and the provinces along the Chinese border. The number of motor vehicles owned is shown in Table 2-2-4.

As of 1989, there were 27,384 trucks and 5,660 passenger cars, or 0.013 per person for trucks and 0.0027 per person for passenger cars.

Table 2-2-4 Vehicle Fleet 1970-1989

	1970	1980	1985	1986	1987	1988	1989
Cars	3,608	5,912	5,671	5,755	5,787	5,775	5,660
Trucks	13,511	21,880	25,118	25,805	26,577	27,316	27,384
Buses	703	1,331	1,460	1,514	1,628	2,105	2,410
Special vehicles	1,015	2,863	3,335	3,399	3,322	3,962	4,072
Trailers	4,137	7,511	8,536	8,941	9,868	10,639	-
Total (excl. trailers)	18,837	31,986	35,584 (tons)	36,473	37,314	39,158	39,526
Average truck capacity (load) unit: tons	3.14	3.84	4.35	4.35	4.42	-	-

Source: Statistics of M. of Transport

Note: - data not available

(3) Air Transport

In the summer season, there are four flights per week from Ulaanbaatar to Beijing, two flights to Moscow, two to Irkutsk, and two to Hohhot, in China. Table 2-2-5 shows the number of flights departing from Ulaanbaatar.

Mongolia has airports in 20 locations, but only those at five locations – Ulaanbaatar, Cholbalsan, Woron, Bayan-hongor and Houd – have paved runways. But because these local airports are important means of transport for the Mongolian people, there is one flight each day departing from Ulaanbaatar to each of these airports.

Table 2-2-5 International Flight Table from Ulaanbaatar

Departure	Number of Flight per Week	Company
Beijing	1 (Mon)	MIAT
	1 (Tue)	CA
	3 (Fri)	MIAT, CA
Moscow	1 (Tue)	SU
	1 (Fri)	MIAT
	1 (Tue)	SU
Hohhot	1 (Wed)	MIAT
	1 (Tue)	CA
	1 (Fri)	CA

Note MIAT: Mongolia Civil Air Transport Organization

CA: China Airlines

SU: Aeroflot Soviet Airlines

Table 2-2-6 Domestic Airports

Name of Airport	Runway Type	Runway Length (in meters)	Acceptable Type of Aircraft
Buyant Ukhs * (Ulaanbaatar)	Asphalt/concrete	2,600	Tu-154
Cholbalsan	Concrete	2,600	Yak-42
Undorhaan*	Earth	2,000	AN-24
Baruun Urt	Earth	1,800	AN-24
Dalanzadgad*	Earth	1,800	AN-24
Mandalgobi	Earth	1,600	AN-24
Bulgan	Earth	2,100	AN-24
Erdenet	Earth	1,800	AN-24
Arvayheer	Earth	1,800	AN-24
Kar Khorum	Earth	1,800	AN-24
Hujirt	Earth	1,800	AN-24
Moron	Asphalt/concrete	2,440	Yak-42
Tsetsereg*	Earth (improved)	1,600	AN-24
Uliastay	Earth	3,000	AN-24
Bayanhongor*	Asphalt/concrete	2,600	Yak-42
Altay	Earth	3,200	AN-24
Hovd	Asphalt/concrete	2,850	Yak-42
Ulaangom	Earth (improved)	2,000	AN-24
Ulgii*	Earth	2,700	AN-24
Tosontsengel	Earth	2,400	AN-24

*Priority for upgrading

2-2-2 Railway Transport

(1) Freight Transport

1) Volume of transport

Freight volume by type of transportation are shown in Table 2-2-7.

Freight transportation volume increased steadily until 1988 and has been on the decline since. It plummeted to 33.9 million tons in 1991, or 40.9% less than the amount recorded in 1988.

A glance at the freight volume by type of transportation reveals that, at more than double the share for rail transport, motor vehicle transport has the largest share of the total freight volume. But the share for rail transport exceeds that for road transport when it comes to freight transport ton-kilometers. Nowadays, rail is used mainly for long-distance international freight transport, and motor vehicles for short-distance freight transport.

Table 2-2-7 Freight Volume by Type of Transportation

Type	Unit	1985	1986	1987	1988	1989	1990	1991
Total	mln.ton	51.0	55.5	59.1	63.7	57.5	51.5	34.0
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	mln.t.km	7905.4	8390.9	8283.3	8418.9	7931.4	6870.3	4234.4
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Railroad	mln. ton	15.0	15.9	16.7	17.8	16.9	14.5	10.2
	%	29.4	28.7	28.3	28.0	29.4	28.2	30.0
	mln.t.km	5959.6	6333.4	6170.9	6241.1	5956.1	5085.9	2957.9
	%	75.4	75.5	74.5	74.1	75.1	74.0	69.9
Ship	mln.ton	0.04	0.04	0.04	0.04	0.06	0.07	0.05
	%	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	mln.t.km	4.9	4.3	5.2	5.0	4.9	4.9	1.7
	%	0.1	0.1	0.1	0.1	0.1	0.1	0.0
Automobile	mln.ton	35.9	39.5	42.3	45.8	40.5	36.9	23.7
	%	70.5	71.2	71.6	72.0	70.5	71.7	69.8
	mln.t.km	1934.4	2046.1	2099.1	2162.2	1960.6	1771.7	1271.0
	%	24.5	24.4	25.3	25.7	24.7	25.8	30.0
Airplane	mln.ton	0.01	0.01	0.01	0.01	0.01	0.01	-
	%	0.0	0.0	0.0	0.0	0.0	0.0	-
	mln.t.km	6.5	7.1	8.1	10.6	9.8	7.8	3.8
	%	0.1	0.1	0.1	0.1	0.1	0.1	0.1

Source: Mongolia Railway Statistics

a) Freight transport volume by commodity

This section shows the trend in the rail freight volume of exports, imports, transit and domestic freight. From 1985 until 1990, the total volume of these commodities changed within a range of about 14-18 million tons. But in 1991, it plummeted to 10.2698 million tons, or 57% of the 1988 level.

In 1985, the freight volume of exports, imports, transit and domestic freight accounted for 47% 9.8%, 28.9% and 14.0%, respectively, of the total rail freight transport volume. But by 1991, this changed to 69%, 1.6% 12.4% and 16.6%, respectively. Although the volume of domestic freight changed within the range of 7-9 million tons in the 1985-1990 period, the volume and ratio of imports and exports decreased during the same period.

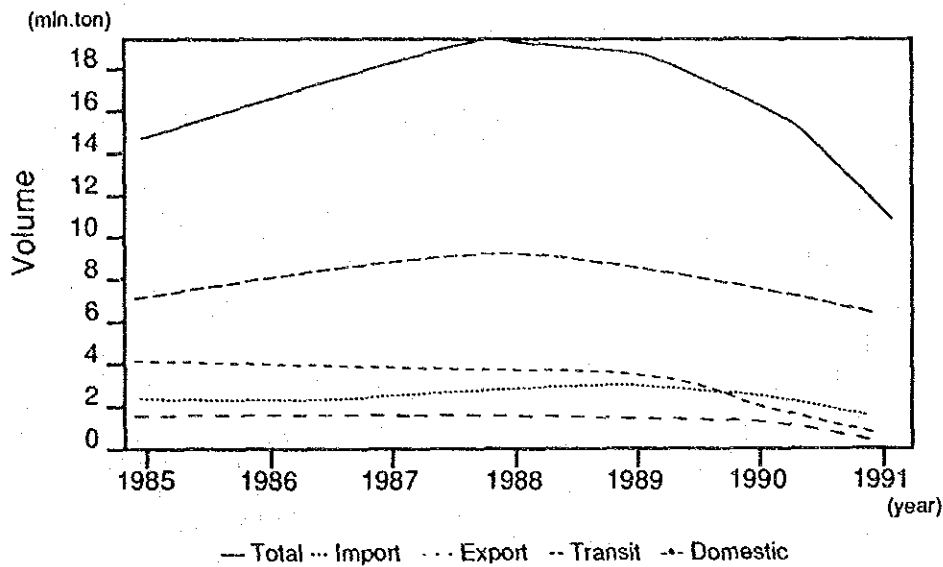


Fig. 2-2-3 Freight Transport Volume by Commodity

b) Exports

Representative export commodities include oil, coal, machine facilities, fluorite and wood.

In the period from 1985 to 1991, after peaking in 1989 as 2.829 million tons, the total export volume declined, plunging in 1991 by about 62% over the previous year's level. Viewed by item, export of mining products, oil and coal, dropped to about 40-50% of the 1985 level, while those of agricultural products, wool and food, plunged to about 10%. By contrast, export of construction materials, non-ferrous metal and the like -- while limited in absolute terms -- increased.

Two factors are responsible: (1) the output of each export item decreased due to the economic dislocation since 1990; and (2) the decline in transport capacity due to deterioration of transport facilities, etc.

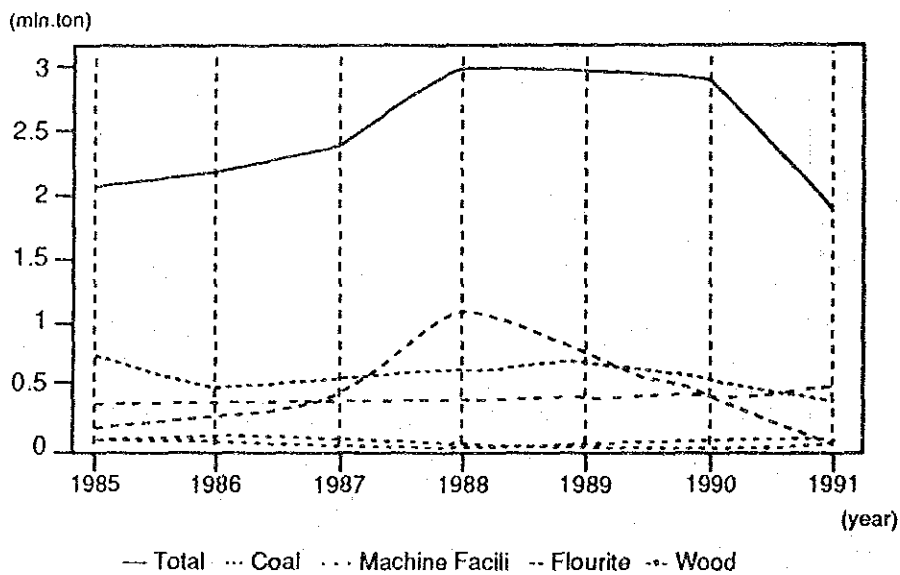


Fig. 2-2-4 Railway Freight Transportation Volume by Export Commodities

c) Imports

Representative import commodities are mining products, coal and oil; chemical products; fertilizer; and foodstuffs, foods and raw foods.

The total import volume in the period from 1985 to 1991 shows that every year the volume was lower than in the previous year, plunging in 1991 to about 30% of the 1985 level.

Viewed by item, the import volumes of construction materials and oil fell dramatically in 1991, to 6.5% and 54.6%, respectively, of the level recorded in 1985. Also, imports of foods and raw foods fell substantially, to 38.7% and 22.5%, respectively.

Two factors are believed responsible: (1) the economic dislocation of the Soviet Union, the country from which items are imported; and (2) the impact of lack of foreign currency triggered by the economic situation in Mongolia itself.

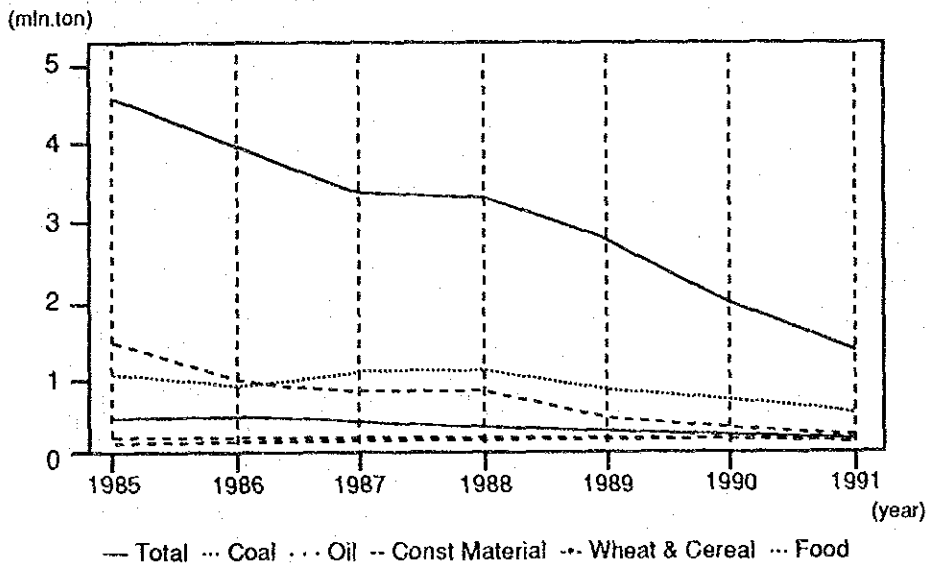


Fig. 2-2-5 Railway Freight Transportation Volume by Import Commodities

d) Transit

The figures presented here represent the total for the China to former Soviet Union direction and the former Soviet Union to China direction.

Representative commodities are industrial products, steel and machine facilities; a mining product, fluorite; and agricultural products, wood and wool.

The total transit volume peaked in 1986 at 1.8026 million tons, plunging to 168,000 tons in 1991, or only about one-tenth the peak level.

View by commodity, the transit volumes of representative commodities, fluorite and wood, were zero, while those of other commodities dipped to about 30% of the 1986 level.

Two factors are believed to be responsible: (1) the economic dislocation in the former Soviet Union and Mongolia; and (2) the deterioration of freight handling facilities.

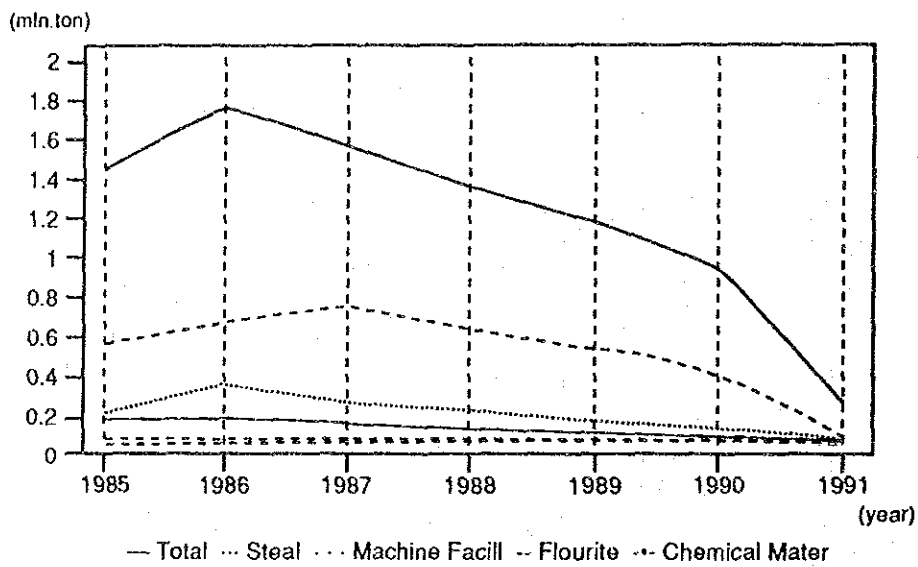


Fig. 2-2-6 Railway Freight Transportation Volume by Transit Commodities

c) Domestic freight

Representative commodities are mining products, coal, oil and fluorite; industrial products, steel, construction materials and machine facilities; and agricultural products, wood and wool.

While the railroad freight transport volume of exports, imports and transit decreased substantially, the total domestic freight volume changed within the range of 7-10 million tons in the period from 1985 to 1991.

Viewed by item, the domestic freight volume of coal was about 5 million tons, demonstrating that the freight volume of coal remained steady.

The domestic freight volume of fluorite, a representative export commodity, was only 100 tons in 1985, but increased by about a thousand fold in 1991. This, it can be said, was caused by the fact that the transport of fluorite, which used to be carried out by truck and other means of transport, was switched to railroad transport.

The domestic freight volume of construction materials recorded a huge year-on-year decrease in 1991. Two factors are responsible: (1) the economic dislocation in Mongolia; and (2) the import of these materials decreased substantially.

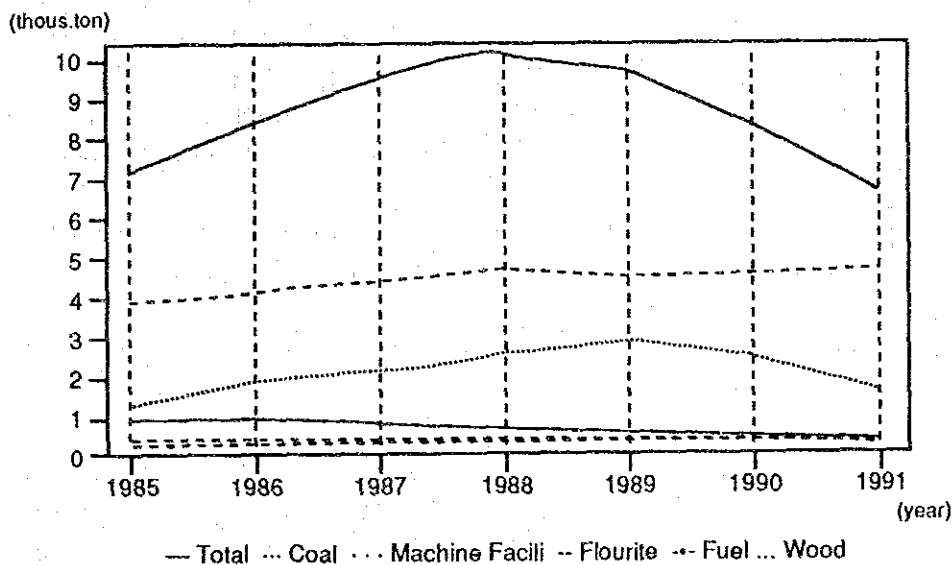


Fig. 2-2-7 Railway Freight Transportation Volume by Domestic Commodities

d) Shipping freight volume

Railway main line from former Soviet Union to Ulaanbaatar has a lot of shipping freight volume comparing from China to Ulaanbaatar. For example, freight volume between Darkhan to Ulaanbaatar was about 3.0 million ton at 1990 and about 1.8 million ton at 1991. Case of branch line, for example, Bagonuur to Ulaanbaatar was 3.7 million ton at 1990. 1991's freight volume decreased comparing 1990's due to the economic dislocation since 1990 and decline in transport capacity due to deterioration of transport facilities (see Appendix 2-2-6, 2-2-7).

2) Train operation

Mongolian Railway prepares two versions of train operation diagram for summer and winter to operate international trains on different operation diagrams. According to the transport demands, the planned diagram is modified to operate additional trains or to change the timetable.

There are three train dispatchers for the following three control zones that divide the whole Mongolian Railway lines into the three divisions.

Zone 1 : Sukhe-baatar – Zuun-hara

Zone 2 : Zuun-hara – Bagahangai

Zone 3 : Bagahangai – Zamyn-Uud

A locomotive operation controller is in charge of locomotive operation in the whole lines of Mongolian Railway. Commands and information are sent through a telephone line exclusively used for this purpose. There are some areas for which the locomotive operation controller can communicate with drivers directly through a radio communication system.

When a station has freight to be dispatched, it requests freight train operation to the Wagon Control Desk of the Train Operation Division. Based on this request, a plan is established to operate freight trains and distribute wagons. The distribution plan of wagons is also sent to the Economic Planning Division. After confirming the numbers of loaded and unloaded wagons of different categories staying at each station, the Division notifies the status of the wagon distribution of the day to the Train Operation Section, Train Operation Division, by 17:00.

The Train Operation Section draws a train operation diagram for the day based on the information and inform each station of the diagram by 20:00 to 8:00 through the train operation command telephone.

It takes about two days after the notification of the Economic Planning division for the train to be actually operated.

a) Planned train operation diagram

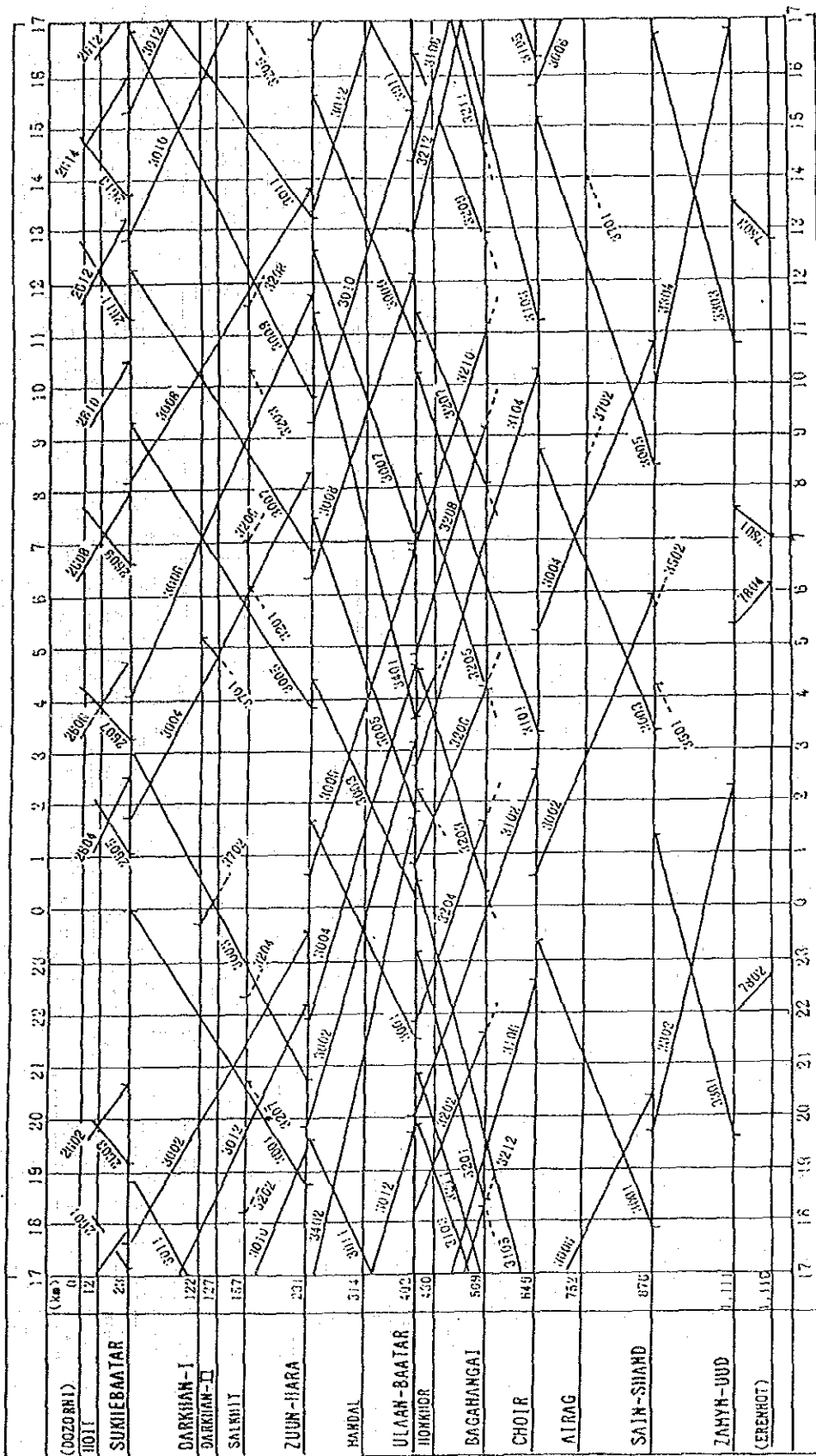
Figure 2-2-8 gives the planned freight train operation diagram in the summer of 1992. Unlike the ordinary schedules of train operation, the train diagram of Mongolian Railway is drawn to cover 24 hours starting at 17:00 in consideration of the work planning and for the convenience of statistics. Since the Chinese track gauge is different from that of Mongolia, Mongolian trains are operated on the 1,520 gauge track to and from Erenhot, the Chinese border station.

Train operation to import petroleum from China started in July 1991 using the Chinese 1,435mm gauge track laid between Erenhot and the Mongolian border station of Zamyn-Uud.

b) Hauling load

Mongolian Railway determines the maximum load and the load for planning train operation for each locomotive type in each section between adjoining stations taking into consideration the status of track.

The maximum gradient, one of the decisive factors for the hauling load, is 1.85% (for down trains between Emeelt and Tolgoit). In other sections, the maximum gradient is about 0.9%. (See Table 2-2-8.) In the Zamyn-Uud area, the planned hauling load is



Note 1: The figures shown are train numbers.

Fig. 2-2-8 Planned Diagram of Freight Trains (May 3~ November 1, 1992)

2,600 tons in the direction to Sain-Shand for the 2M62 type locomotives and 2,000 tons in the direction to Erenhot for the M62 type locomotives. The hauling load is also 2,000 tons for the 1,435mm gauge between Zamy-Uud and Erenhot.

c) Operation frequencies in different sections

Tables 2-2-9 and Figure 2-2-9 give the train operation frequencies in major sections. Larger numbers of trains are operated around the station of Ulaanbaatar in the capital and toward the Russian border, and a smaller number of trains near the Chinese border.

3) Fluctuation of transport volume

Comparatively larger fluctuations in freight traffic were shown from January through June in 1990 and also in the same period in 1991. The maximum fluctuation rate was about 120%.

Table 2-2-9 Number of Freight Trains (per day)

Section	1985			1986			1987			1988			1989			1990			1991		
	UP	DN	Total	UP	DN	Total	UP	DN	Total	UP	DN	Total	UP	DN	Total	UP	DN	Total	UP	DN	Total
1 (Dozomi) - Sukhebaatar	5.4	3.0	8.4	5.7	3.1	8.8	5.0	3.3	8.3	4.7	3.8	8.6	4.5	3.5	8.0	2.0	1.9	3.9	1.5	0.8	2.3
2 Sukhebaatar-Zuun-Hara	-	-	9.3	4.7	4.4	9.1	4.4	4.3	8.7	4.3	4.0	8.3	4.0	3.7	7.7	3.8	3.6	7.4	3.4	3.2	6.6
3 Darkhan-I - Zuun-Hara	-	-	2.0	1.0	1.0	2.0	1.0	1.0	2.0	1.0	1.0	2.0	1.0	1.0	2.0	1.0	1.0	2.0	1.2	1.0	2.2
4 Zuun-Hara - Ulan-Baatar	-	-	12.1	6.0	6.0	12.0	5.9	5.9	11.8	5.7	5.7	11.4	5.0	5.0	10.0	4.5	4.5	9.0	4.3	4.3	8.6
5 Ulaan-Baatar-Choir	-	-	8.4	4.0	4.4	8.4	4.1	4.2	8.3	4.1	4.5	8.6	4.1	4.4	8.5	4.0	4.5	8.5	3.9	4.5	8.4
6 Choir - Sain-Shand	-	-	4.0	1.8	2.1	3.9	1.9	1.9	3.8	1.8	1.8	3.7	1.8	1.8	3.6	1.7	1.8	3.5	1.7	1.8	3.5
7 Sain-Shand - Zamyn-Uud	-	-	2.5	1.1	1.1	2.2	1.1	1.1	2.2	1.1	1.1	2.2	1.1	1.1	2.2	1.1	1.1	2.2	1.1	1.2	2.3
8 Ulaan-baatar-Bagshangai	-	-	5.4	2.5	2.9	5.4	2.6	2.7	5.3	2.6	3.0	5.6	2.6	2.9	5.5	2.5	3.0	5.5	2.4	2.9	5.3
9 Zamyn-Uud - (Erenhot)	2.3	0.8	3.1	2.9	0.8	3.7	2.9	0.8	3.2	2.0	0.7	2.7	1.9	0.8	2.7	1.4	0.8	2.2	0.6	0.2	0.8
10 Darkhan-I - Sharyn-Gol	-	-	4.0	2.0	2.0	4.0	2.0	2.0	4.0	2.0	2.0	4.0	2.0	2.0	4.0	2.0	2.0	4.0	1.8	1.9	3.7
11 Salkhit - Erdenet	-	-	5.0	2.5	2.5	5.0	2.5	2.5	5.0	2.5	2.5	5.0	2.5	2.5	5.0	2.5	2.5	5.0	2.3	2.9	5.2
12 Bagshangai-Baga-Nuur	-	-	5.4	2.5	2.9	5.4	2.6	2.7	5.3	2.6	2.9	5.6	2.6	2.9	5.5	2.5	3.0	5.5	2.4	2.9	5.3
13 Honkhor - Nalaikh	-	-	4.0	2.0	2.0	4.0	2.0	2.0	4.0	2.0	2.0	4.0	2.0	2.0	4.0	2.0	2.0	4.0	1.6	1.7	3.3
14 Airag - Borondor	-	-	-	-	-	-	-	-	-	1.0	1.0	2.0	1.0	1.0	2.0	1.0	1.0	2.0	1.1	1.1	2.2
15 Sainshand - Zuun-Bayan	-	-	-	1.0	1.0	2.0	1.0	1.0	2.0	1.0	1.0	2.0	1.0	1.0	2.0	1.0	1.0	2.0	1.1	1.1	2.2

Note 1: Based on Mongolian Railway's materials.

Table 2-2-10 Monthly Freight Transport Volume

Year	month												
	1990	1	2	3	4	5	6	7	8	9	10	11	12
Tonnage	Total	14,515.7	1,243.1	1,109.6	1,383.8	1,423.3	1,418.4	1,357.1	1,156.0	1,011.5	963.0	1,237.1	1,059.1
	(%)	((1,209.6))	(102.8)	(91.7)	(114.4)	(117.7)	(117.3)	(112.2)	(95.6)	(83.6)	(79.6)	(102.3)	(95.4)
	Arrived	2,209.9	185.7	178.6	224.6	216.3	211.5	197.6	192.7	155.9	166.5	186.1	154.8
	(%)	((184.2))	(100.8)	(97.0)	(121.9)	(117.4)	(114.8)	(107.3)	(104.6)	(84.6)	(90.4)	(101.0)	(84.0)
	Shipped	2,751.8	176.3	194.4	250.0	253.7	312.1	340.1	218.0	193.4	192.6	242.3	234.5
	(%)	((229.3))	(76.9)	(84.8)	(109.0)	(110.6)	(136.1)	(148.3)	(95.1)	(84.3)	(84.0)	(105.7)	(102.3)
	Domestic	8,575.6	786.6	640.1	834.8	861.7	805.8	721.6	660.2	595.1	512.5	728.6	701.4
	(%)	((714.6))	(110.1)	(89.6)	(116.8)	(120.6)	(112.8)	(101.0)	(92.4)	(83.3)	(71.7)	(102.0)	(98.2)
	Passing	978.4	94.5	96.5	74.4	91.6	89.0	97.8	85.1	67.1	86.4	80.1	63.0
	(%)	((81.5))	(116.0)	(118.4)	(91.3)	(112.4)	(109.2)	(120.0)	(104.4)	(82.3)	(106.0)	(98.3)	(77.3)
	Shipped total (%)	11,350.4	968.8	852.6	1,083.9	1,096.3	1,129.1	1,061.3	858.7	804.8	747.0	962.5	921.7
	(%)	((945.9))	(102.4)	(90.1)	(114.6)	(115.9)	(119.4)	(112.2)	(90.8)	(85.1)	(79.0)	(101.8)	(97.4)
Year	1991	1	2	3	4	5	6	7	8	9	10	11	12
Tonnage	Total	10,269.8	994.0	932.2	1,025.4	982.1	948.1	811.1	634.4	662.8	741.6	889.4	830.9
	(%)	((855.8))	(116.1)	(108.9)	(119.8)	(114.8)	(110.8)	(94.8)	(74.1)	(77.4)	(86.7)	(103.9)	(97.1)
	Arrived	1,281.2	105.2	106.6	152.2	138.7	101.7	119.7	123.6	90.6	89.7	84.8	73.8
	(%)	((106.8))	(98.5)	(99.8)	(142.5)	(129.9)	(95.2)	(112.1)	(115.7)	(84.8)	(84.0)	(79.4)	(69.1)
	Shipped	1,706.8	107.0	99.9	115.3	140.8	166.3	159.9	150.2	149.2	153.0	167.9	172.0
	(%)	((142.2))	(75.2)	(70.3)	(81.1)	(99.0)	(117.0)	(112.4)	(105.6)	(104.9)	(107.6)	(118.1)	(121.0)
	Domestic	7,113.2	758.0	718.9	755.0	695.0	674.2	522.5	349.4	418.0	439.9	621.9	561.7
	(%)	((592.8))	(127.9)	(121.3)	(127.4)	(117.2)	(113.7)	(88.1)	(58.9)	(70.5)	(83.3)	(104.9)	(94.8)
	Passing	168.6	23.8	6.8	2.9	7.6	5.9	9.0	11.2	5.0	5.0	14.8	23.4
	(%)	((14.1))	(168.8)	(68.2)	(20.6)	(53.9)	(41.8)	(63.8)	(79.4)	(35.5)	(35.5)	(105.0)	(166.0)
	Shipped total (%)	8,820.0	865.0	818.8	870.3	835.8	840.5	682.4	499.6	567.2	646.9	789.8	733.7
	(%)	((735))	(117.7)	(111.4)	(118.4)	(113.7)	(114.4)	(92.8)	(680.0)	(77.2)	(88.0)	(107.5)	(99.8)

Note 1: Based on Mongolian Railway's materials.
 Note 2: The transport tonnage and shipment tonnage are given in thousand tons and the transport ton-km is given in million ton-km.
 Note 3: The figures in double parentheses indicate the monthly average traffic.
 Note 4: The figures given in % indicate the ratio when the monthly average (figures in parentheses) is put as 100.
 Note 5: The shipped total denotes the total of the shipped and domestic, out of the total tonnage carried.

4) Container transport

Table 2-2-11 gives the number of containers transported from January 1991 through July 1992. 20-foot containers are used for freight transport between Russia and China. 3-ton and 5-ton containers are used between Mongolia and Russia and within the territory of Mongolia. Average numbers of containers transported per day are six 20-foot containers, 17~3-ton containers and 17~5-ton containers. In general, the volume of container transport is not so large in Mongolia due to a shortage of container cars and flat cars.

Table 2-2-11 Container Traffics

(Unit: number of containers carried)

Month	1991		1992	
	20Ft	3 or 5 ton	20Ft	3 or 5 ton
1	311	1,244	61	443
2	122	487	173	289
3	187	751	203	159
4	137	549	142	207
5	142	571	243	369
6	241	967	247	458
7	119	477	97	350
8	159	371	-	-
8	104	192	-	-
10	143	175	-	-
11	210	173	-	-
12	263	208	-	-
Total	2,138	6,165	1,166	2,275
	8,303		3,441	

Note 1: Based on Mongolian Railway's materials.

Note 2: Figures are the total of containers carried for export, import, domestic traffic (3-ton and 5-ton containers alone), and passing traffic.

(2) Passenger Transport

1) Volume of transport

Passenger volume by type of transportation are shown in Table 2-2-12. Although passenger volume had increased steadily every year, it began decreasing in 1989. With 98% of passengers being carried by automobiles, this form of transport accounts for nearly all of Mongolia's passenger volume. Railroads bear only a little more than 1 percent of the total passenger volume. But rail transport accounts for nearly 30% of the total passenger-kilometers. Hence it can be said that railroads play a significant role in Mongolia's long-distance transport.

Table 2-2-12 Passenger Volume by Type of Transportation

Type	Unit	1985	1986	1987	1988	1989	1990	1991
Total	mln.per.	171.2	188.0	210.7	234.5	241.3	232.2	234.0
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	min.p.km	1418.5	1536.5	1692.8	1986.8	2102.9	2056.0	1920.7
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Railroad	min.per.	2.1	2.4	2.5	2.6	2.7	2.6	2.5
	%	1.2	1.3	1.2	1.1	1.1	1.1	1.1
	min.p.km	435.8	467.1	486.5	531.0	578.6	570.1	596.3
	%	30.7	30.4	28.7	26.7	27.5	27.7	31.0
Auto-mobile	min.ton	168.5	185.0	207.5	231.1	237.8	228.8	231.1
	%	98.4	98.4	98.5	98.6	98.5	98.5	98.8
	min.t.km	688.2	747.1	838.6	923.4	957.0	914.6	788.9
	%	48.5	48.6	49.5	46.5	45.5	44.5	41.1
Airplane	min.ton	0.6	0.6	0.7	0.8	0.8	0.8	0.4
	%	0.4	0.3	0.3	0.3	0.3	0.3	0.2
	min.t.km	294.5	322.3	367.7	532.4	567.3	571.3	535.5
	%	20.8	21.0	21.7	26.8	27.0	27.8	27.9

Source: Mongolia Railway Statistics

2) Train operation

In addition to domestic trains, international trains are running between Russia and China through Mongolia. Since the track gauges are different between Mongolia and China, passenger trains exchange bogies at the Chinese border station of Erenhot. For the immigration and emigration procedures for passengers, the trains are required to stay at Erenhot and Zamyn-Uud for long hours.

a) Planned train operation diagram

Figure 2-2-10 gives the planned passenger train operation diagram in the summer of 1992.

b) Sections, numbers of train and passenger cars, and average number of seats.

Tables 2-2-13 and Fig. 2-2-11 give the sections, numbers of trains and passenger cars and the average number of seats offered to passengers.

The largest number of trains, seven trains in each direction, are operated between Darkhan and Darkhan-II and China. Only one train is operated in each direction between Mongolia and China. Up to 18 passenger cars, or 900 seats, compose a passenger train.

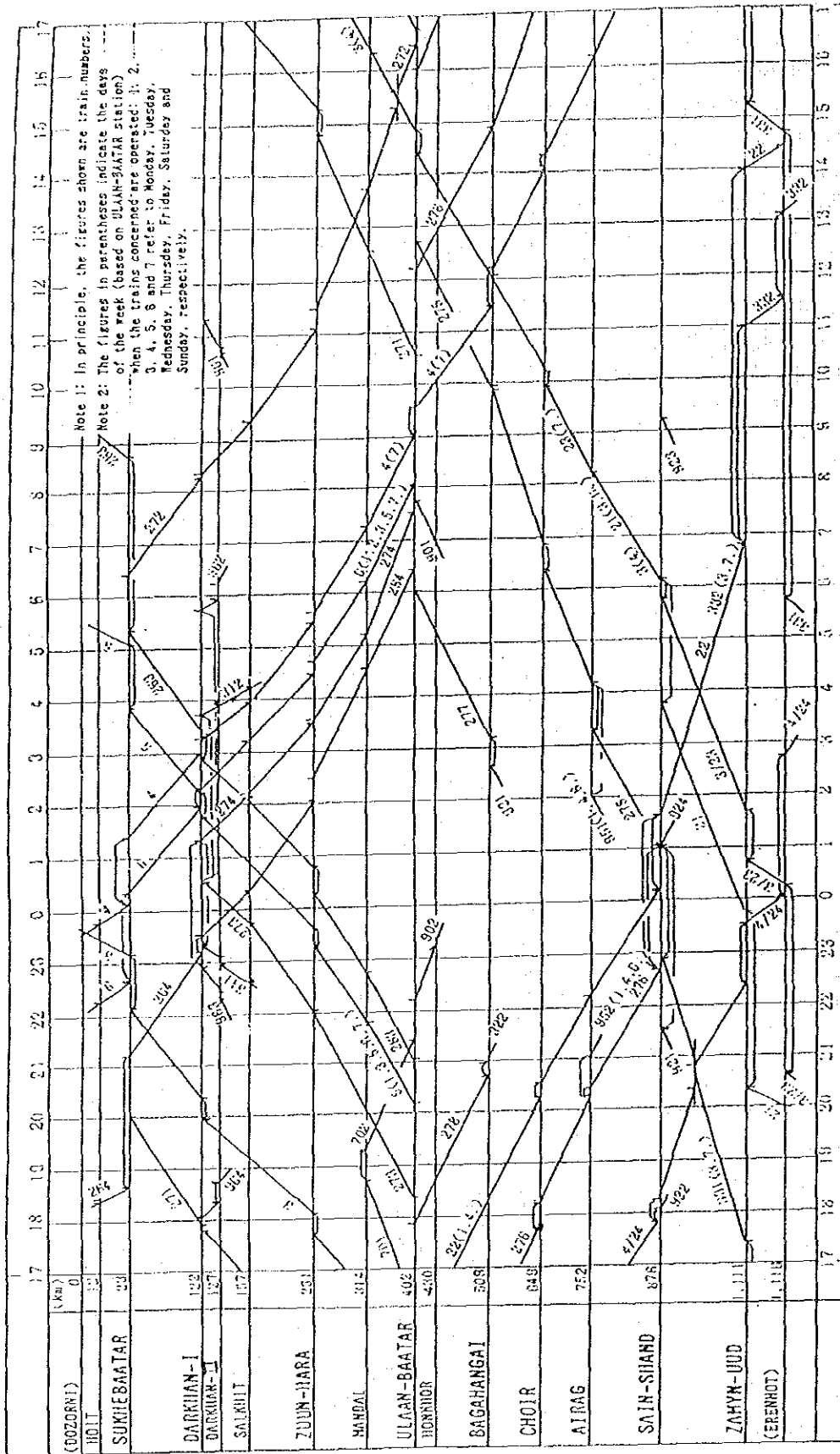


Fig. 2-2-10 Planned Diagram of Passenger Trains (May 3 ~ November 1, 1932)

Table 2-2-13 Schedule of Passenger Train Operation (May 1992 ~ November 1992)

No	Name of train	Section	Frequency of operation/week		Average number of cars per train	Average number of seats per train
1	3	PEKING→ULAANBAATAR →MOSKUA	1	4	15	530
2	4	” ← ” ← ”	1	7	15	530
3	5	ULAANBAATAR →MOSKUA	5	1.3.5.6.7	16	560
4	6	” ← ”	5	1.2.3.5.7	16	560
5	21	ERENHOT →ULAANBAATA	2	3.6.	8	280
6	22	” ← ”	2	1.4.	8	280
7	23	PEKING→ULAANBAATA	1	7.	9	310
8	24	” ← ”	1	4.	9	310
9	263	ULAANBAATAR →ERKHUU	7		11	550
10	264	” ← ”	7		11	550
11	271	ULAANBAATAR →SUKHEBAATAR	7		6	300
12	272	” ← ”	7		6	300
13	273 (+312)	ULAANBAATAR→DARKHAN-I(→ERDENET)	7		12(+10)	600
14	274 (+311)	” + ”	7		12(+10)	600
15	(331) 275	(KHOKHKHOT)SA INSHAND→ULAANBAATAR	(2)7	(3.7)	18	900
16	(332) 276	” + ”	(2)7	(3.7)	18	900
17	277	(BAGANUUR)BAGAHANGAI→ULAANBAATAR	(7)7		6	300
18	278	” + ”	(7)7		6	300
19	311 (+274)	ERDENET→DARKHAN-I(→ULAANBAATAR)	7		10	500
20	312 (+373)	” + ”	7		10	500
21	321 (+277)	BAGANUUR→BAGAHANGAI(ULAANBAATAR)	7		6	300
22	322 (+278)	” + ”	7		6	300
23	331 (275)	(KHOKHKHOT)ZAMYN-UUD→SAIN SAND	2	3.7	6	300
24	332 (276)	” + ”	2	3.7	6	300
25	901	NALAIKH → ULAANBAATAR	7		4	300
26	902	” ← ”	7		4	300
27	921 (+275)	ZUUN-BAYAN→SAINSHAND(ULAANBAATAR)	7		2	160
28	922	” +SAINSHAND	7		2	160
29	923	” + ”	1	7	2	160
30	924 (+276)	” +SAINSHAND(ULAANBAATAR)	1	7.	2	160
31	951 (+275)	BORONDOR→AIRAG	3	1,4,6	3	210
32	952 (+276)	” ← ”	3	1.4.6	3	210
33	961	SHARINGOL→DARKHAN-I	7		2	160
34	962 (+273)	” + ” (ULAANBAATAR)	7		2	160
35	963 (+274)	” + ”	7		2	160
36	964	” +DARKHAN-I	7		2	160
37	701	ULAANBAATAR →MANDAL	7		4	320
38	702	” ← ”	7		4	320

Note 1:Based on Mongolian Railway's materials (as of May 1992).

Note 2:The figures in the parentheses in the column of "Train No." indicate the trains coupled with the trains concerned.

Note 3:The right-hand figures in the column of "Frequency of operation per week" indicate the days of the week based on the ULAAN-BAATAR station when the trains are operated. 1,2,3,4,5,6, and 7 indicate Monday, Tuesday, Wednesday, Thursday, Friday, Saturday and Sunday, respectively.

Train No.	Stations														
	(DOZORNI)	SUKHEBATAR	DARKHAN-I	DARKHAN-II	SALKHIT	ZUUR-IIARA	HARBAL	ULAN-GAATAR	HONKHOR	BAGAIANGAL	CHOLR	AIRAG	SAIN-SHAND	ZAHYR-UUD	(ERENHOT)
702								7							
964			7												
982			7												
902															
332															
312			7												
278															
276															
274															
272			7												
264			7												
24															
22															
6															
4															
	Weekly	13	20	48	34	27	27	34	25	18	11	11	11	5	6
	Daily	1.0	2.0	6.0	4.0	3.0	3.0	4.0	3.5	2.5	1.0	1.0	1.0	0.0	0.0

Fig. 2-2-11 Number of Passenger Trains (May 1992; one way)

3) Fluctuation of transport volume

Comparatively larger fluctuations in passenger traffic were shown from June through November in 1990. The maximum fluctuation rate was about 120%.

Table 2-2-14 Monthly Passenger Transport Volume (1991)

Year Month		1991	1	2	3	4	5	6	7	8	9	10	11	12
Number of passengers	Total	2,536.5	195.4	178.4	192.3	194.5	186.9	221.3	229.3	256.4	226.8	216.6	231.4	207.3
	(%)	((211.4))	(92.4)	(84.4)	(91.0)	(92.0)	(88.4)	(104.7)	(108.5)	(121.3)	(107.3)	(102.5)	(109.5)	(98.1)
	Entering Mongolia	116.9	7.9	1.3	5.8	27.8	1.1	5.5	9.0	7.4	13.0	15.2	20.5	2.4
	(%)	((9.7))	(81.4)	(13.4)	(59.8)	(286.6)	(11.3)	(56.7)	(92.8)	(76.3)	(134.0)	(156.7)	(211.3)	(24.7)
	Leaving Mongolia	237.0	9.8	12.6	16.0	16.1	21.6	30.3	17.4	27.2	22.2	23.5	18.6	21.7
(%)	((19.8))	(49.5)	(63.6)	(80.8)	(81.3)	(109.1)	(153.0)	(87.9)	(137.9)	(112.1)	(118.7)	(93.9)	(109.6)	
Domestic traffic		2,141.5	175.3	163.2	168.1	147.6	162.7	183.5	200.3	215.9	185.9	169.8	189.1	180.1
	(%)	((178.5))	(98.2)	(91.4)	(94.2)	(82.7)	(91.1)	(102.8)	(112.2)	(121.0)	(104.1)	(95.1)	(105.9)	(100.9)
Passing Mongolia		41.1	2.4	1.3	2.4	3.0	1.4	2.0	2.6	6.0	5.6	8.1	3.2	3.1
	(%)	((3.4))	(70.6)	(38.2)	(70.6)	(88.2)	(41.2)	(58.8)	(76.5)	(176.5)	(164.7)	(238.2)	(94.1)	(91.2)
Passenger-km		596.3	42.3	44.0	42.5	47.2	39.8	50.6	48.1	65.4	55.0	57.3	53.8	50.3
	(%)	((49.7))	(85.1)	(88.5)	(85.5)	(95.0)	(80.0)	(101.8)	(96.8)	(131.6)	(110.7)	(115.3)	(108.2)	(101.2)

- Notes:
1. Based on Mongolian Railway's materials.
 2. The number of passenger is given in thousand passengers and the passenger-km is given in million passenger-km.
 3. The figures in double parentheses indicate the monthly average traffic.
 4. The figures given in % indicate the ratios when the monthly average (figures in parentheses) is put as 100.

Appendix 2-2-1 Freight Transport Volume by Commodities

(thous. ton)

Item	1985	1986	1987	1988	1989	1990	1991
Export	2116.2	2144.2	2339.7	2829.0	2873.3	2753.4	1706.8
	100.0	101.3	110.6	133.7	135.8	130.1	80.7
Import	4356.0	4080.5	3711.3	3709.0	2959.7	2209.7	1281.2
	100.0	93.7	85.2	85.1	67.9	50.7	29.4
Transit	1473.9	1802.6	1549.2	1353.8	1268.1	978.4	168.6
	100.0	122.3	105.1	91.9	86.0	66.4	11.4
Domestic	7083.6	7902.1	9152.6	9958.4	9691.1	8575.6	7113.2
	100.0	111.6	129.2	140.6	136.8	121.1	100.4
Total	15029.7	15929.4	16752.8	17850.2	16792.2	14517.1	10269.8
	100.0	106.0	111.5	118.8	111.7	96.6	68.3

Source: Mongolia Railway Statistics

Note: Upper column: Volume

Lower column; Index standardized 1985

Appendix 2-2-2 Railway Freight Transportation Volume by Export Items

(thous. ton)

Commodity	1985	1986	1987	1988	1989	1990	1991
Coal	226.6	301.6	602.5	1055.5	779.8	515.9	119.0
	100.0	133.1	265.9	465.8	344.1	227.7	52.5
Oil	5.9	5.0	2.6	5.4	55.0	65.0	2.4
	100.0	84.7	44.1	91.5	932.2	1101.7	40.7
Steel	59.9	91.8	83.9	80.4	92.7	80.6	25.5
	100.0	153.3	140.1	134.2	154.8	134.6	42.6
Machine facility	18.2	12.6	13.4	16.1	11.0	69.5	19.1
	100.0	69.2	73.6	88.5	60.4	381.9	104.9
Construction materials	74.8	120.3	151.4	125.9	118.4	106.7	131.3
	100.0	160.8	202.4	168.3	158.3	142.6	175.5
Wheat and cereal	46.6	178.4	75.3	169.0	69.3	52.0	30.0
	100.0	382.8	161.6	362.7	148.7	111.6	64.4
Raw foods	29.3	53.6	38.1	27.6	57.2	32.7	21.0
	100.0	182.9	130.0	94.2	195.2	111.6	71.7
Livestock	18.5	19.6	17.5	14.7	14.3	13.3	8.8
	100.0	105.9	94.6	79.5	77.3	71.9	47.6
Wool	17.8	15.8	14.1	15.7	18.2	10.2	2.6
	100.0	88.8	79.2	88.2	102.2	57.3	14.6
Fluorite	783.6	571.1	537.3	653.9	686.0	632.4	356.8
	100.0	72.9	68.6	83.4	87.5	80.7	45.5
Chemical materials	0.5	1.0	1.9	7.7	1.5	14.4	3.2
	100.0	200.0	380.0	1540.0	300.0	2880.0	640.0
Fertilizer	0.0	0.0	0.0	0.0	5.3	24.2	39.3
					100.0	456.6	741.5
Foods	13.8	5.3	10.1	12.7	12.4	6.5	1.6
	100.0	38.4	73.2	92.0	89.9	47.1	11.6
Fuel	12.1	8.4	3.8	2.2	6.5	9.1	2.5
	100.0	69.4	31.4	18.2	53.7	75.2	20.7
Wood	176.1	157.7	134.5	93.7	94.8	68.0	64.9
	100.0	89.6	76.4	53.2	53.8	38.6	36.9
*Copper concentration	408.0	397.1	398.7	406.7	517.7	557.1	450.7
	100.0	97.3	97.7	99.7	126.9	136.5	110.5
Non ferrous metal	1.3	1.8	2.6	2.8	3.8	4.5	5.5
	100.0	138.5	200.0	215.4	292.3	346.2	423.1
Others	223.2	203.1	252.0	139.0	329.4	491.3	422.6
	100.0	91.0	112.9	62.3	147.6	220.1	189.3
Total	2116.2	2144.2	2339.7	2829.0	2873.3	2753.4	1706.8
	100.0	101.3	110.6	133.7	135.8	130.1	80.7

Source: Mongolia Railway Statistics

Note: Upper column; Volume

Lower column; Index standardized 1985

Note: * this commodity changes 'iron ore' in export case

Appendix 2-2-3 Railway Freight Transportation Volume by Import Items

(thous. ton)

Commodity	1985	1986	1987	1988	1989	1990	1991
Coal	333.2 100.0	469.6 140.9	398.5 119.6	349.9 105.0	287.1 86.2	180.1 54.1	198.2 59.5
Oil	1160.7 100.0	1081.4 93.2	1149.2 99.0	1174.7 101.2	1034.1 89.1	817.2 70.4	634.2 54.6
Steel	230.0 100.0	219.5 95.4	215.2 93.6	249.7 108.6	260.0 113.0	227.5 98.9	49.9 21.7
Machine facility	137.2 100.0	123.7 90.2	132.3 96.4	140.4 102.3	123.4 89.9	106.6 77.7	23.1 16.8
Construction materials	1455.6 100.0	1130.0 77.6	844.0 58.0	798.0 54.8	573.5 39.4	306.8 21.1	94.7 6.5
Wheat and cereal	70.9 100.0	61.0 86.0	56.0 79.0	55.7 78.6	72.8 102.7	50.7 71.5	92.2 130.0
Raw foods	55.1 100.0	66.1 120.0	54.6 99.1	62.8 114.0	49.7 90.2	34.0 61.7	12.4 22.5
Livestock	0.4 100.0	0.2 50.0	0.5 125.0	1.2 300.0	0.4 100.0	0.0 0.0	0.0 0.0
Wool	1.0 100.0	0.6 60.0	4.2 420.0	1.6 160.0	2.5 250.0	1.0 100.0	0.2 20.0
Fluorite	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chemical materials	109.8 100.0	98.5 89.7	109.2 99.5	120.7 109.9	91.8 83.6	64.8 59.0	23.1 21.0
Fertilizer	0.0	0.0	0.0	1.5 100.0	9.6 640.0	53.7 3580.0	35.5 2366.7
Foods	116.6 100.0	114.1 97.9	114.5 98.2	121.3 104.0	117.0 100.3	108.2 92.8	45.1 38.7
Fuel	20.5 100.0	30.1 146.8	17.5 85.4	12.1 59.0	12.2 59.5	8.3 40.5	4.1 20.0
Wood	75.4 100.0	86.0 114.1	69.9 92.7	57.9 76.8	40.1 53.2	19.0 25.2	9.7 12.9
*Copper concentrate	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non ferrous metal	5.3 100.0	3.5 66.0	6.5 122.6	5.7 107.5	3.8 71.7	3.6 67.9	0.6 11.3
Others	584.3 100.0	596.2 102.0	539.2 92.3	555.8 95.1	341.7 58.5	228.2 39.1	58.2 10.0
Total	4356.0 100.0	4080.5 93.7	3711.3 85.2	3709.0 85.1	2959.7 67.9	2209.7 50.7	1281.2 29.4

Source: Mongolia Railway Statistics

Note: Upper column; Volume

Lower column; Index standardized 1985

Appendix 2-2-4 Railway Freight Transportation Volume by Transit Commodities

Commodity	1985	1986	1987	1988	1989	1990	1991
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oil	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Steel	556.6 100.0	707.8 127.2	770.0 138.3	615.7 110.6	549.2 98.7	433.1 77.8	10.9 2.0
Machine facility	67.9 100.0	41.1 60.5	23.4 34.5	23.6 34.8	26.5 39.0	32.3 47.6	21.6 31.8
Construction materials	116.6 100.0	163.4 140.1	2.5 2.1	1.6 1.4	1.4 1.2	1.1 0.9	0.0 0.0
Wheat and cereal	0.0	0.6	0.0	10.0	0.0 0	0.0 0	0.0
Raw foods	0.0	0.0	0.0	0.9	0.0	0.0	0.0
Livestock	0.0	0.0	0.2	0.0	0.0	0.0	0.0
Wool	0.0	0.0	2.1 100.0	1.8 85.7	2.0 95.2	1.8 85.7	0.0 0.0
Fluorite	183.8 100.0	183.8 100.0	120.0 65.3	74.4 40.5	110.8 60.3	132.5 72.1	0.0 0.0
Chemical materials	100.2 100.0	101.1 100.9	106.8 106.6	118.8 118.6	99.7 99.5	75.3 75.1	35.9 35.8
Fertilizer	0.0	0.0	0.0	0.0	67.2 100.0	38.2 56.8	79.6 114.0
Foods	71.8 100.0	71.8 100.0	81.1 113.0	89.0 124.0	92.4 128.7	102.2 142.3	2.4 3.3
Fuel	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wood	204.5 100.0	331.6 162.2	241.4 118.0	193.5 94.6	166.5 81.4	39.4 19.3	0.0 0.0
*Copper concentrate	0.1 100.0	0.3 300.0	8.2 8200.0	13.5 13500.0	9.9 9900.0	10.1 10100.0	0.0 0.0
Non ferrous metal	33.4 100.0	53.8 161.1	52.9 158.4	53.2 159.3	52.1 156.0	19.5 58.4	8.8 26.3
Others	139.0 100.0	147.3 106.0	140.6 101.2	157.8 113.5	90.4 65.0	92.9 66.8	12.4 8.9
Total	1473.9 100.0	1802.6 122.3	1549.2 105.1	1353.8 91.9	1268.1 86.0	978.4 66.4	168.6 11.4

Source: Mongolia Railway Statistics

Note: Upper column; Volume

Lower column; Index standardized 1985

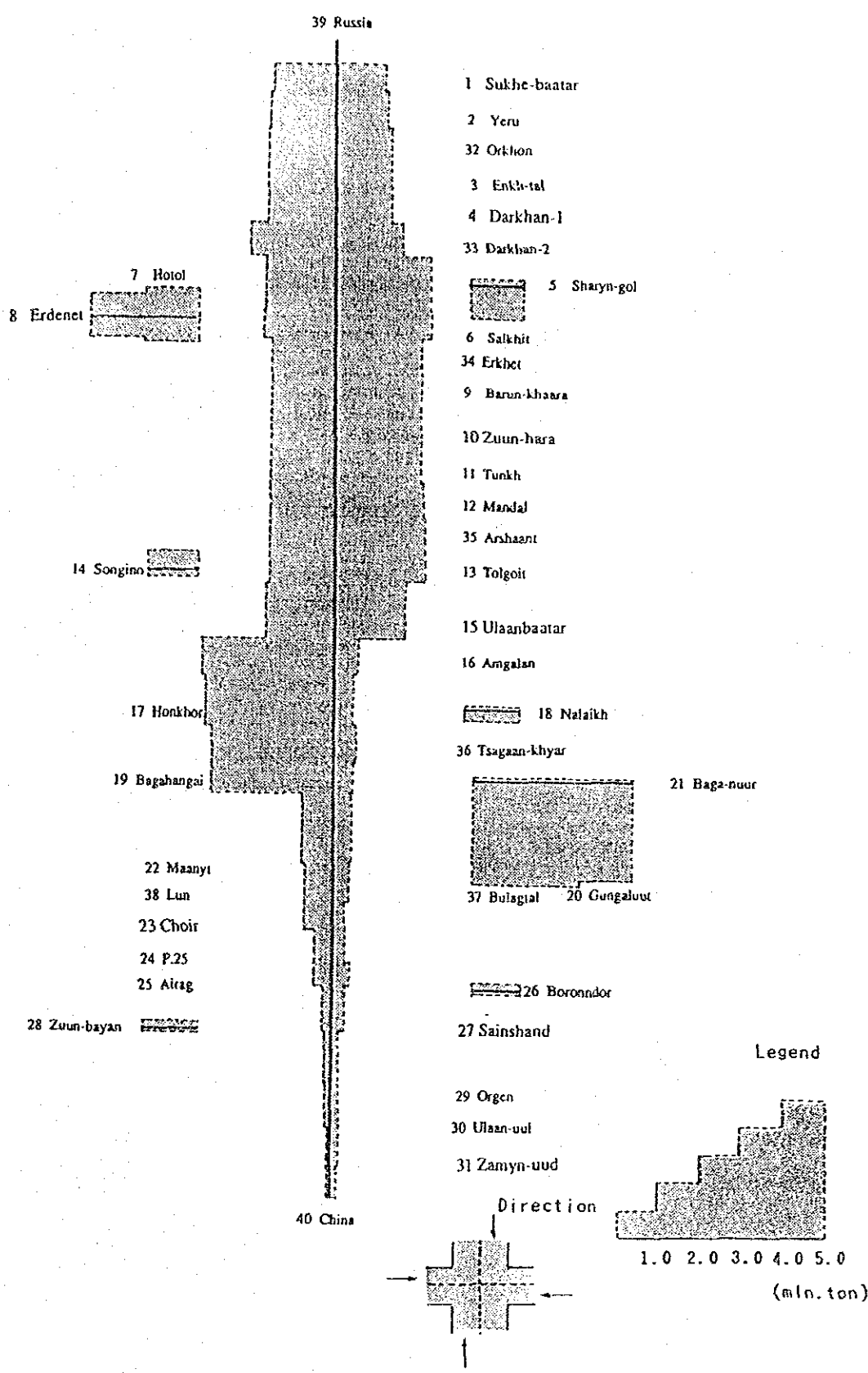
Appendix 2-2-5 Railway Freight Transportation Volume by Domestic Commodities

Commodity	1985	1986	1987	1988	1989	1990	1991
Coal	4046.9 100.0	4533.3 112.0	5023.0 124.1	5342.2 132.0	5073.7 125.4	4830.0 119.4	4910.1 121.3
Oil	79.3 100.0	40.4 50.9	29.3 36.9	21.5 27.1	43.8 55.2	32.3 40.7	26.3 33.2
Steel	34.9 100.0	70.8 202.9	73.8 211.5	85.3 244.4	55.9 160.2	25.3 72.5	23.1 66.2
Machine facility	43.7 100.0	48.5 111.0	45.7 104.6	34.6 79.2	14.6 33.4	11.3 25.9	9.6 22.0
Construction materials	1563.1 100.0	1831.1 117.1	2564.7 164.1	3148.5 201.4	3301.4 211.2	2693.9 172.3	1414.5 90.5
Wheat and cereal	81.6 100.0	82.7 101.3	67.1 82.2	89.4 109.6	91.5 112.1	66.0 80.9	45.5 55.8
Raw foods	27.9 100.0	12.2 43.7	21.6 77.4	15.5 55.6	11.3 40.5	10.3 36.9	6.9 24.7
Livestock	13.4 100.0	16.6 123.9	14.5 108.2	10.0 74.6	9.9 73.9	9.3 69.4	8.9 66.4
Wool	8.4 100.0	9.9 117.9	10.2 121.4	10.0 119.0	9.0 107.1	7.4 88.1	5.1 60.7
Fluorite	0.1 100.0	0.1 100.0	3.8 3800.0	78.6 78600.0	77.9 77900.0	105.5 105500.0	104.4 104400.0
Chemical materials	4.5 100.0	4.2 93.3	4.2 93.3	6.0 133.3	3.6 80.0	10.6 235.6	2.1 46.7
Fertilizer	0.0	0.0	0.0	0.0	0.0	0.0	0.9 100.0
Foods	31.3 100.0	44.9 143.5	29.1 93.0	47.9 153.0	49.9 159.4	39.7 126.8	24.9 79.6
Fuel	253.7 100.0	294.1 115.9	299.7 118.1	268.1 105.7	221.2 87.2	151.9 59.9	101.2 39.9
Wood	523.8 100.0	570.8 109.0	599.6 114.5	474.2 90.5	441.0 84.2	375.9 71.8	258.5 49.4
*Copper concentrate	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non ferrous metal	0.0	0.0	0.4 100.0	1.3 325.0	0.6 150.0	0.3 75.0	0.7 175.0
Others	371.0 100.0	342.5 92.3	365.9 98.6	325.3 87.7	285.8 77.0	205.9 55.5	170.5 46.0
Total	7083.6 100.0	7902.1 111.6	9152.6 129.2	9958.4 140.6	9691.1 136.8	8575.6 121.1	7113.2 100.4

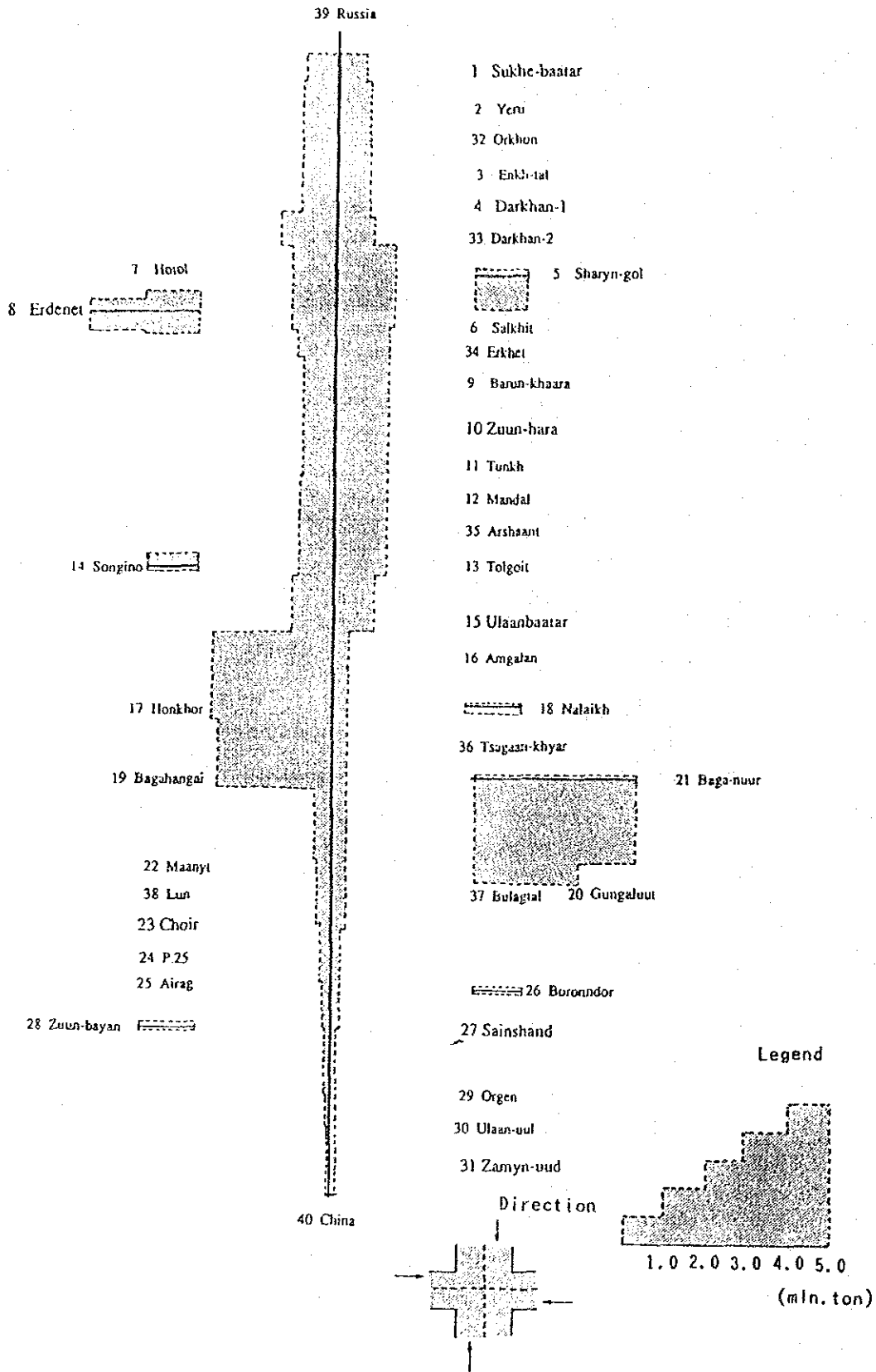
Source: Mongolia Railway Statistics

Note: Upper column; Volume

Lower column; Index standardized 1985



Appendix 2-2-6 Shipping Freight Volume between Each Station (1990)



Appendix 2-2-7 Shipping Freight Volume between Each Station (1991)

Appendix 2-2-6 Shipping Freight Volume between Each Station (1990) (thous. ton)

LINK	station (A)	station (B)	A → B	B → A	TOTAL
1	RUSSIA	1 SIKHIE-BAATAR [68]	1885.30	2132.20	4017.50
2	SUKHIE-BAATAR [68]	2 YERU [32]	1981.31	2375.07	4356.38
3	YERU [32]	32 ORKHON	2009.04	2322.07	4331.11
4	ORKHON	4 ENKII-TAL [124]	2118.15	2304.47	4422.62
5	ENKII-TAL [124]	4 DARIKHAN-1 [23]	2118.15	2304.47	4422.62
6	DARIKHAN-1 [23]	33 DARIKHAN-2 [116]	2458.65	3079.49	5538.14
7	DARIKHAN-2 [116]	5 SHARYN-COL [69]	8.70	1552.97	1561.67
8	SHARYN-COL [69]	6 SALKHIT [93]	3444.62	2523.19	5967.81
9	SALKHIT [93]	7 UUTOL [69]	988.52	1018.74	2007.26
10	UUTOL [69]	8 ERDENEF [125]	802.62	736.70	1539.32
11	ERDENEF [125]	34 ERNIET	3146.80	2238.01	5384.87
12	ERNIET	9 BAIUN-KHAARA [13]	3144.40	2185.81	5330.27
13	BAIUN-KHAARA [13]	10 ZUUN-UARA [36]	3115.16	2197.01	5312.17
14	ZUUN-UARA [36]	11 TUNKH [75]	3141.76	2214.83	5356.59
15	TUNKH [75]	12 MANDAL [45]	3209.80	2225.63	5435.39
16	MANDAL [45]	35 ARSHAANT [76]	3201.06	2249.33	5450.39
17	ARSHAANT [76]	13 TOLGOIT [70]	3180.01	2240.63	5427.14
18	TOLGOIT [70]	14 SONCINO [84]	70	1041.30	1042.00
19	SONCINO [84]	15 ULAANBATAR [3]	2618.93	2426.16	5045.09
20	ULAANBATAR [3]	16 ARGALAN [95]	850.81	4802.11	5652.62
21	ARGALAN [95]	17 HONKHOR [63]	688.64	4794.52	5483.16
22	HONKHOR [63]	36 TSAGAAN-KHYAR [14]	17.37	201.40	218.77
23	TSAGAAN-KHYAR [14]	19 BAGAHANGAI [22]	660.94	4567.69	5228.53
24	BAGAHANGAI [22]	37 BULAGTAL [18]	644.14	4524.09	5168.23
25	BULAGTAL [18]	20 GUNGALUUT [46]	170.30	3711.64	3881.94
26	GUNGALUUT [46]	21 BAGA-UUD [108]	170.30	3711.64	3881.94
27	BAGA-UUD [108]	22 HAANYT [134]	134.70	3483.94	3618.64
28	HAANYT [134]	38 LUN [17]	606.68	986.09	1593.37
29	LUN [17]	23 CHDIR [65]	559.48	860.96	1420.44
30	CHDIR [65]	24 P. 25 [38]	551.48	841.96	1393.44
31	P. 25 [38]	25 AIRAG [61]	462.00	675.86	1137.86
32	AIRAG [61]	26 BORONNOR [85]	568.10	630.56	1198.66
33	BORONNOR [85]	27 SAINSHAND [37]	197.60	267.51	465.01
34	SAINSHAND [37]	28 ZUUN-BAYAN [37]	441.51	377.87	819.38
35	ZUUN-BAYAN [37]	29 ORGEN [5.60]	30.20	5.60	35.76
36	ORGEN [5.60]	30 ULAAN-UUL [255.60]	257.41	255.60	512.91
37	ULAAAN-UUL [255.60]	31 ZAMYN-UUD [190.10]	235.01	190.10	425.11
38	ZAMYN-UUD [190.10]	40 CHITRA [154.01]	154.01	35.30	189.91
39	CHITRA [154.01]		94.12	19.80	113.92

Appendix 2-2-7 Shipping Freight Volume between Each Station (1991) (thous.-ton)

LINK	station (A)	station (B)	A → B	B → A	TOTAL
1	39 RUSSIA	1 SUKHIE-BAATAR(68)	1085.60	1194.00	2282.60
2	1 SUKHIE-BAATAR(68)	2 YERU [32]	1152.71	1354.19	2506.90
3	2 YERU [32]	32 ORKHON	1176.61	1305.89	2482.50
4	32 ORKHON	3 ENKH-TAL [124]	1176.61	1304.49	2481.10
5	3 ENKH-TAL [124]	4 DARKHAN-1 [23]	1242.51	1301.79	2544.30
6	4 DARKHAN-1 [23]	33 DARKHAN-2	1393.40	2003.21	3396.61
7	33 DARKHAN-2	5 SHAHYN-GOL [116]	22.80	1307.94	1330.74
8	5 SHAHYN-GOL [116]	6 SALKHIIT [69]	2175.18	1499.11	3674.29
9	6 SALKHIIT [69]	7 HOTOL [93]	788.14	644.11	1432.25
10	7 HOTOL [93]	8 ERDENET [125]	726.84	503.45	1230.29
11	8 ERDENET [125]	34 ERKHET	1813.49	1300.51	3114.00
12	34 ERKHET	9 BARUN-KHAAKA [13]	1812.49	1250.51	3063.00
13	9 BARUN-KHAAKA [13]	10 ZUUN-HARA [36]	1805.89	1249.71	3055.60
14	10 ZUUN-HARA [36]	11 TUNKH [75]	1844.95	1296.12	3141.07
15	11 TUNKH [75]	12 MANDAL [45]	1877.33	1301.22	3178.55
16	12 MANDAL [45]	35 ARSHAANT [70]	1870.53	1319.92	3190.45
17	35 ARSHAANT [70]	13 TOLGOIT [76]	1868.83	1315.42	3184.25
18	13 TOLGOIT [76]	14 SONGINO [84]	35.60	541.50	577.10
19	14 SONGINO [84]	15 ULAANBATAR [3]	1457.56	1505.43	2962.99
20	15 ULAANBATAR [3]	16 ARGALAN [95]	586.12	4361.76	4947.88
21	16 ARGALAN [95]	17 HONKHOR [53]	526.51	4338.21	4858.72
22	17 HONKHOR [53]	18 NALAIKH [14]	14.50	139.10	153.60
23	18 NALAIKH [14]	36 TSAGAAN-KHIYAR	502.86	4201.21	4704.07
24	36 TSAGAAN-KHIYAR	19 BAGAHANGAI [14]	487.66	4137.81	4625.47
25	19 BAGAHANGAI [14]	37 BULAGTAL [22]	123.96	3606.59	3730.55
26	37 BULAGTAL [22]	20 GUNGALHUU [18]	123.96	3606.03	3729.99
27	20 GUNGALHUU [18]	21 BAGA-NUIR [46]	91.26	2882.85	2974.11
28	21 BAGA-NUIR [46]	22 MAANYT [108]	489.65	676.07	1165.72
29	22 MAANYT [108]	38 LUN [134]	444.40	555.90	1000.30
30	38 LUN [108]	23 CHUIR [17]	444.40	555.90	1000.30
31	23 CHUIR [17]	24 P.25 [66]	354.06	459.80	813.86
32	24 P.25 [66]	25 AIRAG [38]	374.06	402.30	776.36
33	25 AIRAG [38]	26 BOKONNOR [61]	190.70	164.33	355.03
34	26 BOKONNOR [61]	27 SAINSHAND [85]	279.49	261.90	541.39
35	27 SAINSHAND [85]	28 ZUUN-BAYAN [37]	25.86	5.70	31.56
36	28 ZUUN-BAYAN [37]	29 ORCEN [61]	194.68	230.16	424.84
37	29 ORCEN [61]	30 ULAAN-UUL [85]	196.18	156.76	346.94
38	30 ULAAN-UUL [85]	31 ZAHYN-UUD [37]	177.98	88.36	266.34
39	31 ZAHYN-UUD [37]	40 CHINA	142.20	81.21	223.41

Appendix 2-2-8 OD Table of Freight Volume (1990) (thous. ton)

Station	(1) SUKHE-BA YERU [32]	(2) ENKH-TAL DARKHAN- SHARYN-C SALKHIT [69]	(3) [124] I	(4) [23] OL	(5) [116]	(6) [69]	(7) [93]	(8) [125]- AARA [13]	(9) [13] A	(10) ZUUN- HAR [36]	(11) TUNKH [75]	(12) MANDAL [45]
(1) SUKHE-BAATAR [68]	0	0	0	7.3	1	1.1	.6	3.0	3.1	16.6	.2	0
(2) YERU [32]	78.1	0	0	0	0	0	0	0	0	0	3	1
(3) ENKH-TAL [124]	3.5	11.9	0	18.3	1.1	12.1	2.6	8.2	3.7	5.5	11.0	9.5
(4) DARKHAN-I [23]	29.4	2.5	0	0	.9	3.4	14.5	55.7	21.6	28.9	1	6
(5) SHARYN-COL [116]	6.7	3.4	0	646.0	0	0.6	1	257.0	1	21.8	0	2
(6) SALKHIT [69]	.8	.5	0	.5	.2	.0	.0	.0	.0	1.0	1	4
(7) HOTUL [93]	3	0	0	105.0	1	0	0	77.9	0	3	0	0
(8) ERDENET [125]	6	1.2	0	25.3	1	.7	1.1	0	0	14.7	0	0
(9) BARUN-KHAARA [13]	0	0	0	0	0	0	0	0	0	1.2	0	1.3
(10) ZUUN-HARA [36]	4.9	.7	0	4.9	1.9	7.9	.8	1.6	6.3	.0	1	7
(11) TUNKH [75]	0	0	0	1	0	0	.2	0	.2	0	0	2
(12) MANDAL [45]	0	0	0	0	0	0	0	0	0	0	0	0
(13) TOLGOIT [76]	20.3	7	0	22.0	2	0	6.8	18.0	1.6	6.0	1.8	2.3
(14) SONGIRO [70]	0	0	0	0	0	0	0	0	0	0	0	1.1
(15) ULANBATAR [84]	4.3	2	0	11.7	3	2.2	0	5.7	2	8.8	.6	3
(16) ANGALAN [3]	1.9	0	0	3.0	2	.4	0	1.1	.2	1.3	0	0
(17) HONKHOR [95]	0	0	0	2	0	1	0	.5	0	0	0	0
(18) NALAIKH [53]	0	0	0	0	0	1	0	0	0	0	0	2
(19) BAGAHANGAI [14]	0	0	0	0	0	0	0	0	1	0	0	0
(20) CUNGALUUT [22]	5.4	.1	0	4.9	0	0	0	9.5	0	.2	0	7
(21) BAGA-NUUR [18]	93.8	6.1	0	53.3	0	5.7	75.8	153.0	3.0	37.1	1.1	19.1
(22) WAANYT [46]	0	0	0	47.9	0	0	0	16.5	.4	.3	0	0
(23) CHOIR [108]	0	0	0	.6	0	1	16.8	2	0	0	0	0
(24) P. 25 [134]	0	3.1	0	.2	0	3.2	0	4.0	.9	2.3	7.9	1.6
(25) KIRAG [1]	0	0	0	0	0	0	0	0	0	0	0	0
(26) BOKUNDOR [17]	0	0	0	0	0	0	0	1.2	0	0	0	0
(27) SAINSHAND [66]	1	0	0	18.8	0	5	41.3	0	0	3	0	0
(28) ZUUN-BAYAN [38]	3	0	0	0	0	0	0	2	0	0	0	0
(29) ORCEN [61]	0	0	0	0	0	0	0	0	0	0	0	0
(30) ULAN-UUL [85]	0	0	0	0	0	0	0	0	0	0	0	0
(31) ZHAYN-UUD [37]	0	0	0	0	0	14.2	0	0	0	0	0	0
(32) ORKHON [33]	0	0	0	0	0	0	0	0	0	0	0	0
(33) BARKHAN-2 [34]	0	0	0	0	0	0	0	0	0	0	0	0
(34) ENKHET [35]	0	0	0	0	0	0	0	0	0	0	0	0
(35) ARSHAANT [36]	0	0	0	0	0	0	0	0	0	0	0	0
(36) ISAGAAN-KHUYAR [37]	0	0	0	0	0	0	0	0	0	0	0	0
(38) LUN [39]	0	0	0	0	0	0	0	0	0	0	0	0
(39) RUSSTA [40]	20.8	0	0	222.2	3.6	16.3	104.3	188.8	6.9	2.3	0	0
(40) CHIRA	.07	.00	.00	.12	.00	.60	.00	.42	.00	.12	.00	.00
(41) TOTAL	271.27	30.40	.00	1093.12	8.70	69.20	264.90	802.62	48.10	148.72	23.20	38.30

	(13) TOLGOIT [76]	(14) SONGINO [70] AK	(15) ULAANBAT [84]	(16) AHGALAN [3]	(17) HONKHOR [95]	(18) NALAIKHU [53] AI	(19) BAGAHANG [14] T	(20) GUNGALUU [22] R	(21) BAGA-NUU [18]	(22) HAANYT [46]	(23) CHOIR [108]	(24) P.25 [134]
(1) SUKHE-BAATAR [68]	29.2	0	25.7	2.6	1.0	0	3	0	1	2	10.6	0
(2) YERU [32]	10.4	0	11.4	2.2	0	0	2.8	5	0	0	1.2	0
(3) ERKH-TAL [124]	7.6	0	3.7	3.7	0	0	10.1	0	0	2.0	1.1	0
(4) DARKHAN-1 [23]	49.4	0	337.0	9.6	3.8	1	2.0	5	10.0	1.6	16.3	4
(5) SHARYN-COL [116]	41.1	0	670.0	1.2	2	2	1	4	0	0	0	0
(6) SALKHJ [69]	1.6	0	1.4	2.1	2	0	3	5	3	0	1	0
(7) HOTOL [93]	1.1	0	166.0	9.1	4.0	1	0	0	1.5	0	0	0
(8) ERDENET [125]	32.9	0	38.2	2.0	0	0	13.1	23.2	21.4	1.2	1.3	0
(9) BAKUN-KHARA [13]	3	0	0	0	0	1	0	1	0	0	1.1	0
(10) ZUUD-HARA [36]	29.6	0	12.2	17.4	7	8	2.0	4	5	3.4	12.8	4
(11) TUNKH [75]	14.1	0	43.1	14.6	0	0	6	0	0	0	1	0
(12) MANDAL [45]	0	0	0	1	0	0	8	0	0	2	2	0
(13) TOLGOIT [76]	0	0	31.1	1.7	0	2	1.2	1	18.9	2.3	4.3	1
(14) SONGINO [70]	1032.0	0	0	0	1.1	0	1.0	0	0	1.1	0	0
(15) ULAANBATAR [84]	2.4	0	0	5.2	4	6	2.7	0	1.9	4.0	10.0	5
(16) AHGALAN [3]	2.3	0	4.0	0	0	0	0	6	0	7	1.7	1
(17) HONKHOR [95]	1	0	0	0	0	0	0	0	0	0	0	0
(18) HALAIKH [53]	59.1	7	103.0	6	0	0	2	0	0	0	1	0
(19) BAGAHANGAI [14]	0	0	4	1.3	0	0	0	1.5	7	0	1.2	0
(20) GUNGALUU [22]	10.7	0	170.0	8.3	5	0	5	0	0	2.1	4.1	5
(21) BAGA-NUUR [18]	229.0	0	2172.0	24.5	3	0	6.0	0	0	18.1	5.5	7.7
(22) HAANYT [46]	2.2	0	3	0	0	0	0	0	3	0	4	1
(23) CHOIR [108]	9.4	0	2.0	1.8	2	0	1.6	0	0	1	0	5
(24) P.25 [134]	3.6	0	1.1	1.2	7	0	8	5.5	1.9	0	6.0	0
(25) AIRAG [11]	1	0	2	0	0	0	1	0	0	0	0	2
(26) BOKONNOR [17]	2	0	1	0	0	0	0	0	1.1	0	0	0
(27) SATNSHAND [66]	1.2	0	2.0	8	0	0	3	3	0	0	5	1
(28) ZUUN-BAYAN [38]	4	0	7	2.8	4	0	0	0	0	0	7	0
(29) ORCEN [61]	0	0	0	6	0	0	0	0	0	0	0	0
(30) ULAAN-UUL [65]	0	0	0	8	0	0	0	0	0	0	0	0
(31) ZAMYN-UUD [37]	2	0	2	2	0	0	0	0	0	0	0	0
(32) OKKHON [40]	0	0	0	0	0	0	0	0	0	0	0	0
(33) DARKHAN-2 [33]	0	0	0	0	0	0	0	0	0	0	0	0
(34) ERKHET [34]	0	0	0	0	0	0	0	0	0	0	0	0
(35) ARSHAANT [35]	0	0	0	0	0	0	0	0	0	0	0	0
(36) TSACCAAN-KHUYAR [36]	0	0	0	0	0	0	0	0	0	0	0	0
(37) BULACTAL [37]	0	0	0	0	0	0	0	0	0	0	0	0
(38) LUN [38]	0	0	0	0	0	0	0	0	0	0	0	0
(39) RUSSIA [39]	462.0	0	404.3	104.9	3.4	14.0	2	0	74.7	30.6	26.4	0
(40) CHINA [40]	8.83	0	8.65	.71	.00	.07	.00	.00	.00	.07	.00	.00
(41) TOTAL	2040.23	70	4301.05	218.91	16.90	17.37	47.00	35.60	134.70	67.67	104.70	10.60

(25) AIRAC [1] R	(26) BORONDO [17] D	(27) SAINSHAN [66] AN	(28) ZHUUN-BAY [38] AN	(29) URGEN [61] L	(30) ULAAN-UU [65] D	(31) ZAMYN-UU [37]	(32) ORKHON	(33) DARKHAN- 2	(34) ERKHET	(35) ARSHAANT	(36) TSAGAAN- KIIYAR
(1) SUKHE-BAATAR [68]	.1	.0	3.5	.4	.0	1.0	.0	.0	.0	.0	.0
(2) YERU [32]	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0
(3) ENKH-TAL [124]	.0	2.2	.0	.0	1.0	1.5	.0	.0	.0	.0	.0
(4) DARKHAN-1 [23]	1.1	1.0	6.6	.8	1.3	.1	.0	.0	.0	.0	.0
(5) SHARYN-COL [116]	.0	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0
(6) SALKHIT [69]	.0	.0	1.4	.0	.0	2.6	.0	.0	.0	.0	.0
(7) HOTOL [93]	.0	.1	.0	.0	.1	.0	.0	.0	.0	.0	.0
(8) ERDENET [125]	.1	.7	.4	.9	.0	3.3	.0	.0	.0	.0	.0
(9) BARUN-KHAAKRA [13]	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
(10) ZUUN-HANA [36]	.6	3.4	5.0	.1	1.3	.8	.0	.0	.0	.0	.0
(11) TUNKH [75]	.1	.9	.2	.0	1.0	.0	.0	.0	.0	.0	.0
(12) RANDAL [45]	.0	.1	1.0	.0	.0	.0	.0	.0	.0	.0	.0
(13) TOLGOIT [76]	.9	5.0	14.0	1.9	1.0	.0	.0	.0	.0	.0	.0
(14) SONGINO [70]	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0
(15) ULAANBATAR [84]	.8	1.3	8.7	.1	.2	1.7	.0	.0	.0	.0	.0
(16) AKALAN [31]	.1	.0	.5	1.9	.1	.1	.0	.0	.0	.0	.0
(17) HONKHOR [95]	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0
(18) NALAIKH [53]	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
(19) BACAHANGAI [14]	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
(20) GURCAI-UUT [22]	3.3	11.5	7.6	8.0	.1	1.8	.0	.0	.0	.0	.0
(21) BAGA-NUUR [18]	1.1	47.3	10.0	2.0	.2	1.4	.0	.0	.0	.0	.0
(22) MAANYT [46]	.0	.0	.1	.5	.0	.0	.0	.0	.0	.0	.0
(23) CHUIR [108]	.7	.0	.5	.0	.0	.7	.0	.0	.0	.0	.0
(24) P. 25 [134]	.0	.0	.2	1.6	1.0	20.9	.0	.0	.0	.0	.0
(25) AIRAC [1]	.0	32.0	.2	.0	.0	.1	.0	.0	.0	.0	.0
(26) BOKUNDOOR [17]	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
(27) SAINSHAND [66]	.8	.0	.0	1.1	.3	4.9	.0	.0	.0	.0	.0
(28) ZUUN-BAYAN [38]	.0	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0
(29) ORGEN [61]	.1	72.8	.0	.0	.0	.0	.0	.0	.0	.0	.0
(30) ULAAN-UUL [85]	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0
(31) ZAMYN-UUD [37]	.0	.0	.6	.0	.0	.0	.0	.0	.0	.0	.0
(32) ORKHON	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
(33) DARKHAN-2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
(34) ERKHET	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
(35) ARSHAANT	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
(36) TSAGAAN-KIIYAR	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
(37) BULAGTAL	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
(38) LUH	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
(39) RUSSIA	.8	12.4	8.6	5.4	.0	.0	.0	.0	1.0	1.9	15.3
(40) CHINA	.00	.00	.20	.50	.00	.05	.00	.00	.00	.00	.00
(41) TOTAL	10.00	190.70	70.30	25.86	4.60	12.20	37.55	.00	1.00	1.90	15.30

	(37) BULACIAL LUN	(38) RUSSIA	(39) CHINA	(40) TOTAL
(1) SUKHE-BAATAR [68]	.0	.0	7.6	3.7
(2) YERU [32]	.0	.0	5.3	.3
(3) ENKII-TAL [124]	.0	.0	.0	.0
(4) DARKHAN-1 [23]	.0	37.7	.0	.0
(5) SHARYN-COL [116]	.0	3.2	.0	3
(6) SALKHIT [69]	.0	7.8	.0	.0
(7) HOTUL [93]	.0	6.0	.0	26.40
(8) ERDENET [125]	.0	525.5	6.5	361.04
(9) BARUN-KHAYARA [13]	.0	1.4	.0	736.70
(10) ZUUN-HARA [36]	.0	9.6	19.0	7.60
(11) TUNKII [75]	.0	.0	.0	80.60
(12) MANDAL [45]	.0	1.5	.0	5.70
(13) TOLGOIT [76]	.0	70.0	12.8	268.32
(14) SONCINO [70]	.0	.0	.0	1041.30
(15) ULAANBATAR [84]	.0	58.0	6.8	156.68
(16) ANCALAN [3]	.0	37.0	.5	64.63
(17) HONKHOR [95]	.0	29.2	.0	32.10
(18) HALAIKH [53]	.0	36.5	.0	201.40
(19) BAGAHANGAI [14]	.0	.0	.0	5.60
(20) GUNCALUUT [22]	.0	.0	.0	227.70
(21) BACA-NUUR [18]	.0	459.3	8.8	3483.94
(22) MAANYT [46]	.0	58.0	.0	146.20
(23) CHOIR [108]	.0	138.9	.4	181.32
(24) P. 25 [134]	.0	.0	.0	162.00
(25) AIRAG [1]	.0	51.2	.0	81.60
(26) BORONDOR [17]	.0	263.8	.3	267.51
(27) SAINSHAND [66]	.0	50.7	3.0	131.90
(28) ZUUN-BAYAN [38]	.0	.0	.0	5.50
(29) ORCEN [61]	.0	.0	.0	70.00
(30) ULAAN-UUL [85]	.0	154.1	.0	155.10
(31) ZHAYN-UUD [37]	.0	.0	.0	15.61
(32) ORKHON	.0	2.2	2.8	5.01
(33) DARKHAN-2	.0	.0	.0	.00
(34) ERKHET	.0	52.2	.0	62.20
(35) ARSHANT	.0	2.8	28.5	31.25
(36) TSAGAAN-KHAYAR	.0	43.5	.0	43.60
(37) BULACIAL	.0	.0	.0	.00
(38) LUN	.0	19.0	.0	19.00
(39) RUSSIA	.0	8.0	.0	1886.30
(40) CHINA	.00	.00	.00	19.80
(41) TOTAL	.00	8.00	2132.20	94.12
				12687.32

Appendix 2-2-9-0D Table of Freight Volume (1991) (thous.-ton)

station	(1) SUKHE-BA AYAR[68]	(2) YERU [32]	(3) ENKHU-TAL [124]	(4) DARKHAN- [23]	(5) SHARYN-G OL [116]	(6) SALKHIT [69]	(7) HOTOL [93]	(8) ERDENET [125]	(9) BARUN-KH AARA[13]	(10) ZUUN-HAR [36]	(11) TUNKH [75]	(12) MANDAL [45]
(1) SUKHE-BAATAR[68]	0	1	3	5	0	0	1	3	2	14	0	1
(2) YERU [32]	50.7	0	0	2	0	0	0	1	0	0	0	0
(3) ENKHU-TAL [124]	2.9	1	0	7	0	1	2	3	2	1	0	2
(4) DARKHAN-1 [23]	12.4	3	0	7	19	4	9	37	5	19	1	1
(5) SHARYN-GOL [116]	4.8	0	0	60	0	0	29	240	0	11	0	0
(6) SALKHIT [69]	1	0	0	1	1	0	0	0	0	4	0	1
(7) HOTOL [93]	2	0	0	8	0	0	0	49	0	4	0	0
(8) ERDENET [125]	1	0	0	12	2	0	1	0	1	1	3	0
(9) BARUN-KH AARA[13]	0	0	0	0	0	0	0	1	0	7	1	0
(10) ZUUN-HARA [36]	1.1	9	1	6	6	2	1	1	2	0	1	2
(11) TUNKH [75]	0	0	0	3	0	0	1	0	0	2	0	5
(12) MANDAL [45]	0	0	0	0	0	0	0	1	0	0	0	0
(13) TOLGOIT [76]	6.9	1	0	13	7	6	6	10	3	4	1	0
(14) SONGINO [70]	0	0	0	0	0	0	0	0	0	0	0	0
(15) ULAANBATAR [84]	2.6	0	0	11	0	1	0	2	0	6	0	3
(16) ARKALAN [3]	0	0	1	5	1	6	0	5	6	0	0	0
(17) HONKHOR [95]	0	0	0	1	0	0	0	1	0	0	0	1
(18) HALAIKH [53]	0	0	0	0	0	0	0	0	2	0	0	0
(19) BAGAHANGAI [14]	0	0	0	0	0	0	0	1	0	0	0	0
(20) GUNCALUUT [22]	40.9	0	0	35	8	5	0	11	4	26	5	10
(21) BAGA-NUUR [18]	42.1	1	1	36	0	1	5	8	6	26	3	7
(22) MAANYI [46]	1	0	0	3	3	0	0	1	0	0	0	0
(23) CHOIR [108]	0	0	0	2	8	5	7	2	4	1	1	0
(24) P. 25 [134]	1.5	3	1	2	1	6	1	3	0	1	2	1
(25) AIRAG [1]	0	0	0	1	0	1	0	1	0	0	0	1
(26) BOHONDDOR [17]	0	0	0	2	0	0	2	8	1	0	0	0
(27) SAINSHAND [66]	0	0	0	16	0	1	3	1	0	1	0	1
(28) ZUUN-BAYAN [38]	0	0	0	2	3	0	0	9	0	0	0	1
(29) ORGON [61]	0	0	0	0	0	0	3	0	0	0	0	1
(30) ULAAR-UUL [85]	0	0	0	0	0	0	0	0	0	1	0	1
(31) ZHAYN-UUD [37]	0	0	0	1	0	5	3	1	0	1	0	0
(32) ORKHON [32]	0	0	0	0	0	0	0	0	0	0	0	0
(33) DARKHAN-2 [33]	0	0	0	0	0	0	0	0	0	0	0	0
(34) ERKHET [34]	0	0	0	0	0	0	0	0	0	0	0	0
(35) ARSHAANT [35]	0	0	0	0	0	0	0	0	0	0	0	0
(36) TSAGAAN-KHIYAR [36]	0	0	0	0	0	0	0	0	0	0	0	0
(37) BULAGTAL [37]	0	0	0	0	0	0	0	0	0	0	0	0
(38) LUN [38]	0	0	0	0	0	0	0	0	0	0	0	0
(39) RUSSIA [39]	20.1	0	0	156	7	1	6	169	4	1	4	0
(40) CHINA [40]	1.29	0	0	1	12	2	16	34	0	5	1	0
(41) TOTAL	187.89	5.90	4.30	926.32	22.80	31.66	111.90	726.84	17.60	117.41	12.30	28.90

	(13) TOLCOIT [76]	(14) SONGJINO [70] AR	(15) ULAANBAT [84] AR	(16) ANGALAN [3]	(17) HONKHOR [95]	(18) NALAIKH [53] AI	(19) BACAHANG [14] T	(20) CUNGALUU [22] K	(21) BACA-NUU [18]	(22) MAANYT [49]	(23) CHHOR [108]	(24) P. 25 [134]
(1) SUKHE-BAATAR [68]	22.2	.0	10.4	2.9	.3	.1	.0	.0	.6	.0	2.0	.0
(2) YERU [32]	6.1	.0	9.6	4.1	.0	.0	.0	.0	.0	.0	.0	.0
(3) ENKH-TAL [124]	15.9	.0	2.0	1.2	1.0	.2	4.2	.0	2.1	2.1	10.5	2.5
(4) DARKHAN-1 [23]	34.0	.0	102.0	4.5	3.1	1.0	.0	.0	2.7	1.0	10.5	.0
(5) SHARYN-COL [116]	38.9	.0	475.7	.3	.0	.0	.0	3.8	.0	.0	.0	.0
(6) SALKHIT [69]	.4	.0	.0	1.0	.0	.0	.0	.0	.1	.0	6.1	.0
(7) HOTOI [93]	.0	.0	53.7	.5	.0	.0	.0	.0	.1	.0	.1	.0
(8) ERDENET [125]	15.1	.0	30.3	4.7	.0	.6	.0	27.4	8.8	.0	.8	.0
(9) BARUN-KHARA [13]	2.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.5	.0
(10) ZUUN-HARA [36]	36.0	.0	14.7	9.8	1.0	.1	1.2	.0	.1	.5	5.2	.3
(11) TURKH [75]	10.0	.0	19.7	3.4	.1	.1	.0	.0	.4	.0	1.9	.0
(12) MANDAL [45]	.1	.0	.0	.0	.0	.0	.0	.0	1.9	.0	.0	.0
(13) TOLCOIT [76]	.0	34.7	3.0	.7	1.1	.4	2.0	.0	5.9	6.5	8.4	.0
(14) SONGJINO [70]	541.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
(15) ULAANBATAR [84]	4.8	.0	.0	.8	1.1	.4	2.5	.0	.4	.1	3.5	.2
(16) ANGALAN [3]	.8	.0	1.4	.0	.0	.0	4.9	.0	.5	.2	.4	.3
(17) HONKHOR [95]	.4	.0	.3	.0	.0	.0	.1	.0	.0	.0	.0	.0
(18) NALAIKH [53]	65.4	.0	71.0	.0	.0	.0	.0	.0	.0	.9	1.4	.0
(19) BACAHANGAI [14]	.0	.0	.1	.1	.0	.0	.0	.0	.7	.0	.6	.0
(20) CUNGALUU [22]	67.6	.0	357.9	13.3	.1	.0	2.1	.0	.5	4.4	7.9	.6
(21) BACA-NUUR [18]	89.6	.0	2440.8	13.3	.4	.0	3.7	.0	.0	7.7	4.1	1.6
(22) MAANYT [46]	1.4	.0	.1	.0	.0	.0	.0	.0	.1	.0	.0	.0
(23) CHHOR [108]	.0	.0	2.8	1.1	.0	.0	.0	2.0	.0	.0	.0	.3
(24) P. 25 [134]	2.6	.0	3.5	.1	.0	.0	.0	.0	.7	.9	36.6	.0
(25) AIRAG [1]	.2	.0	.2	.2	.1	.0	.0	.0	.1	.0	.0	.0
(26) BORONNOR [17]	1.2	.0	.2	.1	.1	.0	.0	.0	.0	.0	.0	.0
(27) SAINSHAND [66]	1.2	.0	2.6	2.6	.2	1.1	.0	.0	.1	.0	.3	.0
(28) ZUUN-BAYAN [38]	.5	.0	.6	2.7	.1	.0	.0	.0	.0	.0	.0	.0
(29) ORGON [61]	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
(30) ULAAN-UUL [85]	.2	.0	.1	.1	.0	.0	.0	.0	.0	.0	.0	.0
(31) ZAYYN-UUD [37]	.0	.0	.1	.1	.0	.0	.0	.0	.0	.0	.8	.0
(32) ORKHON	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
(33) DARKHAN-2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
(34) ENKHET	.0	.0	.0	.0	.0	.0	.0	.9	.0	.0	.0	.0
(35) ARSHAANT	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
(36) TSAGAAN-KHUYAR	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
(37) BULAGTAL	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
(38) LUN	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
(39) RUSSIA	305.2	.0	153.0	46.3	1.3	11.5	.1	.0	65.3	22.3	28.2	.0
(40) CHINA	24.91	.00	29.33	.65	.00	.00	.00	.00	.06	20.03	.00	.00
(41) TOTAL	1287.21	35.60	3845.13	114.55	8.00	14.50	20.80	33.20	91.26	66.83	130.80	5.80

	(25) AIRAC [I] R	(26) BORDONDO [17] D	(27) SATRSUAN [BU] AN	(28) ZUUN-BAY [38] AN	(29) ORGEN [01] L	(30) ULAAN-UU [85] D	(31) ZAHYN-UU [37]	(32) ORKHON	(33) DARKHAN- 2	(34) ERKHET	(35) ARSHAANT KHIYAR	(36) TSAGAAN- KHIYAR
(1) SUKHE-BAATAR [68]	2	0	10.4	2	1	4	1	0	0	0	0	0
(2) YERU [32]	0	6	2	0	0	0	0	0	0	0	0	0
(3) ENKH-TAL [124]	3.0	0	3.0	0	0	3.1	0	0	0	0	0	0
(4) DARKHAN-1 [23]	1.8	1.4	23.7	1.6	1.8	2	0	0	0	0	0	0
(5) SHARYN-COL [110]	0	0	0	0	0	4	0	0	0	0	0	0
(6) SALKHIT [69]	0	0	5.8	0	0	1.1	2.6	0	0	0	0	0
(7) HOTOL [93]	0	1.0	1	0	1	4	0	0	0	0	0	0
(8) ENDEMET [125]	1.1	3.1	5.1	3	2.4	3.9	7	0	0	0	0	0
(9) BARUN-KHAKARA [13]	0	0	0	0	0	0	0	0	0	0	0	0
(10) ZUUN-HAKA [30]	1.0	3.8	12.9	2	2	4	4	0	0	0	0	0
(11) TUNKH [75]	0	1.6	5	0	0	5.1	0	0	0	0	0	0
(12) MANDAL [45]	0	0	1.2	1.3	0	2	0	0	0	0	0	0
(13) TOICDIT [76]	6	3.0	15.7	2.5	1.9	1.2	11.0	0	0	0	0	0
(14) SONCINO [70]	0	0	3.5	1	2	2	1.2	0	0	0	0	0
(15) ULAANBAYAR [84]	9	6	22.5	3	3	2	5.1	0	0	0	0	0
(16) ANGALAN [3]	1	2	3.5	2.6	1.2	1.2	8	0	0	0	0	0
(17) HONKHOR [95]	0	0	8	1.2	0	0	0	0	0	0	0	0
(18) MALAIKH [53]	0	0	7	0	0	1	1	0	0	0	0	0
(19) BAGARANCAI [14]	0	0	3	0	0	0	0	0	0	0	0	0
(20) GUNCALDUT [22]	6	0	2.3	1.2	0	0	0	0	0	0	0	0
(21) BAGA-NUUR [18]	4.7	64.5	22.2	9.8	1	6	2.8	0	0	0	0	0
(22) HAANYI [46]	0	19.6	2	0	0	0	0	0	0	0	0	0
(23) CHOIR [108]	9	0	5.2	8	0	2	0	0	0	0	0	0
(24) F. 25 [131]	6.9	2.2	8.2	1.2	10.5	47.7	33.7	0	0	0	0	0
(25) AIRAC [11]	0	22.0	5.4	0	2	2.2	0	0	0	0	0	0
(26) BORUNDOR [17]	1	0	0	0	7	0	0	0	0	0	0	0
(27) SAINSHAND [66]	5	0	0	1.4	1.0	7.3	1.8	0	0	0	0	0
(28) ZUUN-BAYAN [38]	0	0	0	0	0	0	0	0	0	0	0	0
(29) ORGEN [61]	0	65.0	0	0	0	4.4	0	0	0	0	0	0
(30) ULAAN-UUL [85]	0	0	2	0	0	0	0	0	0	0	0	0
(31) ZAHYN-UUD [37]	0	0	2	0	2	3	0	0	0	0	0	0
(32) ORKHON	0	0	0	0	0	0	0	0	0	0	0	0
(33) DARKHAN-2	0	0	0	0	0	0	0	0	0	0	0	0
(34) ERKHET	0	0	0	0	0	0	0	0	0	0	0	0
(35) ARSHAANT	0	0	0	0	0	0	0	0	0	0	0	0
(36) TSAGAAN-KHIYAR	0	0	0	0	0	0	0	0	0	0	0	0
(37) BULAGTAL	0	0	0	0	0	0	0	0	0	0	0	0
(38) LUUN	0	0	0	0	0	0	0	0	0	0	0	0
(39) RUSSIA	3.1	8.9	15.0	6.5	1	1	3	5	0	2.4	48.9	16.8
(40) CHIHRA	0	0	0.97	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(41) TOTAL	25.51	197.50	168.87	30.26	27.00	80.70	60.60	.50	.00	2.40	48.90	16.80

	(37) BULACTAL LUN	(38)	(39) RUSSIA	(40) CHINA	(41) TOTAL
(1) SUKHE-BAATAR [68]	.0	.0	7.6	10.6	91.81
(2) YERU [32]	.0	.0	3.4	.5	78.10
(3) ENKHE-TAL [121]	.0	.0	.0	.0	72.90
(4) DAKHIAN-1 [123]	.0	.0	40.4	.3	375.79
(5) SHARYN-COL [116]	.0	.0	.3	1.7	1307.94
(6) SALKHIT [69]	.0	.0	.1	.0	12.60
(7) HOTOL [93]	.0	.0	6.9	.1	191.26
(8) EYDENET [125]	.0	.0	361.8	27.6	503.45
(9) BAKUN-KHAYAL [13]	.0	.0	6.5	.0	11.80
(10) ZUUN-RAKA [36]	.0	.0	4.6	6.5	110.06
(11) TUNKH [75]	.0	.0	.0	.7	39.58
(12) MANDAL [45]	.0	.0	.2	.0	3.40
(13) TOLGOIT [76]	.0	.0	24.6	25.5	180.03
(14) SONGINO [70]	.0	.0	.0	.0	541.50
(15) ULAANBAJAR [84]	.0	.0	25.3	41.4	117.36
(16) AHGALAN [3]	.0	.0	53.3	5.6	72.49
(17) HONKHOR [95]	.0	.0	.2	1.3	2.75
(18) HALAIKH [53]	.0	.0	.0	.0	139.10
(19) BAGHANGAI [14]	.0	.0	.1	.1	2.00
(20) CUNCALUUF [22]	.0	.0	.0	4.3	723.68
(21) BAGA-NUUR [18]	.0	.0	49.8	9.1	2882.85
(22) HAANYT [46]	.0	.0	95.1	.1	141.75
(23) CHUIR [108]	.0	.0	116.5	.5	136.66
(24) P. 25 [134]	.0	.0	.0	.0	83.30
(25) ATRAG [1]	.0	.0	49.3	.0	82.80
(26) BOKHONDOR [17]	.0	.0	161.8	.5	164.33
(27) SAINSHAND [66]	.0	.0	.1	2.7	37.39
(28) ZUUN-BAYAN [38]	.0	.0	.0	.0	6.70
(29) ORGEN [61]	.0	.0	.0	.0	73.40
(30) ULAAN-UUL [85]	.0	.0	67.6	.0	68.40
(31) ZAYYN-UUD [37]	.0	.0	.0	1.7	8.92
(32) ORKHON	.0	.0	1.4	.0	1.40
(33) DAKHIAN-2	.0	.0	.0	.7	.74
(34) ERKHET	.0	.0	50.0	.0	50.00
(35) ARSHAANT	.0	.0	4.5	.2	4.70
(36) TSACAAN-KHAYAR	.0	.0	63.4	.0	63.40
(37) BULACTAL	.0	.0	.0	.6	.66
(38) LUN	.0	.0	.0	.0	.00
(39) RUSSIA	.0	.0	.0	.0	1088.60
(40) CHINA	.00	.00	.00	.00	81.21
(41) TOTAL	.00	.00	1194.00	142.20	9553.61

2-3 Review of Past Survey of Zamyn-Uud Transshipment Facilities

2-3-1 Overview of the Past Survey

The former Soviet Union's feasibility study of cargo transshipment facilities at Zamyn-Uud station was implemented by All USSR Export and Import Corporation and Ural Transport Facilities Design Institute based on the contract between the said Corporation and Complex Import Corporation in Mongolia which was concluded according to the "Agreement on Economy, Science and Technology, 1986 to 1990" reached on January 15, 1986 between the Soviet Union and Mongolia.

The cargo transshipment facilities improvement project was proposed by China to shift the transshipment work of cargos bound for Mongolia, the Soviet Union and Europe from Erenhot in China to Zamyn-Uud in Mongolia in 1990.

The volumes of cargos to be transshipped every year at Zamyn-Uud in the 2000s are estimated to be 850,000 tons of import and 1,690,000 tons of export.

This feasibility study covered transport demands, transport planning, facilities of track, cargo handling, telecommunication, signal and rolling stock maintenance, architecture and other various fields.

On the basis of this feasibility study, the construction of 1,435mm tracks started. However, the construction work was suspended after four tracks had been completed in 1990 due to the changes in the political and situation in the Soviet Union.

2-3-2 Transport Plan

Figure 2-3-1 gives the overall routing according to the transport plan.

Although Shanghai was considered as the exit to the sea transport route, Tientsin is more appropriate which is nearer to Mongolia under the present circumstances.

The transport volumes had been reviewed based on the data in 1987. The volume of import was assumed at the same level as in the present study made by this JICA team. However, the volume of export was planned 16% smaller.

The USSR's plan scheduled to operate six Mongolian freight trains and four Chinese freight trains in each direction between the two countries.

Petroleum was expected to come from the Soviet Union, but not from China.

2-3-3 Track and Civil Structure

(1) Track

Table 2-3-1 and Figure 2-3-2 show the tracks, 1,520mm and 1,435mm gauges, planned by the former Soviet Union for the transport demands in 2000.

Table 2-3-1 Track Plan

Purpose	Number of track		Remarks
	1,520mm	1,435mm	
1. Train operation between Zamy-Uud and Erenhot			Single track
2. Departure/arrival and marshalling	1	1	
3. Cargo transshipment	9	7	
(1) Wagon			
* Packed food	4	4	
* Packed industrial goods	2	2	
* Packed chemicals	1	1	
(2) Gondola car			
* Bulky cargo	2	1	
(3) Container	1	1	

Also included in the plan were draw-out tracks, locomotive standing track, a track to connect two track gauges, 1,435mm and 1,520mm, tracks for freight car washing and locomotive maintenance. The track layout must be designed to transport large volume of cargos and to smoothen the flow of cars. In the former Soviet Union's plan, several short platforms were designed for different categories of cargos transported by wagon. This design necessitates repeated marshalling work and is inefficient, when the train composition, the number of cars, tracks for departure and arrival and tracks for marshalling work involved are taken into account.

The flourite was considered in the design of the transshipment track for cargos transported in gondola cars. Since the flourite is transported in flexible containers for the time being, however, installation of a low floor platform will be sufficient enough.

The standards of the former Soviet Union were applied to the track structure.

(2) Civil Structure

1) Track bed

Tracks were all to be laid on the embankment. The volume of the embankment will reach as much as 710,000m³ including those of departure and arrival tracks of 1,435mm gauge track and the transshipment work site.

It is necessary to efficiently construct tracks step by step to meet the transport demands.

2) Cargo platform and warehouse

For different categories of cargos, short high floor platforms were planned for the transshipment of cargos in wagons. Roofs were planned to cover the total area including the 1,435mm and 1,520mm tracks.

This design is desirable when the natural conditions of Zamy-Uud station and working conditions are considered. Given the volume of cargos to be handled, however, this design will entail considerably high costs.

It is practical to promote the construction step by step in such a manner to construct a roof on the high platform only at the first stage and build a warehouse at the platform end to store valuables.

3) Width of container platform

The container platform was designed to be about 20 m wide in consideration of the space for temporary storage. It can be smaller to meet the transport volume.

4) Architecture plan

Figure 2-3-2 gives the buildings and houses necessary for the transshipment work to be built according to the progress of the construction of the transshipment facilities. However, some of these facilities seem to be substituted with the existing facilities. The architecture plan must deliberately be reviewed, therefore.

2-3-4 Cargo Handling Equipment

Figures 2-3-3 to 2-3-5 give cargo handling equipment and cargo transshipment plan for different categories of cargos such as packed cargo, container and bulky cargo.

(1) Packed Cargo

Small-size forklifts and overhead cranes were planned for packed cargos with the use of pallets. Though this is a desirable design, the plan must be implemented step by step, since the structure of the house and overhead cranes require large amounts of initial investment.

(2) Container

For container handling, a double counter lever crane, span 25m and capacity 24/30.5 ton was planned, which seems to be excessively large for the estimated transport volume. The type of crane and the span shall be reviewed to select proper specifications.

(3) Bulky Cargo

Bulky cargos were planned to be transshipped from 1,435mm gauge track to 1,520mm track by a grab of 3.0m³ attached to the overhead crane. Due to the freight car construction and the grab profile, some volume of cargos will remain not grabbed in this process. This will require the outer side of the car floor to open downward to drop the remained cargos. After that, the cargos dropped from the car must be handled again. According to the method adopted in the plan, such unnecessary work could not be neglected.

Although it depends on the volume to be handled, silos and belt conveyors are generally the best to transship such cargos in such packing styles.

In short, the cargo handling equipment must be selected to meet the volume of cargo and packing profiles.

Fig. 2-3-1 Scheme of transport

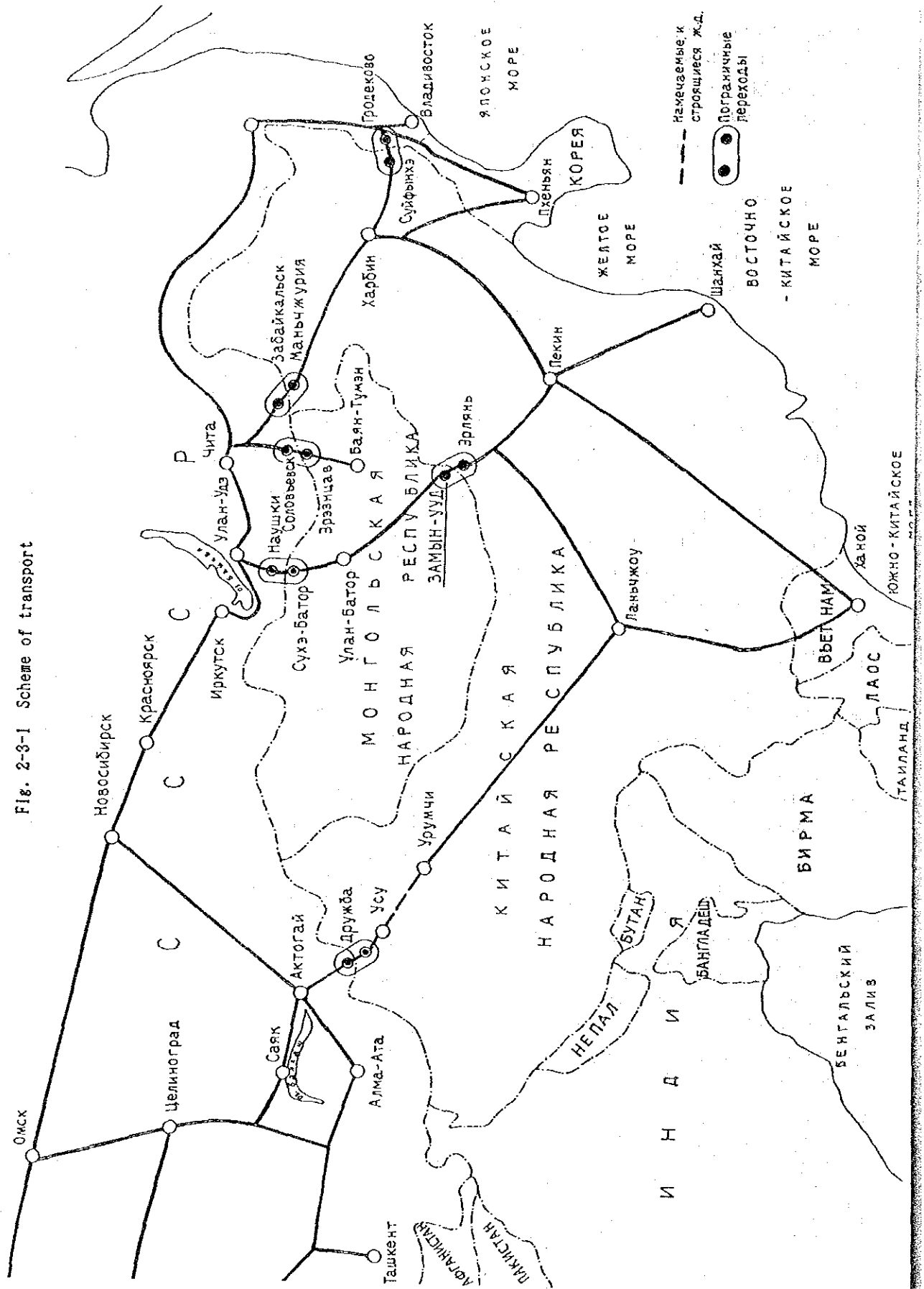
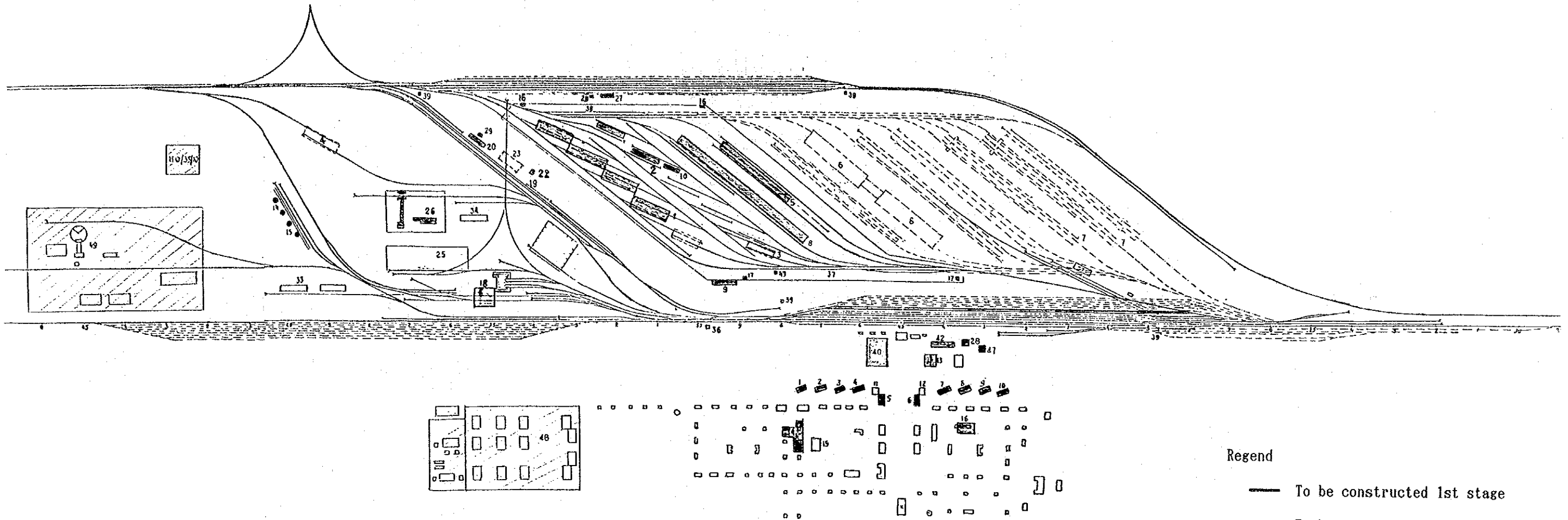


Fig. 2-3-2 Track and Civil structure Plan



Regend
 — To be constructed 1st stage
 To be constructed 2nd stage

Reference No.	Name of Building (facility)
	Transshipment point
1	Roofed warehouse for foodstuff
2	Roofed warehouse for cotton and industrial goods
3	Roofed platform for chemicals
4	Roofed platform for dangerous goods
5	Open storage for fluorite
6	Roofed platform for cereals
7	Open storage for coal
8	Storage space for container, heavy and lengthy goods
9	Office-residential house
10	Power loader maintenance station
11	Warehouse for facilities and spares
12	Machines and skids storage house
13	Automatic fire pump station
14	500 m ³ water tank
15	250 m ³ water tank
16	Watch tower
17	Check point

Reference No.	Name of Building (facility)
18	Locomotive maintenance facilities
	Including workshops and components of diesel engine. Common workshop and parking lot for automobiles and track maintenance machines
	Rolling stock maintenance mechanization station including the following
19	Rolling stock cleaning and washing house
20	Rolling stock maintenance house
21	Manufacture-residential house
22	Compressor station
23	Rolling stock washing exhaust water treating facilities
24	Spare rolling stock cleaning space
25	Combustible lubricant station
	Automatic oil filling station
26	Boiler room
27	Broadcasting sub-center
28	Point and signal station
29	Substation 10/04 kV

Reference No.	Name of Building (facility)
30	Distribution station
31	Drain pump station
32	Drain pump station
33	Common cargo warehouse
34	Site supervisor office
35	Passenger car re-arranging station
36	Crossing attendant room
37	Weight scale for 1520mm gauge rolling stock
38	Weight scale for 1435mm gauge rolling stock
39	Heating station for 10 persons
40	Station building
41	Telecommunication center
42	Station office and broadcasting room
43	Sweeper room
44	Border check point
45	House for Gondola car staff

Technological Scheme of Transshipment Package Piece Cargo

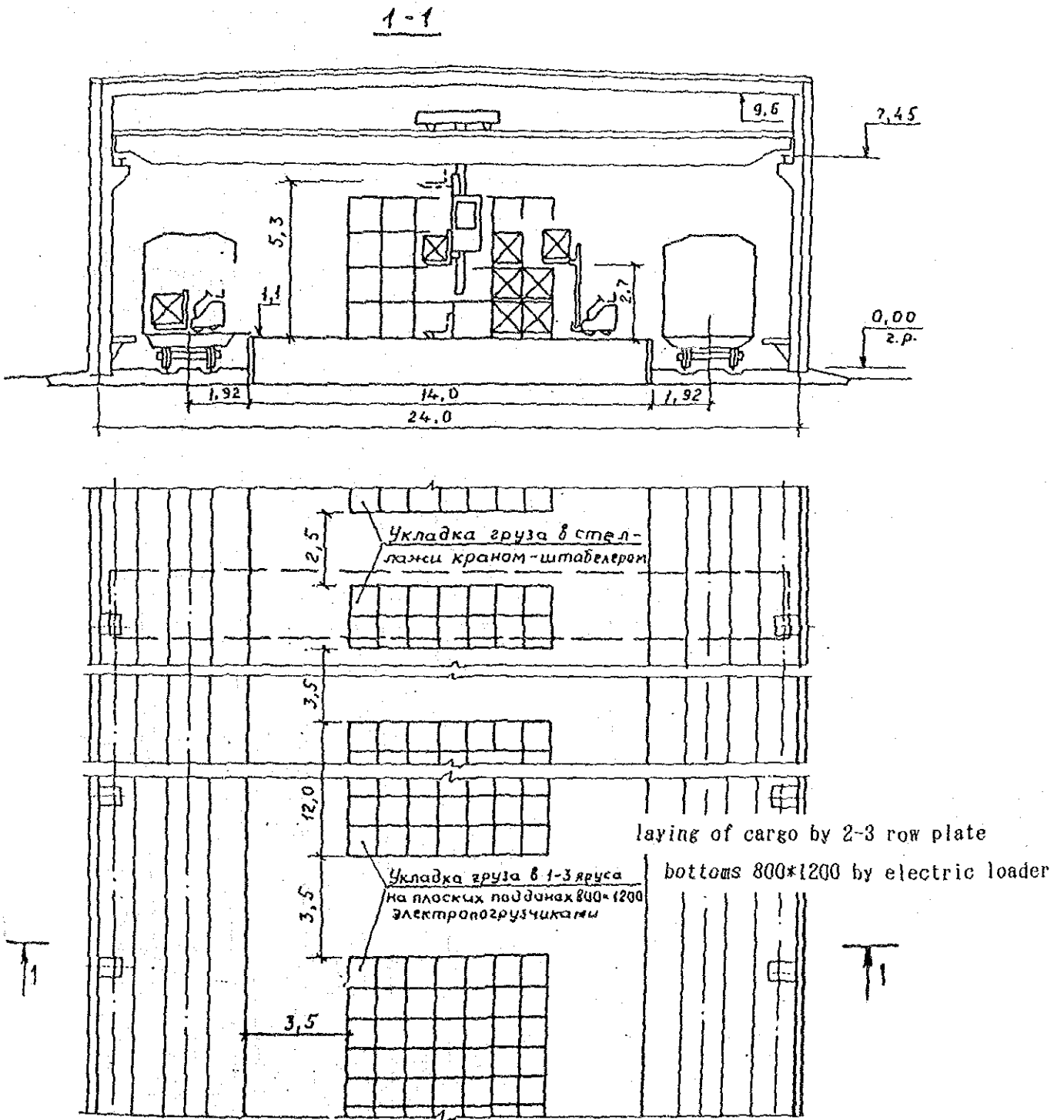


Fig. 2-3-3 Package Piece Cargo

Technological Scheme of Transshipment Large-capacity Containers

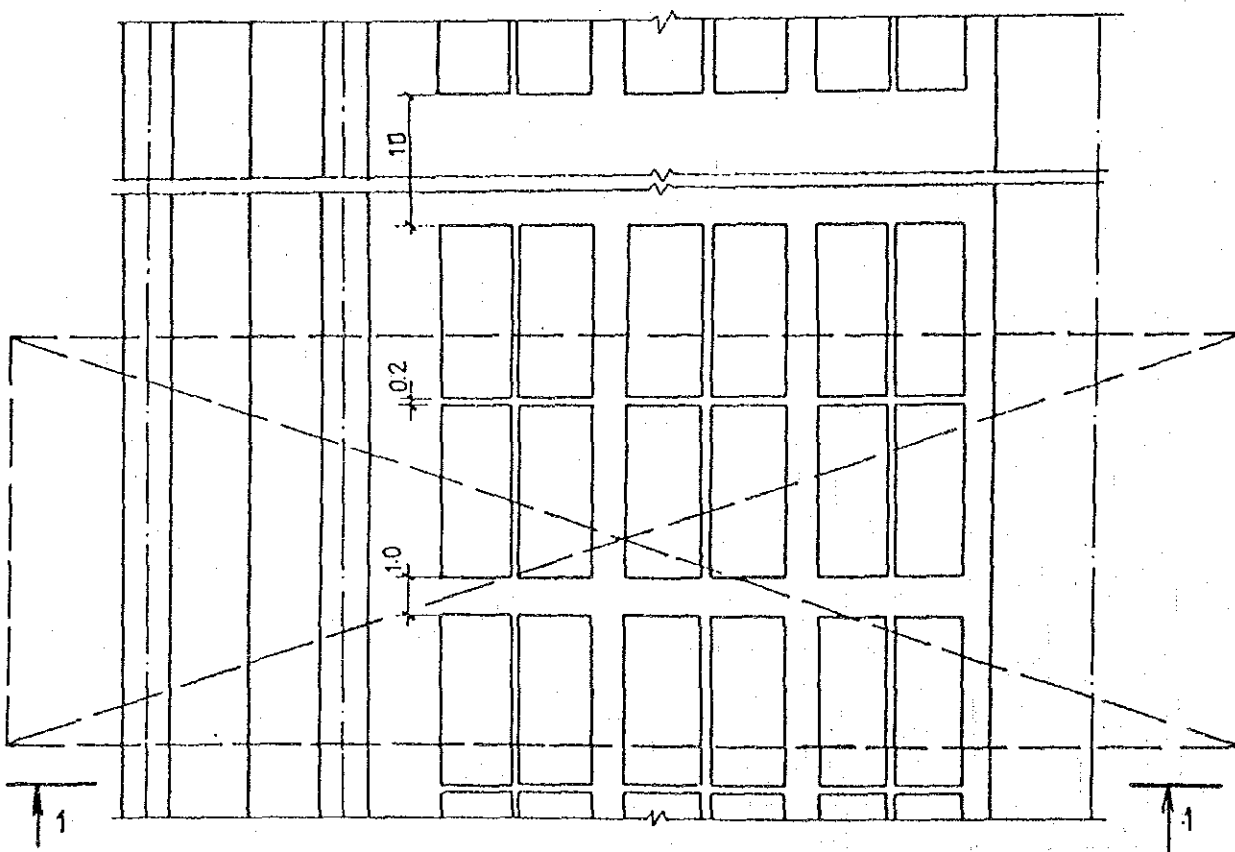
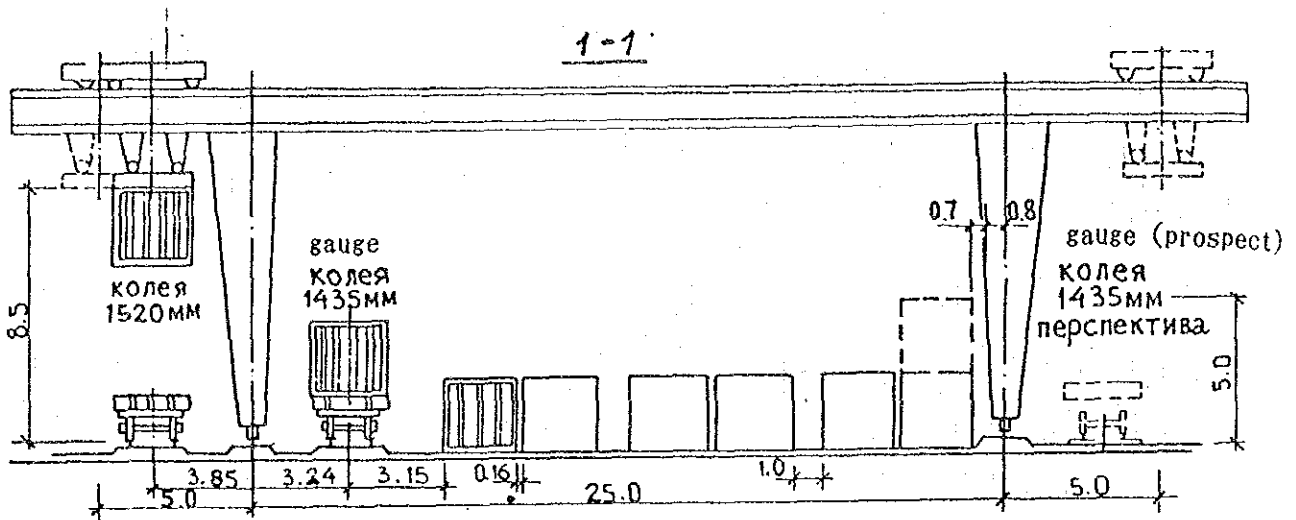


Fig. 2-3-4 Container