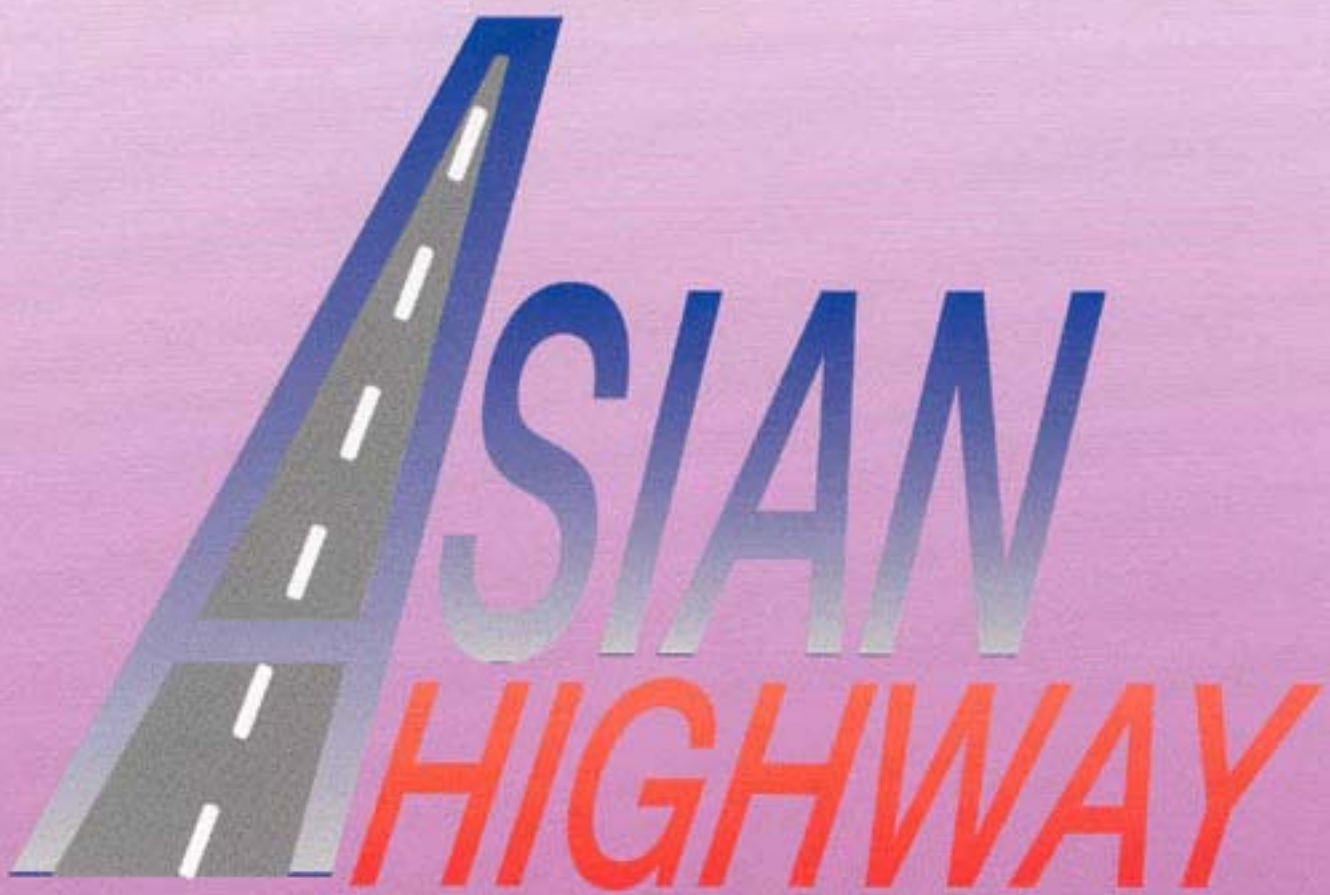
ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC



THE ROAD NETWORKS
CONNECTING
CHINA, KAZAKHSTAN, MONGOLIA, THE RUSSIAN FEDERATION
AND
THE KOREAN PENINSULA

UNITED NATIONS

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Most of the data in the tables and figures came from the national experts.

The place names in this publication follow the United Nations standards, which conform with The Times Concise Atlas of the World, eighth edition.

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I. INTRODUCTION

A. Background

The Asian Highway project was initiated in 1959. Later when the integrated Asian Land Transport Infrastructure Development Project (ALTID) was conceived in 1991 to emphasize the integration of land transport development and facilitation, the Asian Highway was included as an important part of this new project. The ALTID strategy was later refined in 1996 to stress the need to complete the formulation of the Asian Highway network to cover the whole of Asia.

1. Asian Land Transport Infrastructure Development project

To promote international trade and tourism and following the recommendations of the Meeting of the Committee on Transport and Communications held in 1990 in Bangkok, the forty-eighth session of the Economic and Social Commission for Asia and the Pacific in 1992 endorsed an integrated project on Asian Land Transport Infrastructure Development, comprising the Asian Highway, the Trans-Asian Railway, and the facilitation of land transport as a priority project for Phase II, 1992-1996 of the Transport and Communications Decade for Asia and the Pacific. Later the ALTID project was also included as a priority project in the New Delhi Action Plan for Infrastructure Development for Asia and Pacific (1997-2006).

As a part of an integrated sea, land and air transport system to facilitate regional and international trade and tourism, the overall objective of the ALTID project was to assist member countries in providing reliable and efficient land transport linkages within the region as well as interregional linkages with the regions of the Economic Commission for Europe (ECE) and the Economic and Social Commission for Western Asia (ESCWA).

2. Asian Highway project

As a part of the ALTID project, in 1992 the Economic and Social Commission for Asia and Pacific (ESCAP) initiated a Study for the Development of the Asian Highway Network, aiming at revitalizing the Asian Highway project. The primary objective of the project was to assist participating member countries in developing road transport infrastructure in Asia and to link Asia with Europe, thereby promoting regional and international cooperation for economic and social development, as well as opening up new potential for international trade and tourism.

The Asian Highway project achieved considerable progress with assistance from the United Nations Development Programme (UNDP), Japan and the Republic of Korea, together with the joint efforts of the project member countries of ESCAP. The Asian Highway network has been expanded and improved in many countries, the capacities of national road organizations have been strengthened, and a number of road specialists have been trained.

The first study for the formulation of the Asian Highway network was completed in 1994 and published in 1995, with the participation of 18 member countries: Afghanistan, Bangladesh, Cambodia, China, India, Indonesia, the Islamic Republic of Iran, the Lao People's Democratic Republic, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, the Philippines, Singapore, Sri Lanka, Thailand and Viet Nam. As a result 29 Asian Highway routes totalling 69,000 kilometres and covering 18 countries were identified, revised and formulated.

Under the ALTID project, ESCAP completed a second study for the formulation of the new regional Asian Highway network and its overall development in Central Asia and the South Caucasus in

1996. National networks, road classification, design standards and border-crossing facilitation measures were reviewed, and also Asian Highway routes in Central Asia and the South Caucasus were identified. Countries participating in this project were Armenia, Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. As a result 13 Asian Highway routes totalling 21,000 kilometres were identified for Central Asia and the South Caucasus and included in the network.

Five international routes of about 40,000 kilometres of regional and international importance and 37 subregional routes of about 50,000 kilometres of intraregional importance have been included in the Asian Highway network.

In order to promote international transport along the Asian Highway, ESCAP has published eight route maps of the Asian Highway as well as a series of maps with international links. In addition, the Asian Highway database covering the network has also been developed under the project. As part of further Asian Highway project activities the publications, "Strategy and Guidelines for Upgrading of Asian Highway Routes" and "Guidelines for Asian Highway Promotion" have been elaborated and published by ESCAP.

The study on the Asian Highway network formulation and development is still under process and will be finalized after completing the road network identification in North-East Asia, the Asian Highway routes in Georgia, which joined ESCAP in 2000, and the updating of the entire network.

B. Objective of the study

The objective of the study is to assist member countries in developing a road transport infrastructure of international importance linking countries within Asia, as well as between Asia and Europe, with the objective of facilitating the growth of international and bilateral trade to promote economic and social progress of the countries in the region. Within the objective, the immediate aim of the study is to review the national technical standards and to identify highway routes of international importance to connect North-East Asia with Central Asia, the Caucasus and Europe.

C. Project progress and activities

The study, funded by the Government of the Republic of Korea, was initiated in June 1998 with an original completion date of January 2000. Missions to Kazakhstan and the Russian Federation, and the Republic of Korea and Mongolia were completed in November 1998 and March 1999 respectively, during which country reports prepared by the national experts were collected. China provided information on technical standards, the existing condition of its road network and highway development plans in July 1999. Moreover, in January 2001 China also informed the study team that a national study on the selection of the Asian Highway network had been completed and would be submitted to the secretariat in 2001. Based on the national study China proposed 11 possible alternative routes for inclusion in the Asian Highway network during the Expert Group Meeting.

Under a separate study, "Promotion, Development and Formalization of the Asian Highway Project (Phase III and IV)", review and formulation of the Asian Highway network in other Asian Highway member countries is ongoing with the objective of completing the formulation of the Asian Highway network to cover the whole of Asia. A policy-level Expert Group Meeting for all Asian Highway member countries is planned in 2002 to consider the Asian Highway network covering the whole of Asia.

As identification of the Asian Highway routes in China, the Democratic People's Republic of Korea, Kazakhstan, the Republic of Korea and the Russian Federation by this study is essential to complete the overall Asian Highway network, it is necessary to finalize the study on the basis of available information. Moreover, the Commission at its fifty-seventh session requested the secretariat

to complete this study at an early date. Therefore, the main focus is to identify the road network in the participating countries in order to develop the Northern Corridor of the Asian Highway connecting the North-East Asia and Europe.

In order to identify important national networks forming part of the Northern Corridor of the Asian Highway network in China, the Democratic People's Republic of Korea, Kazakhstan, the Republic of Korea and the Russian Federation, the following activities were undertaken in close coordination with the participating member countries:

(a) National experts from China, Kazakhstan, Mongolia, the Republic of Korea and the Russian Federation were engaged by ESCAP to provide the necessary input to the study;

(b) Missions to the countries were undertaken and country reports were received from national experts outlining the main features of the policies of their respective countries based on a questionnaire provided to them from ESCAP;

(c) Existing data and information, results of recent studies, missions reports and country reports were reviewed with assistance from a road expert engaged for the study;

(d) The national standards and the status of the road network were reviewed against Asian Highway design standards;

(e) The proposed routes by the countries were evaluated according to the agreed Asian Highway route criteria;

The policy-level Expert Group Meeting to consider the findings of the study and provide recommendations for the formulation of the Northern Corridor of the Asian Highway was held from 10-12 October 2001 in Bangkok.

D. Outline of the report

This report presents the findings of the "Study on the Road Network connecting China, Kazakhstan, Mongolia, the Russian Federation and the Korean Peninsula". It has been prepared largely with the input and cooperation of the national experts from participating countries, comments and suggestions from the road authorities of participating countries, and incorporates the recommendations of the expert group meeting.

This chapter presents the background of Asian Highway development, and outlines the purpose and objectives of the study. Chapter II provides an overview of other related international transport development programmes in the region and briefly reflects on the efforts of various international organizations towards the improvement of land transport networks in the region. Chapter III provides an overview of the status of road networks and technical standards in the participating countries. Chapter IV assesses the routes proposed by the participating countries according to the agreed Asian Highway route criteria and proposes a new route numbering system for the proposed Asian Highway routes. It also gives information on the interconnectivity of the identified routes with other existing routes of international, regional and subregional importance, being part of intra- or interregional routes. Conclusions are finally drawn in Chapter V.

II. TRANSPORT DEVELOPMENT PROGRAMMES OF INTERNATIONAL ORGANIZATIONS

In addition to ESCAP, several international organizations are active in the development of transport networks in the participating countries of the ESCAP region. They are the European Union (EU) through the Trans–European Network Programme, and Technical Assistance for the Commonwealth of Independent States (Tacis); the Commonwealth of Independent States (CIS); the Economic Cooperation Organization (ECO), the United Nations Special Programme for the Economies of Central Asia (SPECA), UNDP with the Tumen River Area Development Programme (TRADP) and the Silk Road Regional Cooperation Programme; and ECE. The activities of these international organizations are briefly described in the following paragraphs.

A. European Union

The EU is implementing common transport policies to enhance the development of an integrated transport network to ensure economic integration and the freedom of movement within member states for goods, people and services.

Transport network development in the EU is supported through the implementation of Trans-European Network and Technical Assistance for the Commonwealth of Independent States programmes.

1. Trans-European Networks

The programme for the development of the Trans-European Network was initiated in December 1992 to enable citizens to travel and business to deliver their goods without hindrance or risk from one end of the Union to the other in response to the imbalances of the European transport system as identified in the White Paper on "Future development of the common transport policy". Later "The Community Guidelines for the Development of Trans-European Transport Network" was adopted in 1996. Currently European Union member states are implementing 14 priority projects, which are only part of the Trans-European transport network, endorsed by the European Council held in Essen in December 1994.

2. Technical Assistance for the Commonwealth of Independent States

The EU launched the Tacis Programme in 1991 to provide technical assistance to the newly independent countries of Eastern Europe and Central Asia to enhance the transition process in those countries. The overall aim of Tacis in the transport sector is to create a trans-European transport network, encompassing all modes of transport and encouraging environmentally friendly modes of transport. The most important transport project undertaken by Tacis is Transport Corridor Europe Caucasus Asia, creating an east-west link and opening up new trading opportunities for all member countries.

This programme was launched in Brussels in May 1993 to develop a west-east transport corridor form Europe to Central Asia via the Caucasus and the Caspian Sea. The EU funds this technical assistance programme. The member countries are Armenia, Azerbaijan, Bulgaria, Georgia, Kazakhstan, Kyrgyzstan, Mongolia, the Republic of Moldova, Tajikistan, Turkey, Ukraine and Uzbekistan. A Multilateral Agreement on International Transport for Development of the Europe-the Caucasus-Asia Corridor was signed in Baku in September 1998. It covers all modes of transport in the defined corridor. The Intergovernmental Secretariat is located at Baku. ESCAP and ECE are mentioned in the Baku agreement as participating in the implementation. To date this programme has

financed 25 technical assistance projects and 11 investment projects for the rehabilitation of infrastructure.

B. United Nations Economic Commission for Europe

Before the EU member states started taking steps towards the greater integration of their transport policies, steps had already been taken on a wider scale by ECE which had started to review the standards applied in European countries and to enunciate technical and commercial criteria for integrating the existing infrastructure into a network providing increased operational speed and capacity. The work of ECE is reflected in 55 international agreements and conventions that provide the international legal and technical framework for the development of international road, rail, inland waterway and combined transport in the ECE region. Countries outside the ECE region apply some of these international legal instruments as well.

Agreements providing a framework to construct and develop a coherent international transport network for road and rail are: the European Agreement on Main International Traffic Arteries of 1975; the European Agreement on Main International Railway Lines of 1985, and the European Agreement on Important International Combined Transport Lines and Related Installations of 1991.

These agreements stipulate the adoption of a network of railway lines and major roads constituting the European road (E-road) network extending east to Moscow and south-east to Turkey. The development of trade with Central Asia requires adequate transport infrastructure with the countries of Western Europe as well as in the transit countries. The ECE programme of work for 1996-2000 includes the extension of the European network to Central Asia and Caucasian ECE member States. This programme undertakes to introduce main road links in Eastern Europe, Central Asia and Caucasian ECE member States in the E-road network.

C. Commonwealth of Independent States

Newly independent states which emerged from the territory of the former Soviet Union have established CIS. Member states have very close economic relationships, common technical standards and a common road network which had been developed in the time of the former Soviet Union.

Realizing their shared interest in pursuing the adoption of common standards and in developing their road networks in a concerted way, the member states of CIS have started developing a network of intra-republic roads to facilitate international and bilateral trade and tourism within the CIS region, as well as between Asia and Europe. To implement these objectives, CIS member states have established the Interstate Council of Road Builders. CIS member states elaborated and approved the CIS international road network based on the road network of the former Soviet Union. The CIS international road network is a system of principal and intermediate routes in west-east and north-south directions. It also includes branches and connecting links.

D. Economic Cooperation Organization

ECO is an intergovernmental organization established in 1985 by the Islamic Republic of Iran, Pakistan and Turkey for the purpose of promoting economic, technical and cultural cooperation. The organization was expanded in 1992, to include seven new members: Afghanistan, Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.

The transport and telecommunications sector, with the objective of developing transport and communications infrastructure linking the member states with each other and with the outside world, is a major sector of cooperation among member states.

The Almaty Outline Plan for the development of the transport sector in the ECO region is considered a basic blueprint for the transport development strategy of ECO. The Outline Plan aims to:

- Facilitate transportation and transit of goods and passengers within the ECO region through short-medium and long-term measures

- Develop the ECO road network plan to maximize the use of the existing infrastructure in the region and to provide access to seaports for the landlocked member countries of the region

- Develop multimodal transport through a study of the potential market and a review of the road, rail and port infrastructure in the member countries

At the ECO Extraordinary Summit held in Ashgabat in May 1997, certain rail and road routes were designated as priority routes for development. As recommended in the Outline Plan for improving transit transport and border crossing, the ECO Transit Transport Framework Agreement was concluded on 9 May 1998 at Almaty. This framework agreement covers all modes of transport: rail, road, airways, inland waterways and maritime transport.

Cooperation between ESCAP and ECO was established with the signing of the Memorandum of Understanding in 1993, which recognized the ECO region as a major area of cooperation.

ESCAP is implementing a joint project on multimodal transport with ECO and the United Nations Conference on Trade and Development (UNCTAD), which is being funded by the Islamic Development Bank. The project principally aims to facilitate interregional and international multimodal transport through training and institutional development.

E. Special Programme for the Economies of Central Asia

At the suggestion of the Secretary-General, ESCAP and ECE initiated SPECA in 1997 to facilitate the economic integration of the Central Asian countries into both Europe and Asia, and to strengthen economic cooperation among those countries.

The Presidents of four Central Asian countries: Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan and the Executive Secretaries of ECE and ESCAP launched SPECA at Tashkent in March 1998. The Tashkent Declaration identifies four priority programme areas:

- Development of transport infrastructure and cross-border facilitation
- Rational and effective utilization of energy and water resources of Central Asia
- Organization of an international economic conference on Tajikistan and a joint strategy for regional development and the attraction of foreign direct investment
- Regional cooperation on the development of routes for pipelines for hydrocarbons

Working groups to translate SPECA into specific project activities have been established by ECE and ESCAP. The project working group on transport and border crossing mainly focuses on transport related activities. It was formed on the basis of the Tashkent Declaration and mainly works towards having a multilateral framework agreement on transport and border-crossing facilitation with particular reference to road transport. It is hoped to establish a regional road transport committee with representation from the competent authorities of all SPECA countries to ensure adequate coordination and monitoring of the implementation of the proposed memorandum of understanding. So far only three countries Kazakhstan, Kyrgyzstan and Tajikistan have actively participated in the activities of the working group.

F. United Nations Development Programme

1. Tumen River Area Development Programme

An agreement among five North-East Asian countries, China, the Democratic People's Republic of Korea, Mongolia, the Republic of Korea and the Russian Federation, to cooperate in economic development was initiated by UNDP following discussions in 1991. It covers the following areas:

- The Rajin-Sonbong Economic and Trade Zone in the Democratic People's Republic of Korea
- Eastern Mongolia
- The Yanbian Korean Autonomous Prefecture in north-east China, and the Primorsky Territory in the far east of the Russian Federation

The Republic of Korea joined the project as the fifth member of TRADP.

Collectively, these areas are referred to as the Tumen Region and connecting hinterland. The Tumen River serves as a border where China, the Democratic People's Republic of Korea and the Russian Federation meet. The first phase involved extensive planning and background studies. The second phase involved investment promotion and development initiatives designed to build momentum in the region as a growth triangle. Now the third and current phase is addressing issues for regional economic cooperation in North-East Asia.

The major goals of regional economic cooperation are investment and trade, environment, tourism, transport and telecommunications, energy and human resources development.

The transport working group meeting of TRADP was held in Yanji, Yanbian Autonomous Prefecture, Jilin Province of China from 7 to 9 December 1998. The meeting endorsed an action plan consisting of six programmes, eight objectives and eleven outputs. Programmes 1 and 3 are related to the development of transport routes and facilitation in the participating countries of the present study.

Programme 1 "Joint Transport Planning" is important for improving linkages in the Tumen River Region and suggests that each country participant should prepare a transport plan for their area of the Tumen Region and that the Advisory Expert Group would then endeavour to coordinate the respective plans.

Programme 3 "Cross-border Facilitation" aims to improve the cross-border movement of people and goods as fundamental to regional economic cooperation and based on commonly accepted international norms and standards.

ESCAP and the UNDP Tumen secretariat are implementing a joint project in the Tumen Area for the identification and development of a priority road network.

2. Silk Road Area Development Project

The "Silk Road" denotes the 2000 year old east-west trade and transport routes, which stretched from the east coast of China to the Atlantic coast of Europe, northward to the Russian Federation and southward through South Asia and the Middle East, involving close to 35 countries. The Silk Road is now also referred to as the New Euro-Asian Continental Land Bridge. The Silk Road Area Development Project (SRADP) focuses on five Central Asian republics and China. This project is designed for capacity-building for regional cooperation and development. Cooperation is sought

through training, workshops, coordinating committees and forums. The project also plans to assist in the implementation of the international transport and transit agreements and also to facilitate trade and tourism.

G. United Nations regional commissions capacity-building programme

The project "Capacity-building through Cooperation, in Developing Interregional Land and Land-cum-Sea Transport Linkages" has been formulated by the five United Nations regional commissions for United Nations development accounts funding.

A meeting of the directors of divisions responsible for transport in the five United Nations regional commissions was convened in Beirut in January 2001. The meeting agreed on the following specific objectives and identified activities to enhance and strengthen national capacities:

- To develop and harmonize interregional transport infrastructure
- To improve transport facilitation along their interregional transport linkages
- To promote networking among experts and institutions
- To enhance the sharing of best practices

The Russian Federation, Kazakhstan and China are included in the ESCAP proposed programme of work.

H. International financing institutions

Multilateral institutions such as the World Bank, the Asian Development Bank (ADB), the European Bank for Reconstruction and Development, and other bilateral financing agencies are providing support to the countries in the development of transport infrastructure.

ADB has provided assistance for the rehabilitation of the 245 kilometre Almaty-Bishek Road, Almaty-Korgas and for the improvement of road sector efficiency in Kazakhstan. The Almaty–Bishek Road project, in addition to physically rehabilitating the road, plans to improve custom facilities at the border and facilitate a cross-border agreement and road safety initiatives in the countries. ADB has also supported the development of highways and expressways in China, some of which are the Changchun-Harbin, Shanxi-Yunnan, Ghongying-Guizhon roads. ADB has provided assistance for the rehabilitation of the road network in Mongolia and is currently undertaking a socio-economic impact study for future investment.

The World Bank has provided assistance to the Russian Federation for highway rehabilitation and maintenance and urban transportation in Moscow, to China for highway projects and urban transport, to Mongolia for transport development and rehabilitation, and to Kazakhstan for road transport restructuring.

I. Coordination

Most of the above activities being implemented through various organizations are focusing on the development of transport corridors, and the facilitation of movement of interregional and international transport.

The programmes of UNDP (TRADP and SRADP), EU (Tacis), SPECA, ADB, the World Bank and CIS are related to the ongoing study. Coordination of the project activities with the ongoing programmes of international organizations is essential to ensure interconnectivity and to develop efficient land transport linkages between various economic regions and subregions. This will be essential to avoid duplication of efforts in the development of linkages.

III. ROAD TRANSPORT

A. Overview of roads and road transport

During the process of formulating the Asian Highway network, it was discerned that in addition to the traditional Asian Highway routes of South Asia (A-1 and A-2) two other routes could potentially be added to improve the international east-west links from North-East Asia. These routes are:

(a) Potential link connecting the Korean peninsula, China to Baku (Azerbaijian), and on to Europe through A-3 (Beijing, Zhengzhou), A-4 to Urumqi, China through a newly developed international route A-5 in the Central Asian republics and the Russian Federation;

(b) Potential link connecting North-East Asia with the Russian Federation, and on to Europe through southern Siberia.

The existing and potential international Asian Highway corridors are shown in figure 1.

The following illustrates an overview of the roads and road transport in the participating countries.

1. China

The development of road networks in China started relatively late, but rapid economic development in recent years has provided the impetus to increasing highway construction.

Since the implementation of the reform and opening policy, China has made significant progress in highway, particularly expressway development. The length of the road network is 1,231,176 kilometres out of which 62 per cent is paved. The road network carries about 77 per cent of domestic freight and the road density is 128 kilometres per thousand square kilometres. Understanding the importance of developing the national road network, the Eighth Five-year Plan included the development of communications and highways as a key aspect of the economic development strategy. As a result, highway networks link all counties, 98 per cent of towns, 80 per cent of villages and all the major economic centres in China.

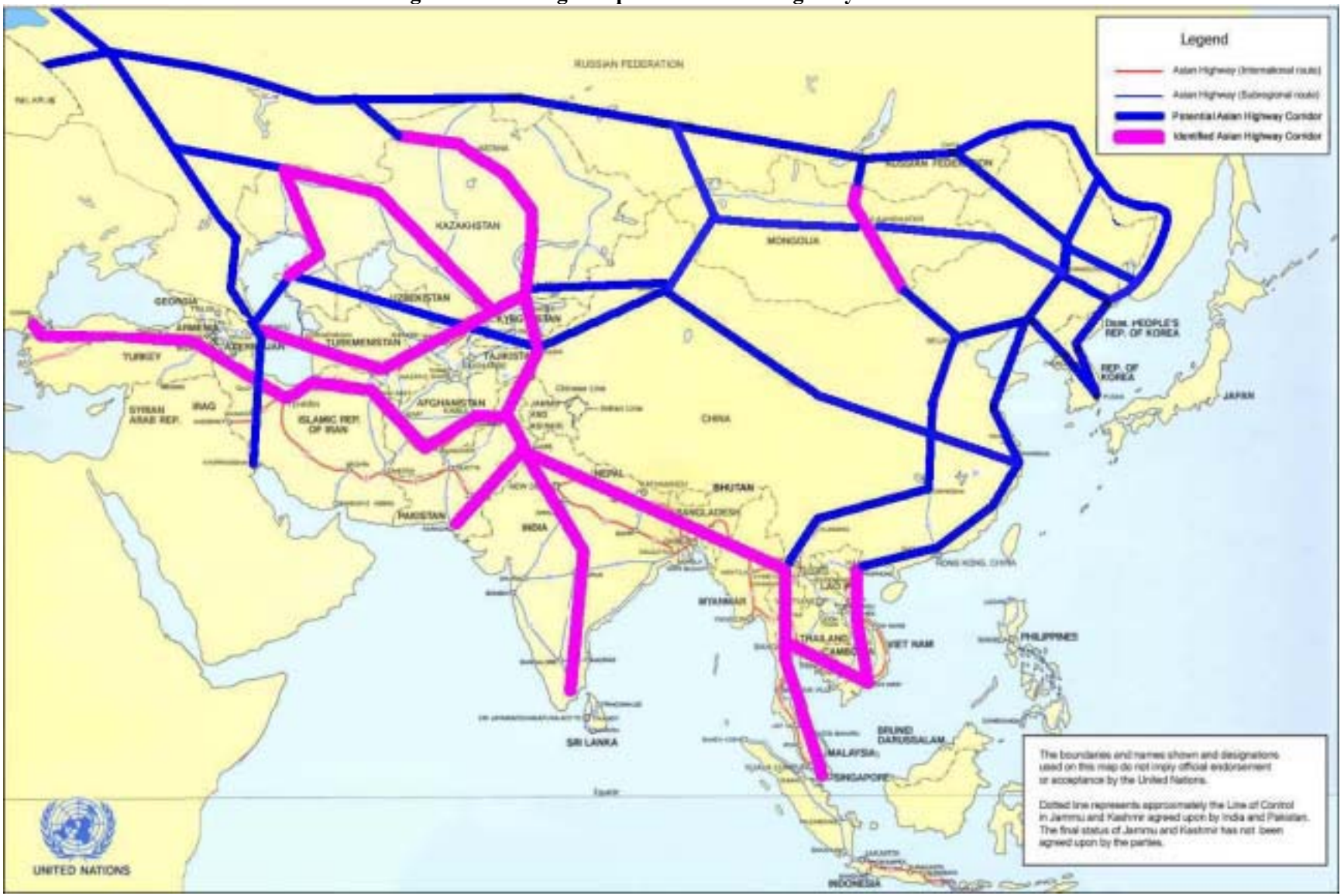
2. The Democratic People's Republic of Korea

The development of roads in the Democratic People's Republic of Korea started after the war on the Korean peninsula. The closed economy of the Democratic People's Republic of Korea, the lack of financial resources and the mountainous terrain in most of the country constrains road network development. The total length of the road network is 31,200 kilometres out of which about 10 per cent is paved. Thus, unpaved roads are predominant in the road networks of the Democratic People's Republic of Korea.

3. Kazakhstan

Roads in Kazakhstan were developed during the period of the former Soviet Union. Thus, road links between these countries are well developed. In recent years, initiatives for the integration of landlocked economies in Central Asia into the world economy has given impetus to the development of links with neighbouring countries. The length of the road network in Kazakhstan is 87,173 kilometres, out of which 68 per cent is paved. The road network carries about 87 per cent of domestic freight and the road density is 32 kilometres per thousand square kilometres. The differences in climatic and geographic conditions, such as deserts and mountains, constrains the development of the highway network in Kazakhstan.

Figure 1. Existing and potential Asian Highway corridors



4. Mongolia

The total length of the road network in Mongolia is 49,250 kilometres, the majority of which are natural tracks, out of which 1,678 kilometres (about three and a half per cent) is paved. Thus, natural unpaved roads predominate in the road network of Mongolia. Most passenger movements are by road. The road network carries about 12 per cent of domestic freight and the road density is 34 kilometres per thousand square kilometres.

Before 1990 land transport was restricted to the former Soviet Union. In recent times, as a result of the efforts of the Government of Mongolia, the national road network is gradually being developed through foreign investment. International agencies, such as the World Bank, ADB and the Kuwaiti Fund, are assisting Mongolia in improving the condition of the road network.

5. The Republic of Korea

Transportation by automobiles began to grow during the 1950s. With the implementation of the Five-year Economic Development Plans, the government realized the absolute importance of roads to the country's economic development and allocated significant funds and other resources to road construction. The expansion of road networks improved accessibility and mobility among regions resulting in a more balanced distribution of income and better living conditions in the Republic of Korea. As a result, the efforts of the government have provided well-developed national road networks. The length of the road network was 87,534 kilometres, in 1999, out of which 68 per cent is paved. The road network carries about 69 per cent of domestic freight (excluding private freight) and the road density is 852 kilometres per thousand square kilometres.

Topographically, most of the Republic of Korea is mountainous terrain, the east is higher than the west and the south. Accordingly, major roads are developed in the north-south direction with many roads located in hilly or mountainous regions.

6. The Russian Federation

The highway network is well developed in the European part of the Russian Federation, whereas in the Asian part, road infrastructure is only developed along the southern border of the Russian Federation and in the far eastern part along the border of China and the Democratic People's Republic of Korea. The total length of road network is 569,036 kilometres, out of which 60 per cent is paved. The road network carries about 35 per cent of domestic freight and the road density is 33 kilometres per thousand square kilometres.

Thus, the levels of development of the road network in the participating countries are different. Figures 2, 3, 4 and 5 show summarized data relating to lengths and density for each country, the pavement condition of roads, the volume of domestic freight movement and the modal share of domestic freight movement respectively.

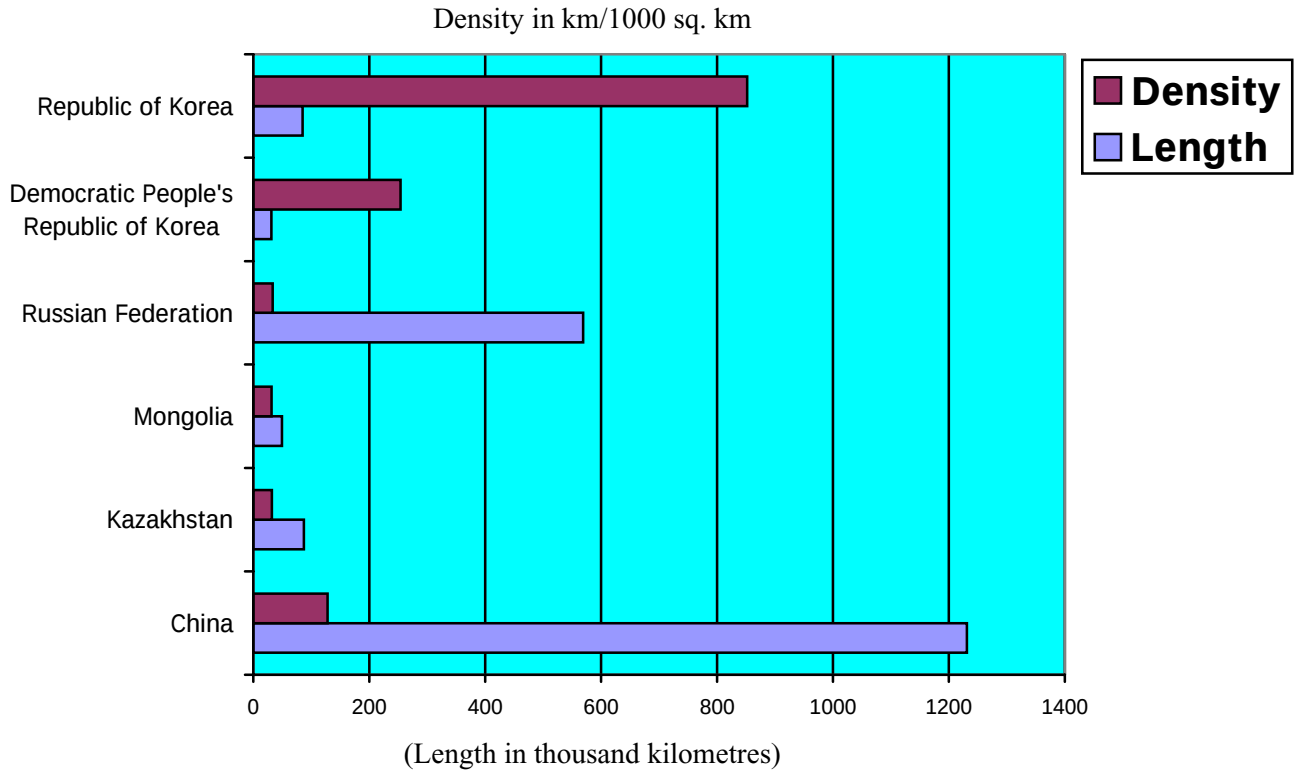


Figure 2. Length of roads and their density (1997)

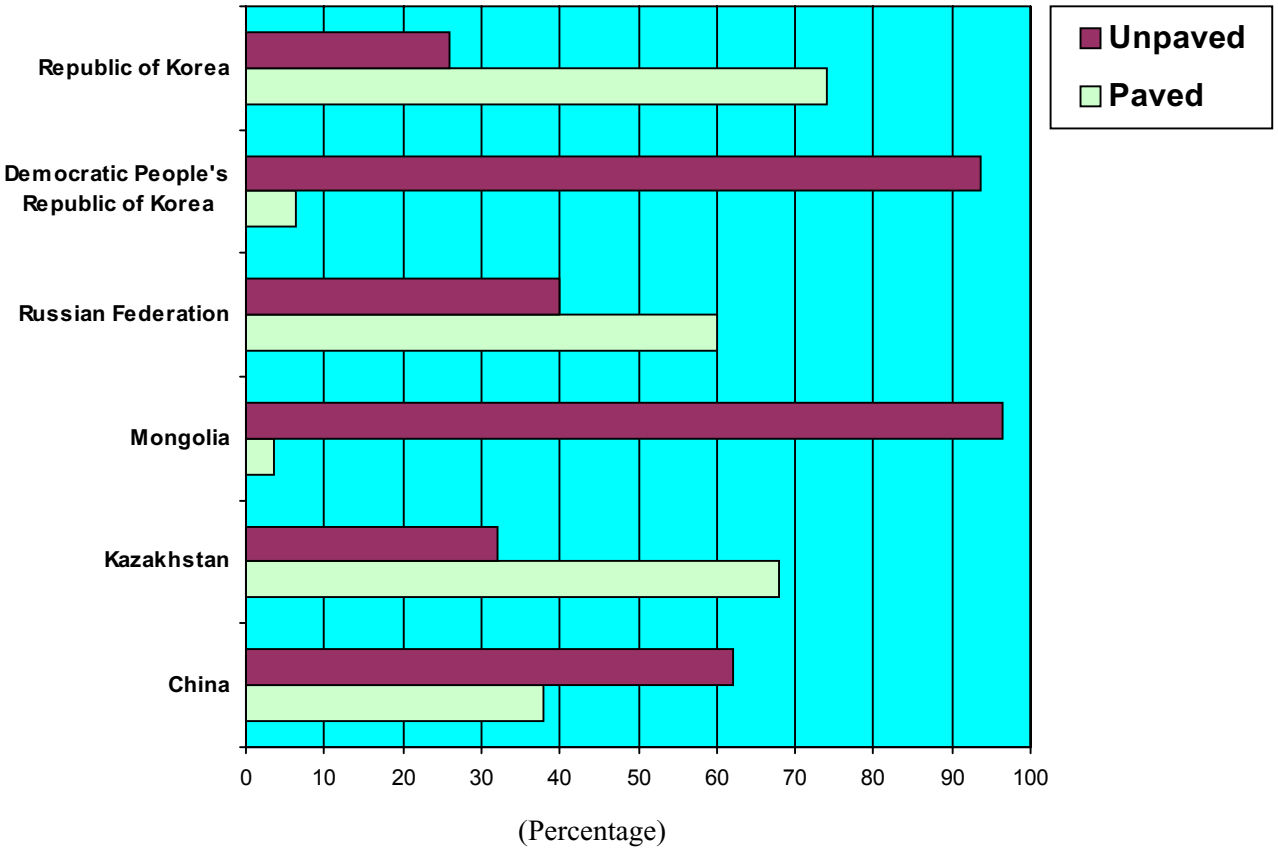
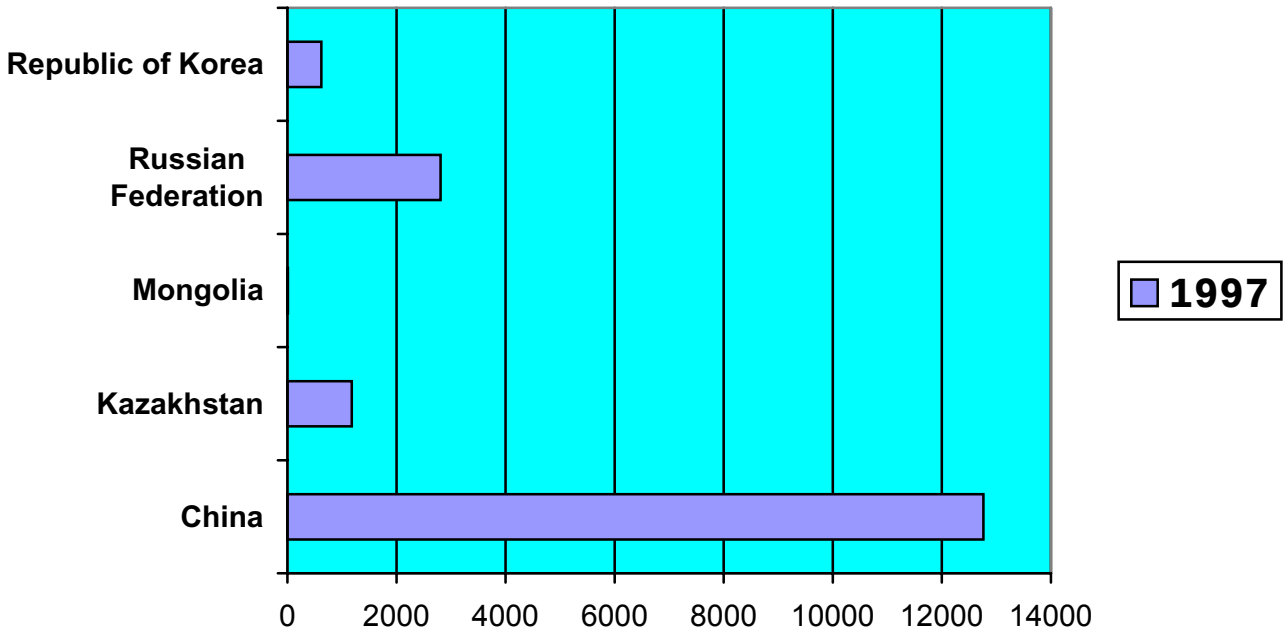
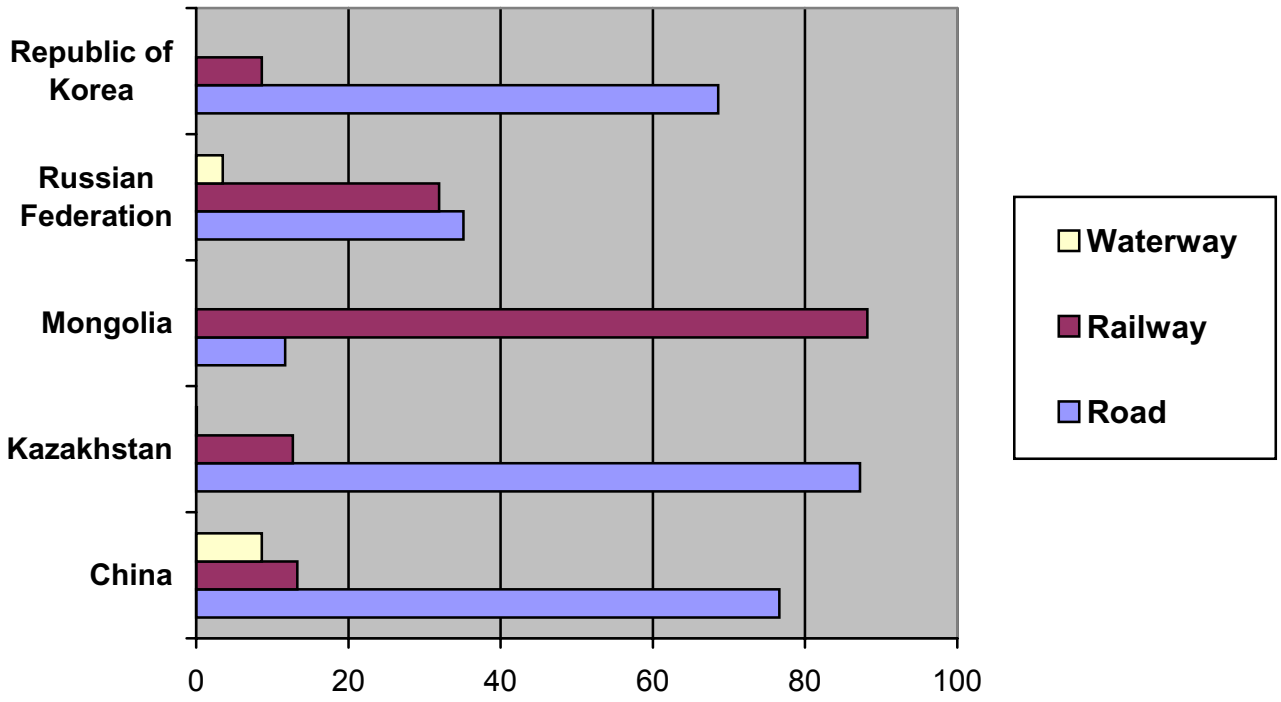


Figure 3. Pavement condition of roads (1997)



(million tons)

Figure 4. Volume of domestic freight movement



(Percentage)

Figure 5. Modal share of domestic freight movement (1997)

B. Road classification and design standards

1. China

The road classification and technical standards for design, construction, rehabilitation and maintenance of roads in China follow the classification and standards that have been approved and formulated by the Ministry of Communications.

(a) Classification

Roads in China are divided into five classes according to their service status. Table 1 shows the classification of roads in China.

Table 1. Classification of roads in China

Classification	Description
National highway	Connects the capital of China with provinces, major industrial centres, links north-south and east-west of China
Provincial highway	Connects capitals of provinces and major centres of provinces
County highway	Connects all counties of China
Township road	Roads of extra large cities
Special road	Roads for special use

(b) Technical standards

Technical Standards of Highway Engineering is used for the new construction and rehabilitation of highways. According to these standards, highways are divided into five categories that are based on their function and traffic volumes.

Highway design standards are summarizied in table 2.

Table 2. Class of roads in China

Class	Annual average daily traffic	Design speed (km per hour)
Expressway	25,000-100,000	120-60
I	15,000-30,000	100-60
II	3,000-7,500	80-40
III	1000-4000	60-30
IV	< 1500	40-20

A brief summary of major technical criteria by highway class is shown in table 3 and 4.

Table 3. Design elements by highway class according to the Technical Standards of Highway Engineering

Highway class		Expressway						Class I		Class II		Class III		Class IV	
Design speed (km/h)		120			100	80	60	100	60	80	40	60	30	40	20
Number of traffic lanes		8	6	4	4	4	4	4	4	2	2	2	2	1 or 2	
Carriage way Width (m)		2x15.0	2x11.25	2x7.5	2x7.5	2x7.5	2x7.0	2x7.5	2x7.0	9.0	7.0	7.0	6.0	3.5 or 6.0	
Subgrade Width (m)	Normal	42.5	35.0	27.5	26.0	24.5	22.5	25.5	22.5	12.0	8.5	8.5	7.5	6.5	
	Variable value	40.3	33.0	25.5	24.5	23.0	20.0	24.0	20.0	17.0				4.5 or 7.0	
Absolute minimum radius of horimntal curve (m)		650			400	250	125	400	125	250	60	125	30	60	15
Stopping Sight distance (m)		210			160	110	75	160	75	110	40	75	30	40	20
Maximum grade(%)		3			4	5	5	4	6	5	7	6	8	6	9
Truck loads		Truck-Super 20						Truck-Super 20 Truck-20		Track-20				Truck-10	
		Trailer-120						Trailer-120 Trailer-100		Trailer-100				Crawler-50	

Table 4. Height clearance of roads in China

Road categories	Height clearance (m)
Expressway	5.0
Class I, II	5.0
Class III, IV	4.5

The typical structures of pavement and typical cross-sections are shown in figures 6.

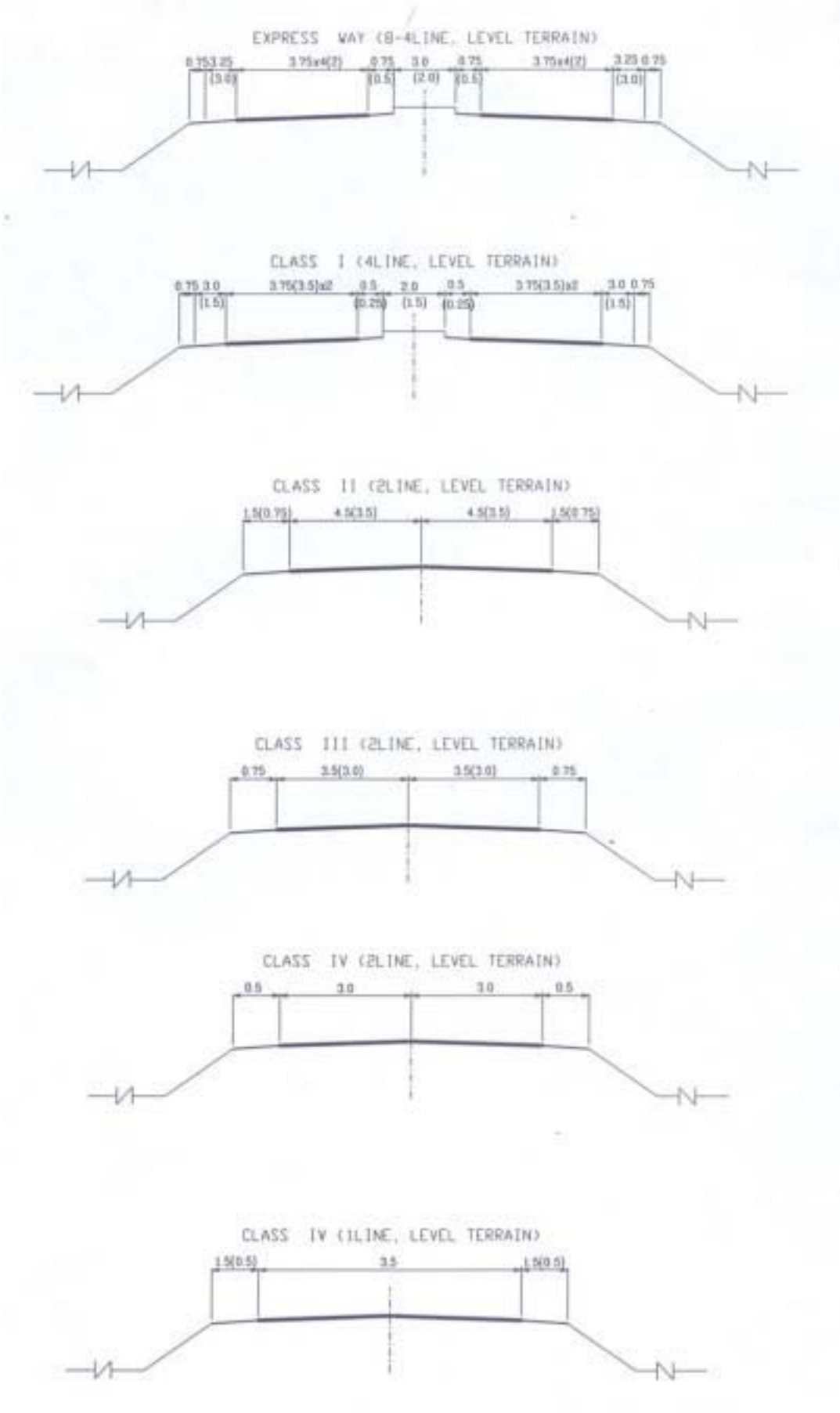


Figure 6. Typical cross-sections

2. Kazakhstan

The classification and the design standards developed in the former Soviet Union for the design, construction, improvement and maintenance of roads are used in Kazakhstan.

(a) Classification

Table 5 shows the classification of roads in the former Soviet Union according to SNiP 2.05.02-85 (the Construction Rules and Procedures).

Table 5. Classification of roads in the former Soviet Union

Classification	Description
State road	Roads connecting capitals of republics, major towns and economic centres.
Republican road	Roads of republican importance, connecting regional and economic centres.
Regional road (Subnational)	Roads of regional importance, connecting district centres, large production plants, and connecting with other transport modes.
Local road	Roads of district importance, connecting district centres with major villages, large local production plants, state farms, and connecting with other transport modes.

In addition to the above, there are some other roads classified as: resort road, approach road, and inter city/village road (streets) in the former Soviet Union classification.

Since it was not necessary to draw a distinction between the state road and the republican road after independence, these two classes are combined into one as the republican road.

Table 6 shows the classification of roads currently adopted by Kazakhstan with relation to the former Soviet Union classification.

Table 6. Classification of roads in Kazakhstan

Country	Classification of roads of the former Soviet Union			
	State	Republican	Regional	Local
Kazakhstan	Republican		Local	

(b) Technical standards

The design, construction, improvement and maintenance of roads in Kazakhstan are carried out according to the provisions of various technical standards of the former Soviet Union. Major former Soviet Union standards relating to highways are listed in table 7.

Table 7. Major former Soviet Union technical standards for roads

Title	Description
SNiP 2.05.02-85	Design standard for highways
SNiP 2.05.03-84	Design standard for bridges and culverts
SNiP 11-7-81	Standards and regulations for civil engineering construction works
GOST 10807-78	Design standard for traffic signs
GOST 13508-74	Design standard for markings
GOST 23457-86	Design standard for traffic control system

Note: SNiP stands for Construction Rules and Procedures.
GOST stands for National Standards.

SNiP 2.05.02-85 is the road design standard in Kazakhstan. The provision of standards is summarized in tables 8, 9, 10 and 11.

Table 8. Class of roads in the former Soviet Union

Class	Design traffic volume (vehicles per day)	Design speed (km per hour)	Remark
I	> 7,000	120-150	State and republic
II	3,000 - 7,000	120	State, republic, regional and local
III	1,000 - 3,000	100	State, republic, regional and local
IV	100 - 1,000	80	State, republic, regional and local
V	< 100	60	Local

Table 9. Cross-section elements of roads in the former Soviet Union

Class	Right of way (m)	Number of lanes	Lane (m)	Median (m)	Shoulder (m)
I	27.5(20.0) - 35.0	4	3.75	5.0(2.0) - 12.5	3.75(1.5) x 2
	35.0(27.5) - 42.5	6	3.75	5.0(2.0) - 12.5	3.75(1.5) x 2
II	15.0	2	3.75	-	3.75 x 2
III	12.0	2	3.5	-	2.5 x 2
IV	10.0	2	3.0	-	2.0 x 2
V	8.0	1	4.5	-	1.75 x 2

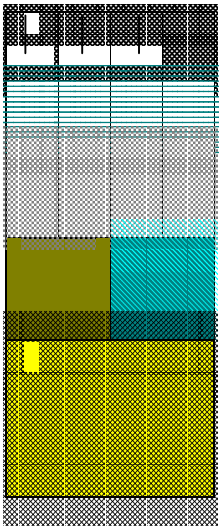
Table 10. Other elements relating to the design speed of roads in the former Soviet Union

Design speed (km/h)	Max. vertical grade (%)	Minimum sight distance (m)		Min. horizontal curve (m)	
		for stopping	for incoming vehicle	Normal	Mountainous
150	3	300	-—	1,200	1,000
120	4	250	450	800	800
100	5	200	350	600	400
80	6	150	250	300	250
60	7	85	170	150	125
50	8	75	130	100	100
40	9	55	110	60	60
30	10	45	90	30	30

Table 11. Height clearance of roads in the former Soviet Union

Road categories	Height clearance (m)
Paved roads	5.0
Tunnels	5.0
Earth roads (as major link)	4.5
Cattle paths	3.0
Bicycle/pedestrian paths	2.5

The initial provision of pavement design load was 6 tons per axle. It was later revised to 10 tons per axle. The typical structures of road pavement are shown in figure 7. Typical cross-sections are shown in figure 8.



4 Asphalt concrete dense

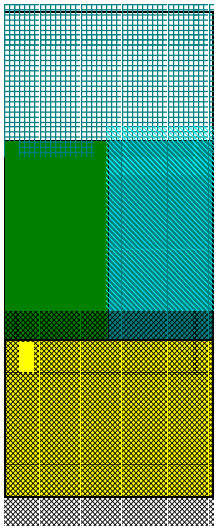
6 Asphalt concrete porous

6 Asphalt concrete porous

20 Bituminous macadam or sand or cement – bound sand - metalling

50 Additional sand layer

Asphalt pavement

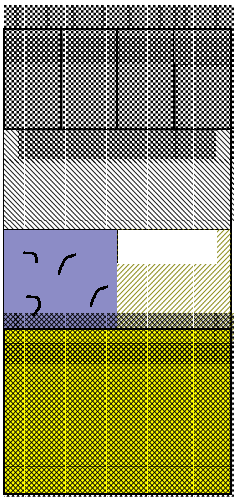


22-24 Cement concrete

16-24 Metalling or cement – bound metalling or cement-bound sand – metalling

40-50 Additional sand layer

Cement concrete pavement



1-3 Coating

6-8 Coating of chipping

14-18 Coating of chipping or gravel

30-50 Additional sand layer

Bituminous treated pavement

Figure 7. Typical structure of road pavement according to SNiP 2.05.02-85

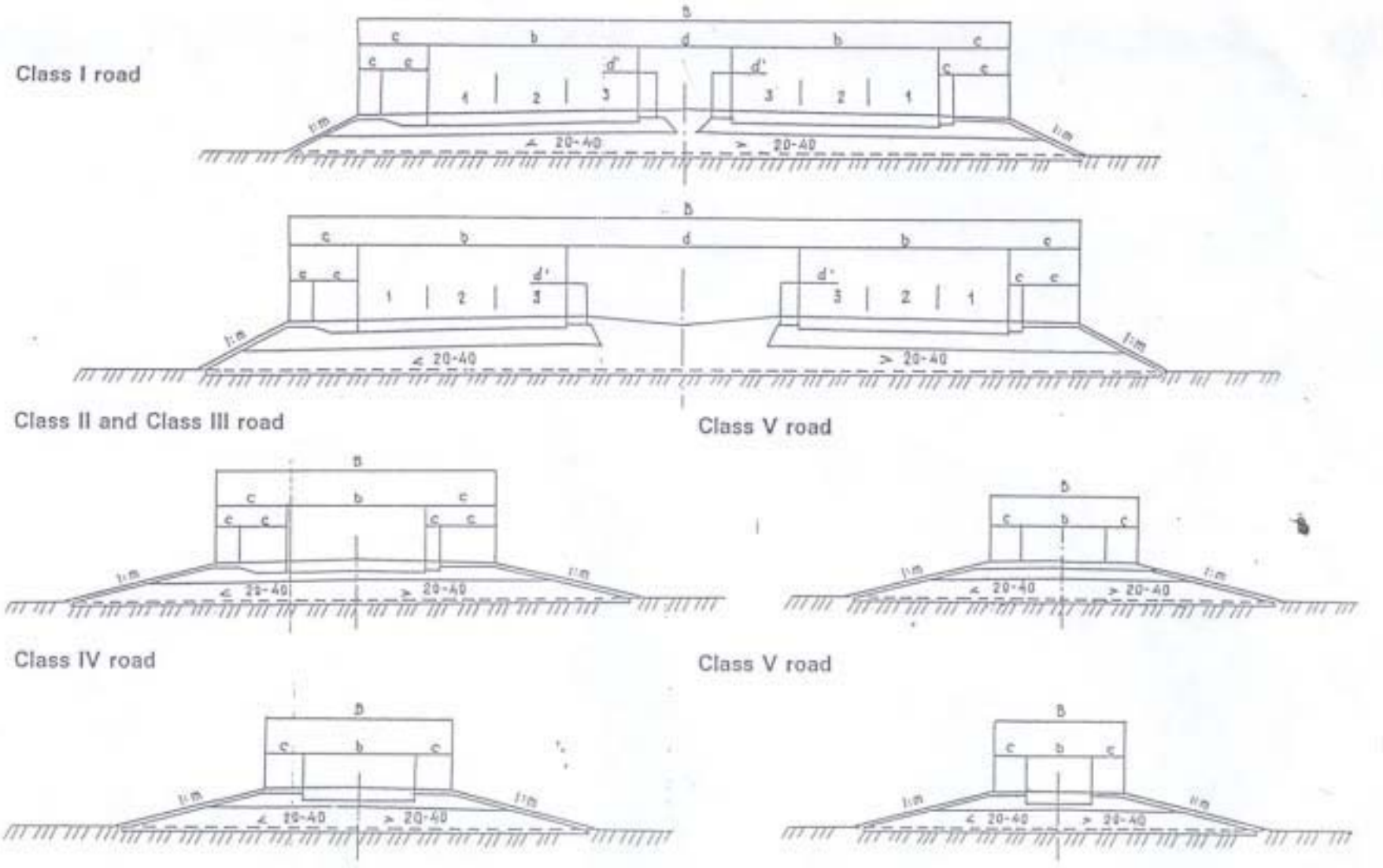


Figure 8. Typical cross-sections according to SNiP 2.05.02-85

For the design of bridges and culverts SNiP 2.05.03-84 and "NK-80" loading with class "A-11" is used. Standard highway traffic loading "NK-80" is shown in table 12 (single axle).

Table 12. Standard highway traffic loading

Loading class	A-11
P (kn)	108
P (kn/m)	9.81

3. Mongolia

The road classification and technical standards for design, construction, improvement and maintenance of roads in Mongolia are based on the classification and the standards developed in the former Soviet Union.

(a) Classification

The technical standards used for design are "Auto Road Construction Standards and Specifications" and SNiP 2.05.02-97. Table 13 shows the classification of roads in Mongolia.

Table 13. Classification of roads in Mongolia

Classification	**Description**
State road	Road connecting major cities and the centre of *Aimags* (There are 21 *Aimags* (region) in Mongolia).
Regional road	Road connecting the centre of *Aimags* and *sums* (*Aimags* are divided into *sums*).

(b) Technical standards

"Highway Design Standards, 1998" for road design and construction were developed with ADB technical assistance and the cooperation of Kazakhstan, Kyrgyzstan and Mongolia in June 1998. The road construction standard has been approved and the road design standard is still under review. Technical guidelines for the improvement and maintenance of roads were developed and approved by the Road Department in 1998. A road maintenance manual has been developed as part of a project financed by the World Bank.

Traffic Control Devices Standards MNS 4596-98 and Traffic Signs Standards MNS 4597-98 were approved by resolution number 22 of the Government's Standardization and Measurement Authority, and have been in use since 10 July 1998.

Tables 14, 15, 16 and 17 show the relation between designed traffic and speed, cross-section elements, provision of gradient, sight distance and horizontal curve related to the design speed and height clearance of roads in Mongolia.

Table 14. Design speed corresponding to design traffic volume

Class	Design traffic volume (vehicle per day)	Design speed (km per hour)
I	≥ 7,000	120-150
II	3,000 - 7,000	120
III	1,000 - 3,000	100
IV	100 - 1,000	80
V	≤ 100	60

Table 15. Cross-section elements of roads in Mongolia

Class	Right of way (m)	Number of lanes	Lane (m)	Median (m)	Shoulder (m)
Expressway	27.5(20.0) - 35.0	4	3.75	3.5 - 20	3.75(2.0) times 2
I	27.5(20.0) - 35.0	4	3.5	5.0	3.5 times 2
II	13.0	2	3.5	-	3.0 times 2
Ill	12.0	2	3.5	-	2.5 times 2
IV	9.0	2	3.0	-	1.5 times 2
Low volume roads	4.5-5.0	1-2	4.5-5	-	-

Table 16. Gradient, sight distance and horizontal curve related to design speed

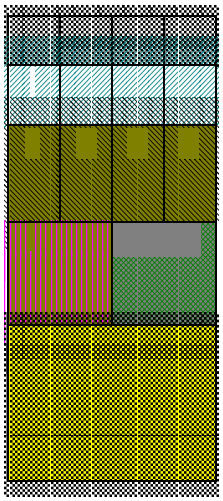
Design speed (km/h)	Max. vertical grade (%)	Minimum sight distance (m)		Min. horizontal curve (m)
		for stopping	for passing	
140	3	280	-—	1250
120	4	250	800	750
100	5	200	680	450
80	6	140	560	250
60	7	85	420	150
50	8	70	340	100
40	9	55	290	60
30	10	45	230	30

Table 17. Height clearance of roads in Mongolia

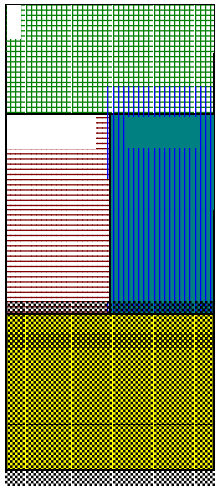
Road categories	Height clearance (m)
Paved roads	5.0
Tunnels	5.0
Earth roads (as major link)	4.5
Cattle paths	3.0

With the exception of low volume roads, pavement structural design for all classes and categories is carried out for 100kN single wheel, single axle load. The typical structures of road pavement are shown in figure 9, the typical cross-sections are shown in figure 10.

Asphalt pavement



Cement concrete pavement



Bituminous treated pavement

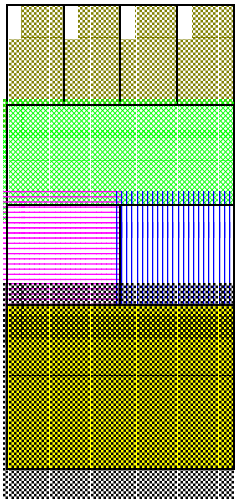


Figure 9. Typical structure of road pavement

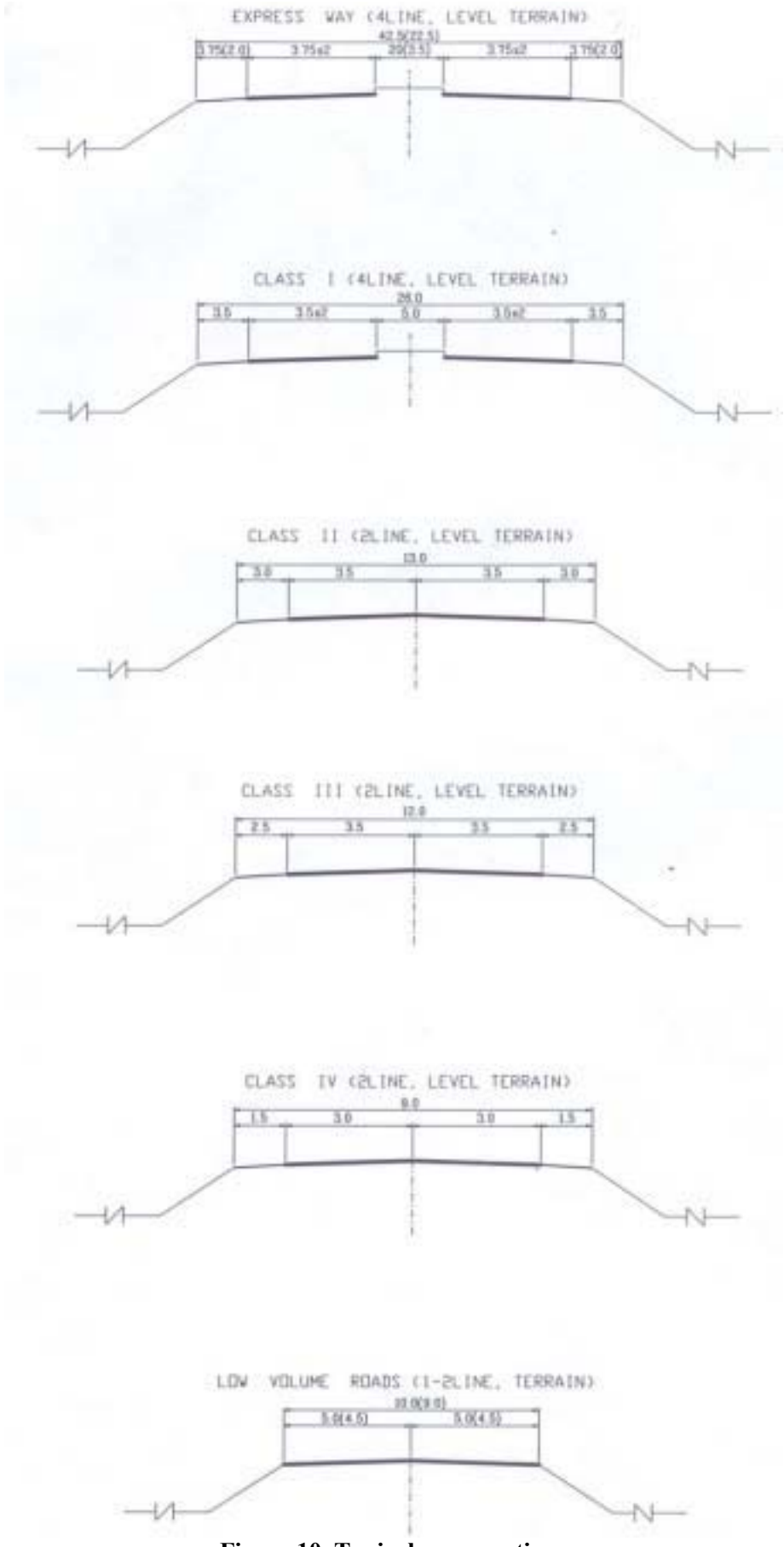


Figure 10. Typical cross-sections

4. The Republic of Korea

Roads in the Republic of Korea are classified according to the Road Regulation. According to the Road Regulation, the roads are divided into classes based on the jurisdiction for planning, construction and management.

(a) Classification

Table 18 shows the classification of roads according to the Road Regulation.

Table 18. Classification of roads in the Republic of Korea

Classification	Description
National expressway	Roads used exclusively by motor vehicles for high speed transport linking major urban centres
National highway	Roads linking important urban centres, ports, and harbours, airports and tourist resorts etc. and constituting the national trunk road network
Provincial road	Roads forming a secondary network which provides linkages between provincial towns
Special greater city roads	Roads within the boundaries of Seoul special city, and Pusan, Taegu, Inch'on, Kwangju, Taejon, and Ulsan cities, direct control of the national government
City road	Roads within city boundaries
Country (Gun) road	Rural public roads connecting villages with their country centres or with neighbouring towns
District road	Roads within boundaries of each district

(b) Technical standards

Technical standards for the design, construction, improvement and maintenance of roads in the Republic of Korea are based on the following standards:

- Code for the structure of roads and facilities
- Guidelines for the installation and maintenance of roads safety facilities
- Code for road traffic safety

The Republic of Korea has its own design standards based on American (AASHTO[1]) standards.

The provisions of road design standards are summarized in tables 19, 20, 21 and 22.

[1] American Association of State Highway and Transport Office

Table 19. Class of roads in the Republic of Korea

Class	Design traffic volume (Vehicle per day)	Design speed (km per hour)
I	≥ 7,000	120 - 150
II	3,000 - 7,000	120
III	1,000 - 3,000	100
IV	100 - 1,000	80
V	≤ 100	60

Table 20. Cross-section elements of roads in the Republic of Korea

Class		Design speed	Width		
			Lane	Shoulder	Median strip
Rural area	Highway	100-120	3.5	3.0	3.0
	National road	60-80	3.25-3.5	1.75	1.5
	Provincial road	50-70	3.0-3.25	1.25	
	City/Country road	50-60	3.0	1.0	
Urban area	Highway	80-100	3.5	2.0	2.0
	National road	80	3.25-3.5		1.5
	Provincial road	60	3.0-3.25		
	City/Country road	50	3.0		

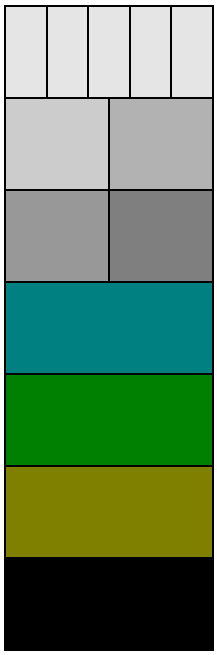
Table 21. Other elements relating to the design speed of roads in the Republic of Korea

Design speed (km/h)	Curve			Slope (%)		Lane width (m)
	Min. curve (m)	min. length of curve (m)		Standard	Special	
		cross angle < 5°	cross angle > = 5°			
120	710	700	140	3	-	> 3.5
100	460	550	110	3	5	3.5
80	280	450	90	4	6	3.5
70	200	400	80	4	6	3.25
60	140	350	70	5	7	3.25
50	90	300	60	6	9	3.0
40	60	250	50	7	10	3.0
30	30	200	40	8	11	3.0
20	15	150	30	10	13	3.0

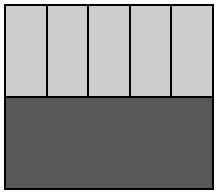
Table 22. Height clearance of roads in the Republic of Korea

Road categories	Height clearance (m) normal (extreme)
All roads	4.5
Collector and local roads	4.5 (4.2)
"rare large vehicles" and "by-pass road"	4.5 (3.0)

The typical structures of road pavement are shown in figure 11. The typical cross-sections of rural and urban areas are shown in figure 12.



Asphalt pavement



Cement concrete pavement

Figure 11. Typical structure of road pavement used in the Republic of Korea

Design load used for bridges and culverts is shown in table 23.

Table 23. Standard highway traffic loading

Loading class	Total loading (ton)
DB-24	43.2
DB-18	32.4
DB-13.5	24.3

Note: **DB** : Weight of vehicle

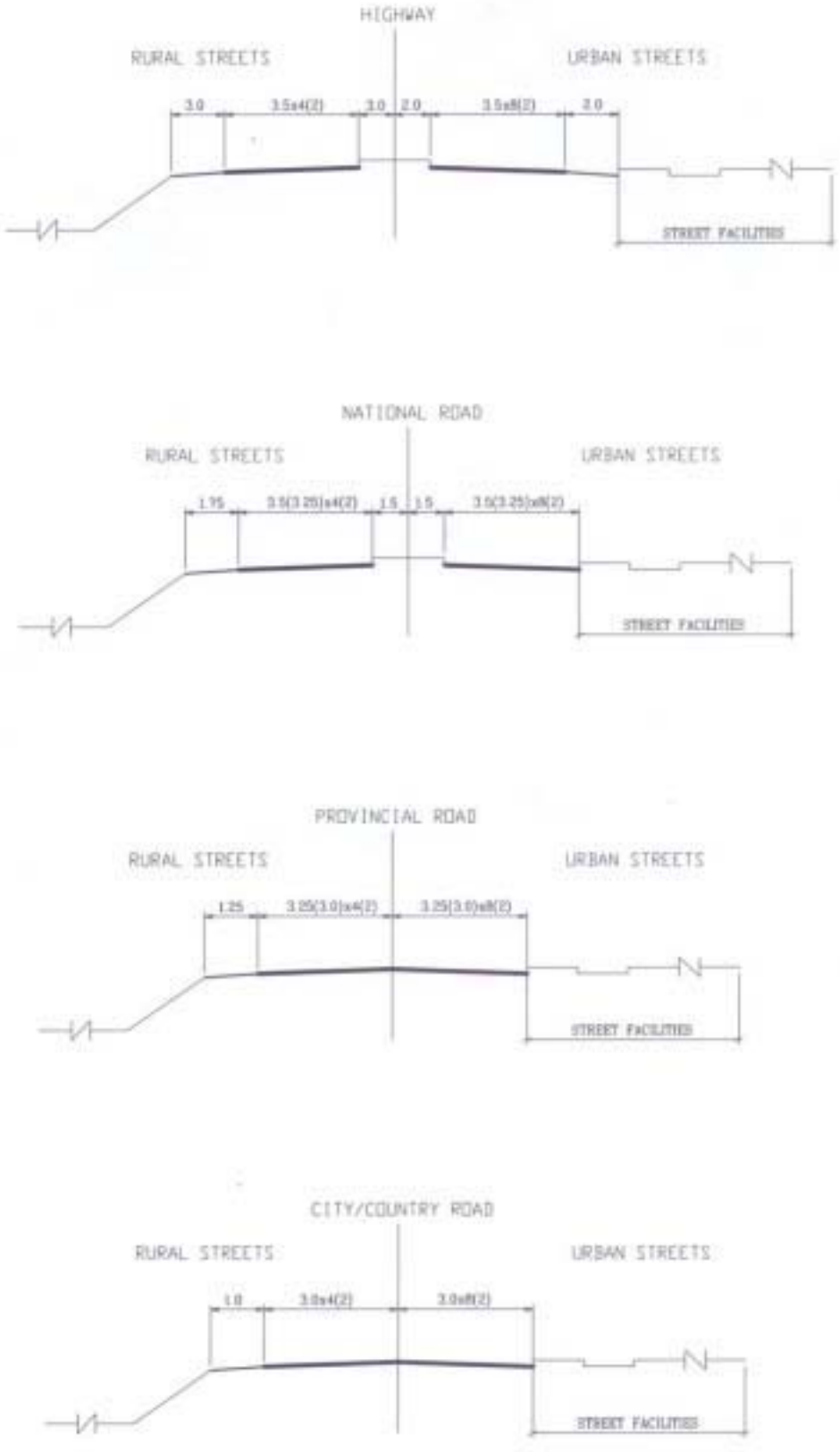


Figure 12. Typical cross-sections

5. The Russian Federation

A new road classification was introduced in the Russian Federation in 1991, which classifies the roads according to the following catagories:

- Federal (National) highways
- Regional highway
- Departmental and private (others) highways

The design, construction, improvement and maintenance of roads in the Russian Federation are carried out according to the provisions of various technical standards developed in the former Soviet Union period. The following are some of the standards in use in the Russian Federation:

SNiP[2] 2.05.02-85:	Design standard for highways
SNiP 2.05.03-84:	Design standard for bridges and culverts
GOST[3] 10807-78:	Design standard for road signs
GOST 13508-74:	Design standard for road markings
GOST R 50597-93:	National Standard for Automobile Roads and Streets
GOST 23457-86:	Design standard for application of signs and markings

SNiP 2.05-02-85, GOST 10807-78, GOST 13508-74, GOST 23457-86 have been revised and GOST R 50597-93 was under revision in 1998 in the Russian Federation.

SNiP 2.05-02-85 further classifies the roads into five classes, Class I, Class II, Class III, Class IV and Class V. Class I is either a four or six lane road with median and shoulders, Class II, Class III and Class IV are double lane roads with shoulders and Class V which is used for low traffic volume is a single lane road with shoulders. Some of the technical provisions of SNiP 2.05-02-85 are included in section III.B.3.

6. Comparison of the Asian Highway design standards and national standards

New Asian Highway classification and design standards which were proposed and endorsed as general guidelines for the Asian Highway by the Expert Group Meeting held in Bangkok from 29 November to 3 December 1993, are included in annex I. The following paragraphs provide a comparison between the related standards and classification in the countries and the existing Asian Highway standards.

Design standards applied in China for highway construction are based on Technical Standards of Highway Engineering, which came into effect after 1998. The standards included in the TSHE meet the Asian Highway design standards. Full access controlled highways, which are classified as

[2] SNiP stands for Construction Rules and Procedures
[3] GOST stands for National Standards

primary in the Asian Highway standards, are classified as expressways in TSHE. Class I, II and III comply with class I, II and III of the Asian Highway standards. Class IV of the TSHE is not suitable for the Asian Highway standards but the design parameters in this class are close to the parameters for class III of the Asian Highway Standards and could be used in extraordinary situations.

The road design standards adopted in Kazakhstan, Mongolia and the Russian Federation are based on SNiP 2.05.02-85, which was used in the former Soviet Union. The design standards included in SNiP meet the Asian Highway design standards. Class I, II and III of SNiP comply with Class I and II of the Asian Highway standards which are considered as desirable standards, while Class IV of SNiP complies with Class III of the Asian Highway standards, which is considered as a minimum desirable standard. Since Class V of SNiP is only a single lane local road, it is not suitable for the Asian Highway. Full access controlled highways, which are classified as primary in the Asian Highway standard are not classified in SNiP. Recently revised design standards, which have been developed with ADB assistance, are in use in Mongolia.

The road design standards adopted in the Republic of Korea are based on the "Code for Structure of Roads and Facilities" which is based on American standards (AASHTO). The design standards included in the "Code of Structure of Roads and Facilities" meet the Asian Highway design standards. Class I, II and III of the "Code of Structure of Roads and Facilities" comply with Class I and II of the Asian Highway standards which are considered as desirable standards, while Class IV and V of the "Code of Structure of Roads and Facilities" comply with Class III of the Asian Highway standards, which is considered as a minimum desirable standard. All classes of roads of the Republic of Korea have a minimum of two lanes in one direction. Full access controlled highways, classified as primary in the Asian Highway standard, are listed as national expressways in the "Code of Structure of Roads and Facilities".

C. Status of the road network and road transport

1. China

(a) *Basic data*

China is the third largest country in the world, covering an area of 9,600,000 square kilometres, stretching about 5,000 kilometres from east to west and 5,500 kilometres from north to south. The population of China (excluding Taiwan Province of China) in 1999 was 1,259,100,000.

Opening up to the outside world and reform initiatives proved highly successful and gave China one of the highest economic growth rates in the world in the 1980s and early 1990s. The gross national product (GNP) per capita remains relatively low. However, the gross domestic product (GDP) in 1999 was 8,191,100,000 yuan renminbi. Manufacturing and agriculture are the main components of GDP.

Agriculture and forestry account for more than onefourth of GDP and employ about threefifths of the labour force. Manufacturing accounts for twofifths of GDP and employs onesixth of the nation's workforce.

(b) *General transport*

China's expanding transport system has not kept pace with the rapid growth and modernization of the larger economy, and railroads, mostly using steam locomotives, still provide the major means of freight haulage.

The length of the national highway network in China is increasing rapidly. The total length of the road network is 1,231,176 kilometres.

An extensive system of inland waterways of 110,000 kilometres, located mostly in central and southern China, provides an alternative mode of transport. International airports are located in Shanghai, Guangzhou, Beijing, and China is operating a domestic air transport service to all provinces and autonomous regions.

Road development indicators are shown in table 24.

Table 24. Road development indicators

Classification	1991	1993	1995	1997
Population (thousands)	1,158,230	1,185,170	1,211,210	1,236,260
Population density (person/sq. km)	120.6	123.5	126.2	128.8
Road density (km/sq. km)	0.108	0.113	0.121	0.128
Number of vehicles (thousands)	6,061,149	8,175,838	10,400,029	12,190,902
Number of driving licences (thousands)	17,915	23,594	35,052	52,068

The modal share of freight and passenger movement are shown in tables 25, 26, 27 and 28.

Table 25. Modal share of domestic freight movement

(in '000 tons)

Freight volume	1991	1993	1995	1997	Modal share per cent
Road transport	7,339,070	8,400,000	9,400,000	9,770,000	76.6
Railway transport	1,528,920	1,630,000	1,660,000	1,696,000	13.3
Inland waterway transport	320,200	341,500	731,820	676,610	5.3
Air transport	-	-	-	10,000	-
Ship	513,500	638,500	398,180	453,990	3.5
Pipelines	155,780	180,000	150,000	1,630,000	1.3
Total	**9,857,920**	**11,190,000**	**12,350,000**	**12,760,000**	**100**

Table 26. Freight traffic volume

(in million ton-km)

Transport	1991	%	1993	%	1995	%	1997	%
Road	342,810	12.3	407,100	13.4	469,500	13.1	527,200	13.8
Railway	1,097,200	39.2	1,195,500	39.3	1,287,000	36.0	1,309,800	34.3
Inland waterway	96,173	3.4	111,052	3.6	158,607	4.4	150,184	3.9
Pipe line	62,100	2.2	60,800	2.0	59,000	1.7	58,500	1.5
Air	1,010	-	1,700	0.1	2,200	0.1	2,900	0.1
Ship	1,199,382	42.9	1,268,048	41.7	1,596,593	44.7	1,773,316	46.4
Total	**2,798,670**	**100.0**	**3,044,200**	**100.0**	**3,573,000**	**100.0**	**3,821,900**	**100.0**

Table 27. Passenger volume

(million passengers)

Transport	1991	%	1993	%	1995	%	1997	%
Road	6,827	84.7	8,610	86.4	10,410	88.7	12,050	90.9
Railway	951	11.8	1,060	10.6	1,030	8.58	924	7.0
Inland waterway	156	1.9	138	1.4	187	1.6	172	1.3
Air	22	0.3	30	0.3	50	0.4	56	0.4
Ship	678	8.4	132	1.3	53	0.4	54	0.4
Total	**8,061**	**100.0**	**9,920**	**100.0**	**11,730**	**100.0**	**13,256**	**100.0**

Table 28. Passenger traffic volume

(in million passengers- km)

Transport	1991	%	1993	%	1995	%	1997	%
Road	287,170	46.5	370,100	47.1	460,300	51.1	554,100	55.4
Railway	282,810	45.8	348,300	44.3	354,600	39.4	352,200	35.2
Inland waterway	11,675	1.9	12,753	1.6	12,526	1.4	11,226	1.1
Air	30,130	4.9	47,800	6.1	68,100	7.6	79,000	7.9
Ship	6,045	0.9	6,847	0.9	4,674	0.5	4,374	0.4
Total	**617,830**	**100.0**	**785,800**	**100.0**	**900,200**	**100.0**	**1,000,900**	**100.0**

(c) *Status and condition of the national road network*

The length of roads by category is shown in table 29.

Table 29. Classification of roads in China

Classification	Length (km)
National highway (including motorway)	116,773
Provincial highway	
County highway	1,062,641
Township road	
Special road	51,762
Total	**1,231,176**

National highways provide connections between the capital of China and administrative and major industrial centres. They also provide connections between the north and south, and east and west of China. Provincial highways connect the capitals of provinces and the major economic centres of provinces. County highways connect centres of counties and towns in counties. Township roads are roads providing connections in extra large cities with a population of over one million.

The Ministry of Communications is responsible for the construction, maintenance and administration of highway and associated facilities, as well as toll levies.

A study of the development of the Asian Highway network published in 1995 identified Asian Highway routes in China. The total length of the national highway network included in the regional Asian Highway network is 13,529 kilometres. Out of which 2,400 kilometres of national highways have been agreed by China as being part of the Asian Highway network.

The following are the Asian Highway routes in China, identified in the previous study titled Asian Highway Network Development which was published in 1995:

A-3 Border of Mongolia-Erenhot-Jiling-Beijing-Changsha-Kunming-Wanding-Mong La (border of Myanmar) and Ban Bo (border of Lao People's Democratic Republic)

A-4 Shanghai-Xinyang-Lanzhou-Urumqi-Kashi-Hongqilafu-border of Jammu and Kashmir

A-81 Tanggu (port)-Tianjin-Beijing

A-82 Shenzhen-Changsha-Shanghai

The National highway network and the existing Asian Highway network are shown in figure 13.

The road length by technical standards and category is shown in tables 30 and 31.

Table 30. Road length by technical standards

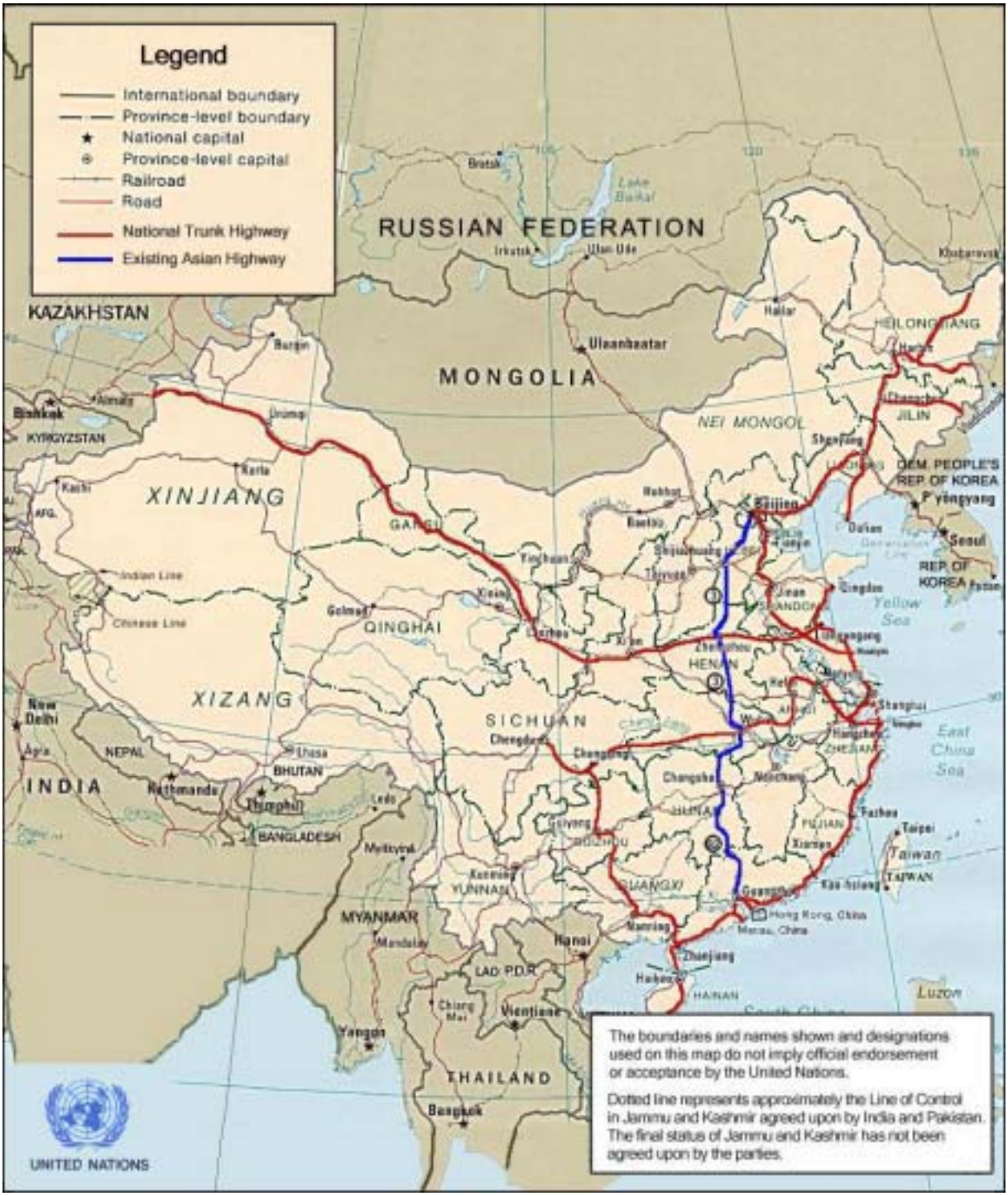
Road classification	Length by technical standards (km)					Total length (km)
	I	II	III	IV	Below IV	
Expressway (access-controlled highway)						4,771
Main or national highway	6,752	41,281	32,358	21,293	7,114	112,002
Secondary or regional highway	7,585	69,142	189,553	575,873	218,921	1,062,641
Other roads	300	1,141	8,876	38,571	2,874	51,762
Total	**14,637**	**111,564**	**230,787**	**635,737**	**228,909**	**1,231,176**

Table 31. Road length by category

(length in km)

Sections		1991	1993	1995	1997
Motorway (access-controlled highway)	**Subtotal**	**574**	**1,145**	**2,141**	**4,771**
	Paved only	574	1,145	2,141	4,771
	(% paved)	(100)	(100)	(100)	(100)
Main or national highway	**Subtotal**	**107,238**	**108,235**	**110,539**	**112,002**
	Paved only	105,528	107,041	109,360	111,044
	(% paved)	(98.4)	(98.9)	(98.9)	(99.1)
Secondary or regional highway	**Subtotal**	**889,816**	**934,778**	**995,863**	**1,062,641**
	Paved only	760,649	811,538	887,212	968,670
	(% paved)	(85.5)	(86.8)	(89.1)	(91.2)
Special used roads	**Subtotal**	**44,082**	**45,755**	**50,607**	**51,762**
	Paved only	39,765	41,657	46,818	48,496
	(% paved)	(90.2)	(91.0)	(92.5)	(93.7)
Total	**Subtotal**	**1,041,136**	**1,083,476**	**1,157,009**	**1,231,176**
	Paved only	**905,933**	**960,236**	**1,043,390**	**1,128,210**
	(% paved)	**(87.0)**	**(88.6)**	**(90.2)**	**(91.6)**

Figure 13. Road network in China



The length of roads by classification and surface type is shown in table 32.

Table 32. Length of roads by classification and surface type

Classification	Length (km)	Road surface type					
		Paved		Gravel		Others	
		km	%	km	%	km	%
Expressway (access-controlled highway)	4,771	4,771	100.0				
Main or national highway	112,002	91,928	82.1	19,116	17.1	958	0.7
Secondary or regional highway	1,062,641	361,035	33.9	607,635	57.2	93,791	8.9
Special used roads	51,762	14,527	28.1	33,969	65.6	3,266	6.3
Total	**1,231,176**	**472,261**	**38.4**	**660,720**	**53.8**	**98,195**	**9.1**

During the eighth Five-year Plan, the length of paved road network has increased by 36 per cent of the total length of highway. Road length by surface condition is shown in table 33.

Table 33. Road condition

(in km)

Sections		1991	1993	1995	1997
	Bituminous	263,921	299,257	340,655	398,750
Pavement	Cement	15,234	28,064	46,172	68,740
	Subtotal	279,155	327,321	386,827	472,261
Gravel and stabilized soil pavement		626,778	632,915	656,563	660,720
Unpaved		135,203	123,240	113,619	98,195
Total		**1,041,136**	**1,083,476**	**1,157,009**	**1,231,176**

(d) *International road links to neighbouring countries*

China is bounded by Mongolia in the north; the Russian Federation and the Democratic People's Republic of Korea in the north-east; the Huang He Sea and the East China Sea in the east; the South China Sea in the south-east; Viet Nam, the Lao People's Democratic Republic, Myanmar, India, Bhutan and Nepal in the south; Pakistan in the south-west; and Afghanistan, Tajikistan, Kyrgyzstan and Kazakhstan in the west. Apart from these 14 countries, China also faces Japan and the Republic of Korea across the Huang He Sea, and the Philippines which lies beyond the South China Sea.

There are 68 border-crossing points officially open to neighbouring countries, out of these 36 border-crossing points are given major importance and operated under the approval of the central government, while the rest are approved by the provincial government. There are also more than 100 temporary border-crossing points approved by the local governments. Although these 36 border-crossing points are administered by the central government and open to all foreigners, there are still 28 provincially controlled points which are open only to citizens of the two countries sharing the border.

All the crossings are not necessarily linked by road, some of them are connected by ferry or ice road (in winter only). The distribution of 68 border-crossing locations include: 11 to the Democratic People's Republic of Korea, 13 points to the Russian Federation, 7 points to Mongolia, 1 point to Kazakhstan, 1 point to Tajikistan, 1 point to Kyrgyzstan, 2 points to Pakistan, 2 points to Nepal, 1 point to Bhutan, 4 points to Myanmar, 4 points to the Lao People's Democratic Republic, 16 points to Viet Nam, 2 points to Macau, China, and 2 points to Hong Kong, China.

The annual volume of border-crossing traffic by road in 1991 is shown in table 34.

Table 34. Annual volume of border-crossing road traffic from/to China

Country	Goods (ton/year)	Passengers (person/year)
The Russian Federation	400,000	N/A
Kazakhstan	250,000	100,000
Mongolia	10,000	N/A
Pakistan	5,000	100,000
Myanmar	50,000	N/A
The Democratic People's Republic of Korea	20,000	N/A

(e) *Development plans*

The "Outline of the Ninth Five-year Plan for National Economic and Social Development and the Prospective Goal of 2010" of China describes long-term highway development and construction policy, and emphasizes the coordinated implementation of the development policy in the regions and country.

During the Ninth Five-year Plan, the construction of important highway sections of four state trunk roads, state roads of high traffic in provincial and regional areas and highway bridges across the Yantze and Huang He Rivers will be launched.

To develop a safe and efficient highway system with trunk routes to fulfill traffic demand and to keep pace with economic development and integration with other modes of transport, a “Prospective development goal of highway construction in China” was developed.

It is planned to complete 12 routes with *"5* longitudinal and 7 transverse", with a total length of 35,000 kilometres in 25-30 years (up to 2020). The planned routes included in “Prospective development goal of highway construction in China” are:

"Five longitudinal " routes

Tongjiang - Sanya
Beijing - Fuzhou
Beijing - Zhuhai
Erenhot of Inner Mongolia Autonomous Region - Hekou of Yuanan
Chongqing - Zhanjiang

"Seven transverse" routes

Suifenhe- Manzhouli

Dandong - Lhasa
Qingdao - Yinchuan
Lianyungang - Huorsko
Shanghai - Chengdu
Shanghai - Ruili
Hengyang - Kunming

These 12 routes will link Beijing with other municipalities and the provincial (regional) capitals. Furthermore, they will connect all the super large cities with a population of over 1 million, and cover 55 per cent of the whole nation's population.

By 2020, the national highway network will provide additional connections with the highways of Bhutan, the Democratic People's Republic of Korea, India, Kazakhstan, Kyrgyzstan, the Lao People's Democratic Republic, Mongolia, Myanmar, Nepal, Pakistan, the Russian Federation, and Viet Nam.

Further, to promote national economic development, to intensify the opening up to the outside of areas along the coast, rivers and borders, and to link various large economic regions, two longitudinal and two transverse state trunk roads with links and connection to the expressways providing transportation in all directions will be developed.

2. The Democratic People's Republic of Korea

(a) *Basic data*

The Democratic People's Republic of Korea occupies the northern portion of the Korean peninsula between the Sea of Japan and the Huang He Sea. The country is bordered by China and the Russian Federation in the north, and by the Republic of Korea in the south. The Democratic People's Republic of Korea covers an area of 122,762 square kilometres, occupying about 55 per cent of the peninsula. The national capital, Pyongyang, is a major industrial and transport centre near the west coast.

The population in the Democratic People's Republic of Korea grew rapidly after the Korean War, roughly doubling in size between 1953 and 1980. The total population was 22.08 million in 1999. The current population growth rate is 0.6 per cent.

The Democratic People's Republic of Korea has a centrally planned closed economy based largely on heavy industries and agriculture. GNP per capita remains low by world standards. The industry sector produces 60 per cent of GDP, followed by agriculture with 25 per cent and services with 15 per cent. The agriculture sector employs about twofifths of the workforce. The manufacturing sector, which employs about onethird of the workforce, is dominated by heavy industries, notably iron and steel, machinery, chemicals and textiles.

(b) *General transport*

The development of the transportation system started after the Korean War. The total length of the national road network is 31,200 kilometres, out of which 1,997 is paved and 29,203 is unpaved.

The railway is government-owned. The total length of railways is 5,000 kilometres. The length of the waterways is about 2,253 kilometres. Most are navigable by small craft only. Pyongyang, Ch'ongjin, Kaesong, Namp'o and Wonsan are major industrial centres and ports. There are 49 airports in the Democratic People's Republic of Korea.

(c) *International links with neighbouring countries*

The Democratic People's Republic of Korea has a land boundary in the north with China and the Russian Federation, and with the Republic of Korea in the south.

The location of border crossings with neighbouring countries is shown in table 35.

Table 35. Border-crossing points

Countries	Border-crossing points
Republic of Korea	Gaesung Jangpung-gun Limgang-ri Jangpung-gun Janghak-ri Pyonggang-ri Pyonggang Pyonggang-ri Chonam-ri Kimhwa-gun Sutae-ri Cholwon-gun Majang-ri Kimhwa-gun Yonghyun-ri Kosong-gun Kueup-ri Keumgang-gun Soksa-ri Changdo-gun Baekhyun-ri Kosong-gun Soksa-ri
China	Shinuiju Manp'o Onsung Saeppyol Wonjong
Russian Federation	Khasan

The existing road network in the Democratic People's Republic of Korea is shown in figure 14.

Figure 14. National road network in the Democratic People's Republic of Korea

3. Kazakhstan

(a) *Basic data*

The Republic of Kazakhstan is the largest country, occupying about 2,724,900 square kilometres of land, in Central Asia. Kazakhstan obtained independence from the former Soviet Union in 1991. The capital has recently been relocated to Astana. The total population was 14,960,000 in 1999. The population growth is currently decreasing at a rate of 1.4 per cent.

Manufacturing industry was stimulated during the Second World War. Modern plants in Kazakhstan now produce cast iron, rolled steel, cement, chemical fertilizers, textiles and a wide array of food products. GDP in 1999 was 2,016,200,000,000 tenga. The manufacturing sector has about a 26 per cent share of GDP and the agricultural sector has about a 12 per cent share of GDP in Kazakhstan.

(b) *General transport*

The land transport infrastructure of Kazakhstan is well developed. There are two major categories of roads, the roads for public use (length: 87,153 kilometres not including urban roads), and the special roads for groups of collective farms and industries (length: 52,127 kilometres). During the last seven years new highway construction has slowed down owing to a lack of resources. The total length of the national railway network and inland waterways is 3,531 and 4,800 kilometres respectively.

Road development indicators are shown in table 36.

Table 36. Road development indicators

Classification	1991	1993	1995	1997
Population (thousands)	16,963.6	16,985.7	16,679.1	16,607.1
Population density (person/sq. km)	6.22	6.23	6.12	6.09
Road density (km/sq. km)	0.032	0.032	0.032	0.032
Number of vehicles (thousands)	-	1,267	1,547	1,493

The modal share of domestic (including to/from CIS countries) freight and passenger movement is shown in tables 37, 38, 39, and 40.

Table 37. Freight movement

(in million tons)

Transport	1991	%	1993	%	1995	%	1997	%
Road	2,236	84.6	1,382.2	83.8	954.2	82.6	991	87.2
Railway	345	13.0	220.5	13.4	161.1	13.9	144	12.2
Inland waterway	10.7	0.4	4.1	0.2	2.0	0.2	1.2	0.1
Pipe line	51.8	2.0	42.3	2.6	37.9	3.3	41.0	3.5
Air	0.07	0	0.02	0	0.03	0	0.03	0
Total	**2,643.57**	**100.0**	**1,649.12**	**100.0**	**1,155.23**	**100.0**	**1,177.23**	**100.0**

Table 38. Freight traffic volume

(in million ton-km)

Transport	1991	%	1993	%	1995	%	1997	%
Road	44,775	9.5	29,213	11.2	10,765	6.7	11,079	7.6
Railway	406,963	86.2	192,258	73.8	124,502	77.6	112,780	77.6
Inland waterway	3,851	0.8	1,546	0.6	802	0.5	443	0.3
Pipe line	16,400	3.5	37,400	14.4	24,164	15.1	20,984	14.4
Air	80	0	102	0	145	0.1	137	0.1
Total	**472,069**	**100.0**	**260,519**	**100.0**	**160,378**	**100.0**	**145,423**	**100.0**

Table 39. Passenger volume

(million passengers)

Transport	1991	%	1993	%	1995	%	1997	%
Road	3,444	98.4	2,237	97.9	1535	97.5	1,263	97.0
Railway	42.6	1.2	44	1.9	37.4	2.4	37.5	2.9
Inland waterway	3.6	0.1	1.3	0.1	0.4	0	0.4	0
Air	8.6	0.3	3.6	0.1	2.0	0.1	1.6	0.1
Total	**3,498.8**	**100.0**	**2,285.9**	**100.0**	**1,574.8**	**100.0**	**1,302.5**	**100.0**

Table 40. Passenger traffic volume

(million passengers-km)

Transport	1991	%	1993	%	1995	%	1997	%
Road	35,355	51.6	19,868	42.1	13,075	42.3	9,913	36.2
Railway	19,734	28.8	20,507	43.4	13,159	42.5	14,199	51.9
Inland waterway	113	0.2	22	0.1	6	0	6	0
Air	13,291	19.4	6,826	14.4	4,713	15.2	3,269	11.9
Total	**68,493**	**100.0**	**47,223**	**100.0**	**30,953**	**100.0**	**27,387**	**100.0**

The modal share of vehicle fleet composition is shown in table 41.

Table 41. Trend in road vehicle fleet composition

Sections		1995	1997
Total		**1,573**	**3,387**
4 or more wheels	Subtotal	1,546	216
	Passenger cars	1,010	1,830
	Buses	68	208
	Trucks	468	1,106
Motorcycles		27	28

(c) *Status and condition of national road networks*

Public roads are classified, according to the "Regulations on Road Classification in Kazakhstan", into two categories: republican roads (17,670 kilometres) and local roads (69,483 kilometres).

The study on the “Highway Network Development in the Asian Republics” in 1996 included 9,879 kilometres of national road network in Kazakhstan in the Asian Highway network.

The technical parameters of most of the national routes included in the Asian Highway network correspond to Asian Highway criteria, except the roads of technical category V which needs upgrading.

The existing Asian Highway routes in Kazakhstan are as follows:

A-5 Border of Kazakhstan -Shymkent-Taraz-border of Kazakhstan - Shymkent-Almaty-Saryozek-Koktal-Korgas

A-60 Border of Kazakhstan -Pavlodar-Semipalatinsk- Georgiyevka-Ayagoz-Taldykorgan-Saryozek

A-61 Border of Kazakhstan – Ural’sk-Aktyubinsk-Kyzylorda-Shymkent-Taraz- border of Kazakhstan

A-62 Petropavlovsk-Yesil-Arkalyk-Zhezkazgan-Kyzylorda

A-63 Urallsk-Atyrau-Dossor-Beyneu- border of Kazakhstan

A-70 Border of Kazakhstan -Atyrau-Dossor-Beyneu-Zhetybay- border of Kazakhstan

A-72 Ucharal-Dostyk

A-74 Border of Kazakhstan -Kostanay- Astana- Karaganda-Balkhash-Almaty- border of Kazakhstan

Figure 15 shows the existing national road and the Asian Highway network in Kazakhstan. The length of roads by class is shown in table 42.

Table 42. Length of public roads in Kazakhstan

Road classification	Length (km)
Republican road (main or national highway)	17,670
Local road (secondary or regional highway)	69,483
Total	**87,153**

Republican roads provide connections between Astana, the capital city of Kazakhstan and other administrative and economic centres. Local roads provide connections within *Oblast* centres, regional centres, district centres and central farmstands of collective farms.

The Department of Transport of the Ministry of Transport and Communications is responsible for public roads in Kazakhstan. The construction and maintenance of roads is under the responsibility of the Road Administration of the Ministry of Transport and Communications.

Figure 15. Existing highway network in Kazakhstan

The road length by technical standards and categories is shown in tables 43 and 44 respectively.

Table 43. Road length by technical standards

Road classification	Length by technical standards (km)					No category	Total length (km)
	I	II	III	IV	V		
Main or national highway	810	3,188	12,880	600	25	167	17,670
Secondary or regional highway	18	1,316	19,557	41,153	2,869	4,550	69,483
Total	**828**	**4,504**	**32,457**	**41,753**	**2,894**	**4,717**	**87,153**

Table 44. Road length by category

(length in km)

Sections		1991	1993	1995	1997
Main or national highway	**Subtotal**	**17,284**	**17,412**	**17,420**	**17,670**
	Paved only	16,990	17,255	17,271	17,503
	(Percentage paved)	(98)	(99)	(99)	(99)
Secondary or regional highway	**Subtotal**	**69,530**	**65,313**	**70,152**	**65,591**
	Paved only	64,123	65,271	64,987	64,933
	(Percentage paved)	(92)	(93)	(93)	(94)
Total	**Subtotal**	**86,814**	**87,873**	**87,572**	**87,153**
	Paved only	**81,113**	**82,568**	**82,536**	**82,436**
	(Percentage paved)	**(93)**	**(94)**	**(94)**	**(95)**

The length of roads by classification and surface type is shown in table 45.

Table 45. Length of roads by classification and surface type

(as of 1997)

Classification	Length (km)	Road surface type					
		Paved		Gravel		Others	
		km	%	km	%	km	%
Main or national highway	17,670	16,427	93	1,076	6	167	1
Secondary or regional highway	69,483	42,669	61	22,264	32	4,550	7
Total	**87,153**	**59,096**	**68**	**23,340**	**28**	**4,717**	**5**

The poor pavement condition of roads is the result of a lack of resources for appropriate maintenance and reconstruction. Pavements for most sections are designed for 10-ton axle loads. Road condition by surface type is shown in table 46.

Table 46. Road condition

(in km)

Sections		1991	1993	1995	1997
	Bituminous	53,793	56,277	56,429	59,096
Pavement	Cement	-		-	-
	Subtotal	53,793	56,277	56,429	59,096
Gravel and stabilized soil pavement		27,320	26,291	26,097	23,340
Unpaved		5,701	5,305	5,046	4,717
Total		**86,814**	**87,873**	**87,572**	**87,153**

Most of the public roads have two lanes. Detailed data for the number of lanes and missing links concerning road classification are shown in table 47.

Table 47. Length of roads by road classifications number of lanes and missing links

(in km)

Sections	Length	More than 6 lanes	4 lanes	2 lanes	1 lane	Missing links
Main or national highway	17,670	-	810	668	25	167
Secondary or regional highway	69,483	-	18	62,046	2,869	4,550
Total	**87,153**	**-**	**828**	**62,714**	**2,894**	**4,717**

(d) *Traffic characteristics on major road networks*

The analysis of traffic volume over the period 1991-1997 demonstrated the decrease in traffic volume in 1994-1995 because of slow economic growth. The traffic volume stabilized in 1996-1997. During this period the significant growth of motor vehicle fleets was observed on some important roads. Average annual daily traffic on the Republican roads does not exceed 5,000 vehicle/day. The proportion of motor roads with a traffic volume of less than 2,000 vehicle/day is about 70 per cent of the whole republic network. This clearly indicates the requirement of resources to enlarge cargo turnover of motor roads by improving their operating conditions. Average daily traffic is shown in figure 16.

(e) *International road links to neighbouring countries*

Kazakhstan is bounded by China in the east, Kyrgyzstan and Uzbekistan in the south, the Caspian Sea and a small section of Turkmenistan in the west, and the Russian Federation in the north. The border-crossing points are identified below:

1. Kazakhstan border-crossing points to China

(i) International:

Bakhty	Semipalatinskaya Oblast
Korgas	Taldykorganskaya Oblast

(ii) Open for bilaterial traffic movement:

Dostyk	Taldykorganskaya Oblast
Maikapchagai	East - Kazakhstanskaya Oblast
Kol'shat	Almatinskaya Oblast
Narynkol	Almatinskaya Oblast
Alekseyevka	East - Kazakhstanskaya Oblast

2. Kazakhstan border-crossing points to CIS republics:

Kegen	Almatinskaya Oblast Gani
Muratbaev	South - Kazakhstanskaya Oblast
Zhibek – Zholy	South - Kazakhstanskaya Oblast
Korday	Zhambylskaya Oblast
Merke	Zhambylskaya Oblast
Ganyushkino	Atyrauskaya Oblast
Zhelaevo	West - Kazakstanskaya Oblast
Martuk	Actyubinskaya Oblast
Kaerak	Kustanayskaya Oblast
Chistoe	North - Kazakhstanskaya Oblast
Kara-kuga	North - Kazakhstanskaya Oblast
Pnirtyshskoe	Pavlodarskaya Oblast
Sherbakty	Pavlodarskaya Oblast
Krasnyy Aul	Semipalatinskaya Oblast
Zhanaozen	Mangistauskaya Oblast

(f) *Development plans*

(i) *Long-term development plans*

In 1995, the Department of Motor Roads of the Ministry of Transport and Communications of Kazakhstan formulated a long-term plan for the improvement and development of motor roads for 1996-2010. The plan is outlined in table 48.

Table 48. The outline of the motor road development plan

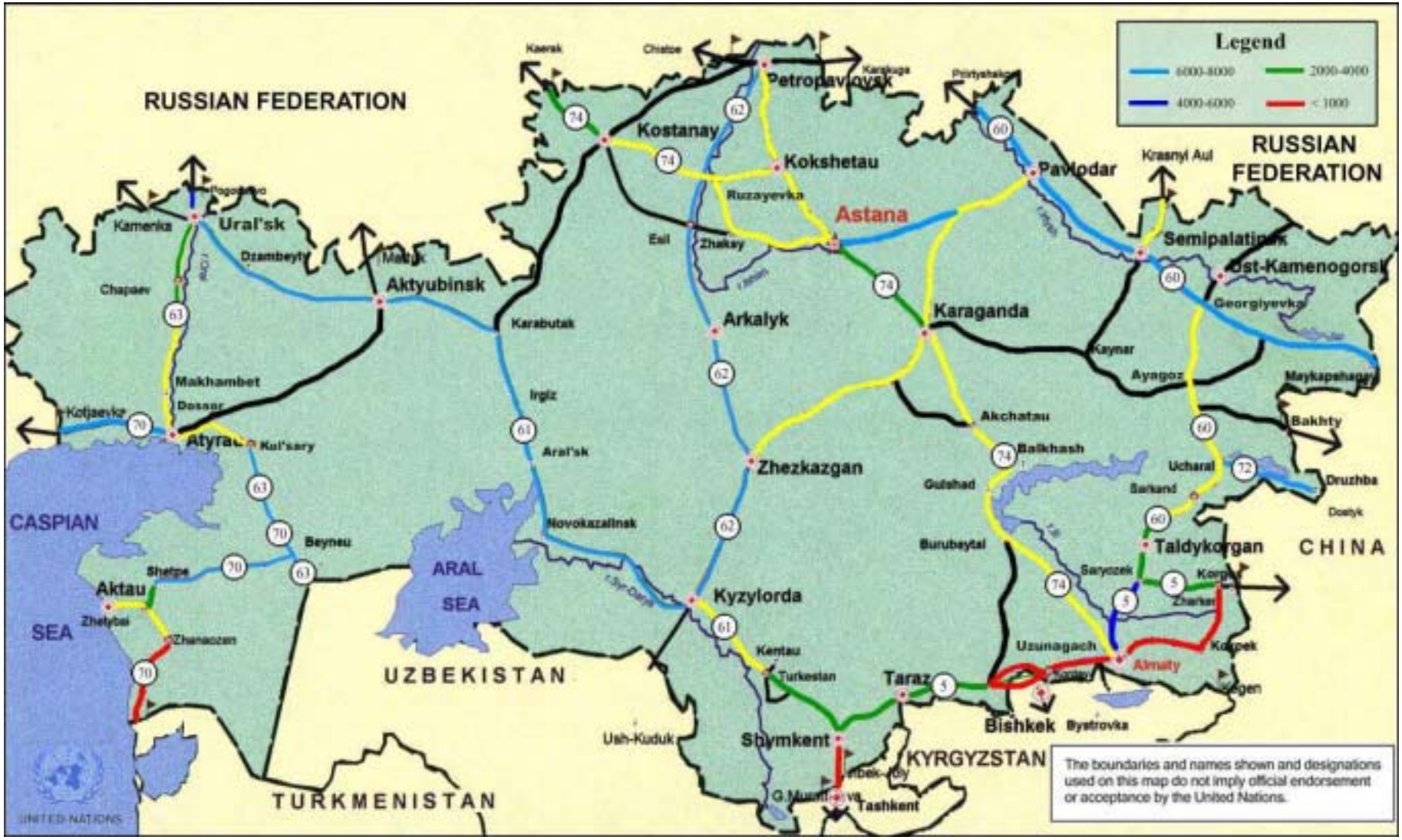
Periods	Major repair		Minor repair		Maintenance plan (thousands of US$)	Total budget (thousands of US$)
	Length (km)	Cost (thousands of US$)	Length (Km)	Cost (thousands of US$)		
1996-2000	6,695	382,371	19,271	230,702	181,192	794,265
2001-2005	6,360	338,066	14,467	173,192	199,311	710,569
2006-2010	6,042	321,166	12,300	147,245	219,232	687,642
Total	19,097	1,041,603	46,038	551,139	299,735	2,192,476

The mid-term National Road Development Plan is based on the State Investment Programme of Kazakhstan which gave priority to the modernization and rehabilitation of the republican motor roads and construction of new roads and bridges.

(ii) *Short-term development plans*

The maintenance of the existing road network is the goal of a short-term road development plan. This plan is annually being worked out on the basis of financial resources allocated by the Transport Department of the Ministry of Transport and Communications.

Figure 16. Average daily traffic in Kazakhstan



4. Mongolia

(a) *Basic data*

Mongolia is a landlocked country in north-central Asia located between the Russian Federation in the north and China in the south. It is Asia's sixth largest country in size and one of the smallest in population. Its shape is an elongated oval, measuring 2,392 kilometres from west to east and, at its maximum 1,259 kilometres from north to south. It occupies about 1,564,100 square kilometres of land and the total population was 2,430,000 in 1999, with a current growth rate of 1.4 per cent.

Until 1990 Mongolia had a socialist centrally planned economy related to the former Soviet Union. Thereafter, democratic reforms started characterizing the country's difficult transition to a market-based economy.

In 1999 GDP was 873,680,000,000 tugrik. The agriculture sector has a share of about 35 per cent of GDP and the manufactureing sector has a share of about 21 per cent of GDP. Agriculture has traditionally employed as much as one half of the workforce but produces only about one fourth of GDP. Industries and mining account for more than one fourth of GDP and employ almost one fifth of the workforce. The manufacturing sector is not developed well, which leads to the import of many consumer goods. Most of Mongolia's industries are concentrated at Ulaanbaatar.

(b) *General transport*

Mongolia's transportation system consists of road networks, railways connecting Ulaanbaatar with the Russian Federation and China, and the international airport at Ulaanbaatar. The total length of the national road network is 49,250 kilometres.

Road development indicators are shown in table 49.

Table 49. Road development indicators

Classification	1991	1993	1995	1997
Population (thousands)	2,187	2,250	2,317	2,387
Population density (person/sq.km)	1.4	1.4	1.5	1.5
Road density (km/sq.km)	0.031	0.031	0.034	0.034
Number of vehicles	43,621	47,575	56,428	70,088
Number of driving licences (thousands)	8.065	16.366	22.072	18.424

The modal share of summer domestic and international transport freight, and passenger movement are shown in tables 50, 51, 52 and 53.

International freight transport by railway is shown in table 54.

Table 50. Freight movement

(in '000 tons)

Transport	1993	%	1995	%	1997	%
Road	3,479.1	23.43	1,648.5	15.55	1,121.4	11.73
Railway	11,364.9	76.55	8,950.8	84.40	8,436.5	88.22
Inland waterway	-	-	1.6	0.02	1.6	0.02
Air	2.9	0.02	2.7	0.03	3.8	0.03
Total	**14,846.9**	**100.0**	**10,603.6**	**100.0**	**9,563.3**	**100.0**

Table 51. Freight traffic volume

(in million ton-km)

Transport	1991	%	1993	%	1995	%	1997	%
Road	1,362.5	31.1	268.4	9.5	152.9	6.3	125.4	4.7
Railway	3,012.6	68.8	2,531.0	90.2	2,279.5	93.5	2,554.2	95.1
Inland waterway	1.7	0.04	-	-	0.2	-	0.2	-
Air	4.1	0.09	5.8	0.3	4.5	0.2	6.3	0.2
Total	**4,380.9**	**100.0**	**2,805.2**	**100.0**	**2,437.1**	**100.0**	**2,686.1**	**100.0**

Table 52. Passenger volume

(million passengers)

Transport	1991	%	1993	%	1995	%	1997	%
Road	213.3	98.7	189.3	98.7	107.2	97.2	76.8	95.0
Railway	2.5	1.1	2.3	1.2	2.9	2.6	3.7	4.6
Air	0.6	0.2	0.2	0.1	0.2	0.2	0.3	0.4
Total	**216.4**	**100.0**	**191.8**	**100.0**	**110.3**	**100.0**	**80.8**	**100.0**

Table 53. Passenger traffic volume

(in million passenger- km)

Transport	1991	%	1993	%	1995	%	1997	%
Road	913.4	64.3	700.6	44.5	424.3	29.8	331.7	19.2
Railway	59.3	4.2	582.5	37.0	679.7	47.7	950.6	55.1
Air	448.4	31.5	289.6	18.5	320.2	22.5	443.4	25.7
Total	**1,421.1**	**100.0**	**1,572.7**	**100.0**	**1,424.2**	**100.0**	**1,725.7**	**100.0**

Table 54. International freight transport by railway

International freight	1991		1993		1995		1997	
	Tons ('000s)	Million ton.km	Tons ('000s)	Million ton.km	Tons ('000s)	Million ton.km	Tons ('000s)	Million ton.km
Export	1,706.81	760.93	992.56	490.32	862.38	541.31	950.89	796.70
Import	1,281.18	467.55	945.06	403.31	868.75	322.31	776.79	318.93
Transit	168.76	186.73	335.77	7,854.01	133.83	148.57	216.98	240.84
Total	**3,156.75**	**1,415.21**	**2,273.39**	**8,747.64**	**1,864.95**	**1,012.19**	**1,944.66**	**1,356.47**

The modal share of vehicle fleet composition is shown in table 55.

Table 55. Trend in road vehicle fleet composition

Vehicle typr		1991	1993	1995	1997
Total		**95,564**	**87,932**	**95,680**	**107,543**
4 or more wheelers	**Subtotal**	**52,012**	**56,883**	**67,864**	**81,427**
	Passenger car	11,880	20,220	23,975	35,578
	Buses	1,928	1,881	2,790	3,982
	Trucks	38,204	34,782	41,099	41,867
Motorcycles		43,552	31,049	27,816	26,116

(c) *Road traffic*

The difficult conversion of the Mongolian economy to a market economy did not much influence the traffic volume. The traffic volumes for different vehicle classes are indicated in table 56.

Table 56. Traffic volume

(in million vehicle-km)

Vehicle class	1991	%	1993	%	1995	%	1997	%
Cars	238	16.7	455	33.0	568	30.8	857	39.8
Buses	246	17.3	216	15.6	296	16.1	378	17.6
Trucks	940	66.0	710	51.4	979	53.1	916	42.6
Total	**1,424**	**100.0**	**1,381**	**100.0**	**1,843**	**100.0**	**2,151**	**100.0**

The average annual distance travelled is shown in table 57.

Table 57. Average annual distance travelled

Vehicle class	1991	1993	1995	1997
Cars	20,000	22,500	23,700	24,100
Buses	128,000	115,000	106,000	95,000
Trucks	42,000	35,000	33,000	30,000

Half of Mongolia's imports originate from the Russian Federation and one third of its exports is destined there to. Mongolia depends on the rail-served corridor through China for more than 80 per cent of its international trade, its main destination being the Tianjin seaport. Transport between China and the Russian Federation, as well as between China and European countries through the Trans-Siberian Railway, passes through Mongolia. There is the potential for growth of the transport of containers between Dzamiin-Uud and Ulaanbaatar, and of transit goods on the section between Dzamiin-Uud and Suhbaatar.

The major origins and destinations of international transport in Mongolia are shown in table 58.

Table 58. Major origins and destinations of international transport in Mongolia

Major origins and destinations of international transport	Remarks
Ulaanbaatar	Capital of Mongolia
Olgiy	Animal husbandry, textile manufacture
Tosontsengel	Agricultural centre, light industry
Harhorin	Animal husbandry, agricultural centre, light industry, tourist centre
Ondorhaan	Animal husbandry, agricultural centre, mining, light industry
Choybalsan	Animal husbandry, agricultural centre, energy production, construction materials manufacture
Saynshand	Animal husbandry, agricultural centre

China is Mongolia's second largest trading partner after the Russian Federation. However, the volume of physical trade is still small for such a large neighbour with a large population and heavy industry relatively close to the frontier.

(d) *Status and condition of the national road network*

The road classification system of Mongolia subdivided roads into functional classes, according to their service status. They are divided into two classes: state roads and regional roads. The length of different types of roads in Mongolia is shown in table 59.

The study for the development of the Asian Highway network in 1995 included 2,368 kilometres of national roads in Mongolia in the Asian Highway network.

Most of the national routes included in the Asian Highway network are in a poor state. Only a small portion of these routes is paved, the remaining portion still consists of dirt tracks.

The existing Asian Highway routes in Mongolia are:

A-3 Border of the Russian Federation -Darhan-Ulaanbaatar-Saynshand-Dzamiin-Uud - Chinese border - 1,027 kilometres

A-83 Darhan-Erdenet-Bulgan-Moron-Ulaangom-Borshoo -1,347 kilometres

Figure 17 indicates the road network and existing Asian Highway network in Mongolia.

Table 59. Classification of roads

Classification	Length (km)
State road	11,063
Regional road	38,187
Total	49,250

The state roads provide connections between Ulaanbaatar and major cities and centres of *Aimags* (there are 21 *Aimags* in Mongolia). Regional roads provide connections to the centres of *Aimags* and *Sums* (*Aimags* are divided into *Sums*).

The Ministry of Infrastructure Development is responsible for state and regional roads, and construction, improvement and maintenance of roads is under the responsibility of the Department of Roads.

The road length by technical standards is shown in table 60 and road length by categories is shown in table 61.

Table 60. Road length by technical standards

(as of 1997)

Road classification	Length by technical standard(km)					Total length (km)
	I	II	III	IV	V	
Main or national highway	-	-	1,283	1,334	8,446	11,063
Secondary or regional highway	-	-	395	490	37,302	38,187
Total	**-**	**-**	**1,678**	**1,824**	**45,748**	**49,250**

Figure 17. Existing road network in Mongolia

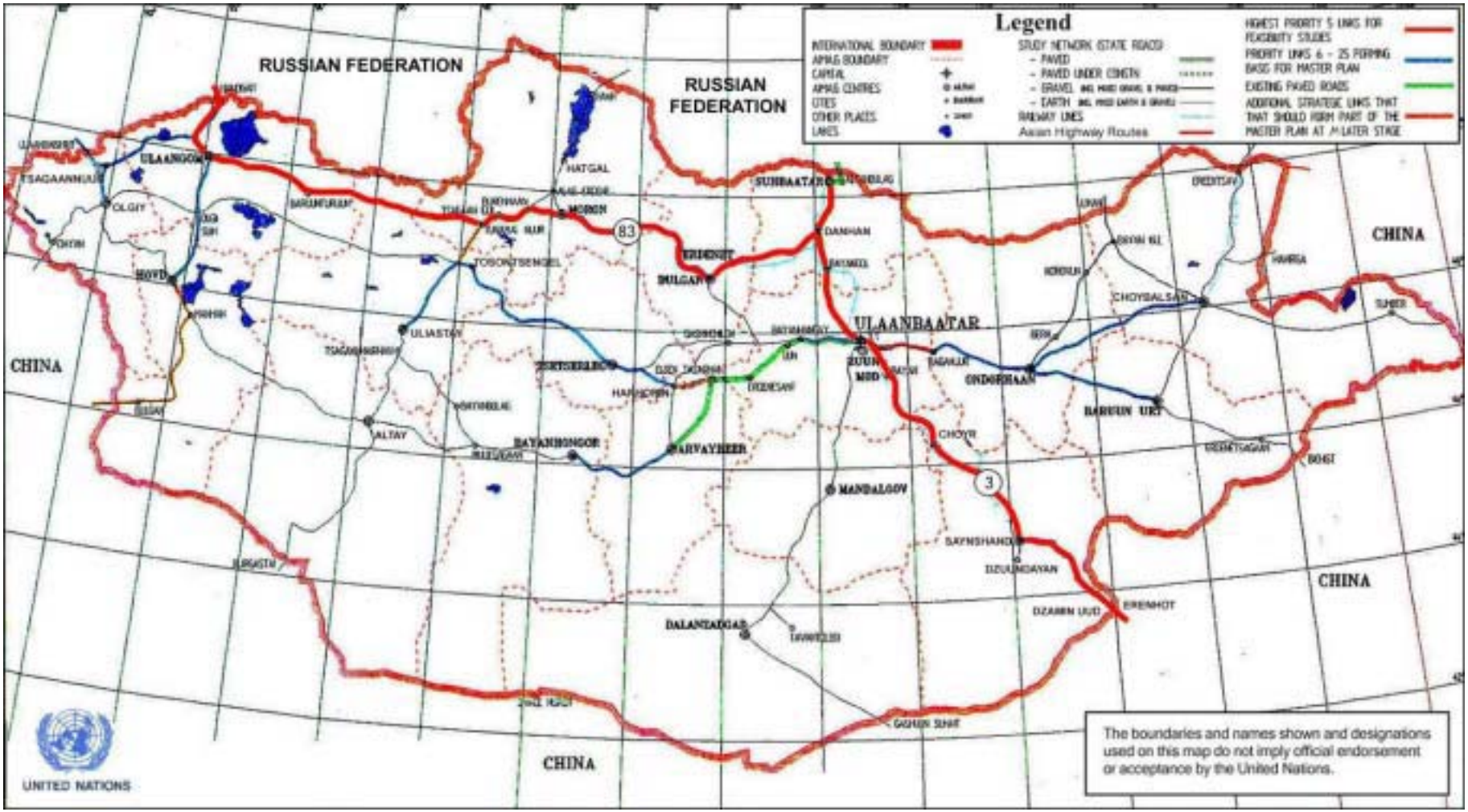


Table 61. Road length by category

(length in km)

Sections		1991	1993	1995	1997
Main or national highway	**Subtotal**	**10,520**	**10,520**	**10,862**	**11,063**
	Paved only	1,055	1,055	1,244	1,283
	(% paved)	(10)	(10)	(11.4)	(11.6)
Secondary or regional highway	**Subtotal**	**38,730**	**38,730**	**38,388**	**38,187**
	Paved only	202	202	395	395
	(% paved)	(0.52)	(0.52)	(1.03)	(1.03)
Total	**Subtotal**	**49,250**	**49,250**	**49,250**	**49,250**
	Paved only	**1,257**	**1,257**	**1693**	**1,678**
	(% paved)	**(2.5)**	**(2.5)**	**(3.3)**	**(3.4)**

Tables 62 and 63 show the length of road by surface type, which shows the majority is in a poor condition, indicating a lack of financial resources and insignificant growth in the length of paved roads.

Table 62. Length of roads by classification and surface type

(as of 1997)

Classification	Length	Road surface type					
		Paved		Gravel		Others	
	(km)	(km)	(%)	(km)	(%)	(km)	(%)
Main or national highway	11,063	1,283	(2.6)	1,334	(2.7)	8,446	(17.2)
Secondary or regional highway	38,187	395	(0.8)	490	1.0	37,302	(75.7)
Total	**49,250**	**1,678**	**(3.4)**	**1,824**	**(3.7)**	**45,748**	**(82.9)**

Table 63. Road condition

(length in km)

Sections		1991	1993	1996	1997
Pavement	Bituminous	1,123	1,169	1,558	1,587
	Cement	88	88	91	91
	Subtotal	**1,212**	**1,257**	**1,649**	**1,678**
Gravel and stabilized soil pavement		3,677	3,684	3,767	3,731
Unpaved		44,361	44,309	43,844	43,841
Total		**49,250**	**49,250**	**49,250**	**49,250**

Most of the state and regional roads in Mongolia have one lane only. Detailed data for the number of lanes according to the road classification are shown in table 64.

Table 64. Length of roads by road classification and number of lanes

Sections	Length (Km)	More than 6 lanes	4 lanes	2 lanes (Km)	1 lanes
Motorway	-	-	-	-	-
Main or national highways	11,063	-	-	1,283	-
Secondary or regional roads	38,187	-	-	395	-
Total	**49,250**	**-**	**-**	**1,678**	**-**

(e) *International road links to neighbouring countries*

Mongolia is bounded in the north by the Russian Federation and in the south by China. Mongolian border-crossing points are shown in table 65.

Table 65. Mongolian border-crossing points with neighbouring countries

Neighbouring country	Border-crossing point
China	Bulgan Dayan Dzamiin-Uud
Russian Federation	Altanbulag Tsagaannuur Ereentsav Hankh

In addition, there are six seasonable border crossings along the Chinese border.

The volume of incoming/outgoing road traffic for major border-crossing points is shown in table 66. The average daily traffic is shown in figure 18.

Table 66. Road traffic volume at border-crossing points

Border-crossing point	Classification	1991	1993	1995	1997
Altanbulag	Total vehicles	21,120	29,010	17,438	12,396
Dzamiin-Uud	Total vehicles	2,497	45,379	69,376	119,571
Tsagaannuur	Total vehicles	6,820	7,925	6,944	5,056
Bulgan	Total vehicles	1,210	1,572	7,507	5,090
Dayan	Total vehicles	1,230	1,180	1,289	1,259
Total		**32,877**	**85,066**	**102,554**	**143,372**

The condition of roads leading to border-crossing points is shown in table 67.

Table 67. Condition of roads leading to border-crossing points

Country	Border-crossing point	Road classification	No. of lanes	Road condition (surface type)
China	Dzamiin-Uud	State	2	Asphalt
Russian Federation	Altanbulag	State	2	Asphalt
Russian Federation	Tsagaannuur	State	1	Gravel
China	Bulgan	State	1	Gravel
China	Dayan	State	1	Earth

The total number of passenger and traffic volumes across each border-crossing point is shown in table 68.

Table 68. Total number of passengers and traffic volumes at border-crossing points

Country	Border-crossing point	Passengers (thousands of person/year)				Vehicle (thousands of veh/year)			
		1991	1993	1995	1997	1991	1993	1995	1997
China	Dzamiin-Uud	13.93	617.09	403.6	613.6	2.497	45.37	69.37	613.6
Russian Federation	Altanbulag	151.3	180.08	159.5	117.1	21.12	29.01	17.43	12.39
Russian Federation	Tsagaannuur	18.34	20.52	24.95	15.31	6.82	7.925	6.944	5.056
China	Bulgan	3.98	4.28	51.10	29.42	1.21	1.572	7.507	5.09
China	Dayan	9.84	10.34	12.08	5.835	1.230	1.180	1.289	1.259

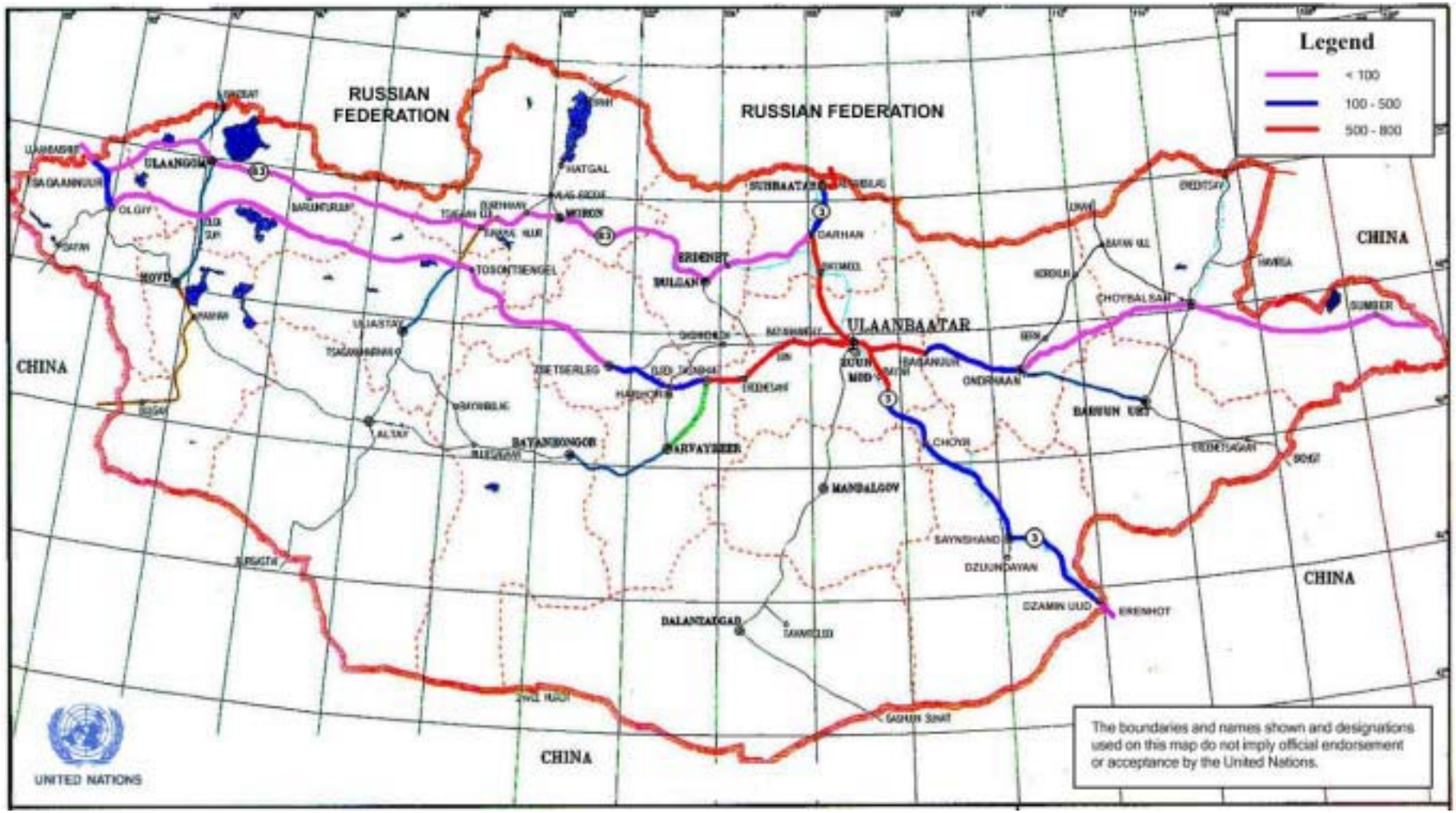
The major container terminals of Mongolia are located at railway stations in Ulaanbaatar, Darhan, Erdenet and Dzamiin-Uud.

(f) *Development plans*

A master plan for the medium-term development of the road network of Mongolia was formulated in 1995. According to this plan, 24 high priority routes were planned for construction in the medium term, during the period 1995-2010. Road construction and maintenance works is currently being carried out along some parts of these routes. The medium-term plan has been reviewed and a road network development plan for 2010 has been formulated based on the initial master plan and government action programme.

Recently, the Government of Mongolia initiated and prepared the "Millennium Road" plan with the purpose of connecting neighbouring and regional countries to facilitate the provision of consumer products and services, to develop transport and to improve the living standards of the population of the region. The Millennium Road includes one horizontal arterial road passing through the capital linking the east and west of the country and five vertical arterial roads. The Millenium Road plan was approved by the Parliament of Mongolia on 25 January 2001.

Figure 18. Average daily traffic in Mongolia



5. The Republic of Korea

(a) *Basic data*

The Republic of Korea occupies the southern portion of the Korean peninsula. The country is bordered by the Democratic People's Republic of Korea in the north, the Sea of Japan in the east, the East China Sea in the south, and the Huang He Sea in the west; in the south-east it is separated from Japan by the Korea Strait. The Republic of Korea faces the Democratic People's Republic of Korea across a demilitarized zone that runs for about 240 kilometres from the mouth of the Han River on the west coast of the Korean peninsula to the south of the town of Kosong in the Democratic People's Republic of Korea on the east coast.

The area of the Republic of Korea is 99,707 square kilometres, which is about 45 per cent of the peninsula. The population of the Republic of Korea was 46,860,000 in 1999 and the current growth rate is 0.9 per cent.

The Republic of Korea has a predominantly market economy based largely on services and light and heavy industries. Economic growth has been heavily dependent on exports of manufactures. GDP in 1999 was 483,778,000,000,000 won and is growing much faster than the population. GNP per capita is similar to those of the other rapidly developing East Asian countries.

Agriculture now accounts for only a small proportion of GDP and employs about one seventh of the workforce. Manufacturing industries account for more than one fourth of GDP and employ nearly one fourth of the workforce. Most industries are owned and run by families, and relatively few firms are listed on the nation's stock exchange. Exports of goods and services represent more than one third of the country's GNP.

(b) General transport

The transport system was expanded and improved considerably after 1960, especially with the creation of a modern highway network and the establishment of nationwide air service. Road transport now accounts for the bulk of passenger travel and most movement of freight. The bus transportation network is well developed. The Republic of Korea has 84,968 kilometres of a well-developed national road network.

The Republic of Korea railways are largely government-owned. Until 1960 rail travel was the major means of inland transportation for both freight and passengers, but since has been superseded by road transport, and, more recently, also by air transport. Currently Seoul and Pusan is connected by a high-speed railway and the construction of another high-speed railway track to connect the capital Seoul and the new international airport at Inch'on is ongoing. The total length of the railway is 3,120 kilometres. The cities of Seoul and Pusan have extended subway systems, as do Inch'on and Taegu.

Internal air transport began in the early 1960s. Most major cities now have scheduled air services. Kimp'o International Airport, at Seoul, served as the country's main port of entry until the opening of the new international airport at Inch'on on 29 March 2001. The new Inch'on international airport is planned as a hub of North-East Asia. Pusan and Cheju also have international airports. Port facilities have been expanded considerably with the tremendous growth in trade. Major ports include Pusan, Inch'on and Kwangyang.

Road development indicators are shown in table 69.

Table 69. Road development indicators

Classification	1991	1993	1995	1997
Population (thousands)	43,296	44,195	45,093	46,885
Population density (person/sq. km)	436.0	444.7	454.3	470.2
Road density (km/sq. km)	0.585	0.617	0.748	0.852
Number of vehicles	4,247,816	6,274,008	8,468,901	10,413,427
Number of driving Licences (thousands)	9,844	13,302	16,404	18,532

The modal share of domestic transport, freight and passenger movement is shown in tables 70, 71, 72, and 73.

Table 70. Freight movement

(in '000 tons)

Classification	1991		1993		1995		1996	
		%		%		%		%
Road	245,126	64.0	289,450	64.9	408,368	68.6	426,414	68.6
Railway	61,215	16.0	60,167	13.5	57,469	9.6	53,527	8.6
Air	200	0.1	273	0.1	323	0.1	351	0.1
Ship	76,124	19.9	96,196	21.6	129,112	21.7	140,951	22.7
Total	**382,665**	**100.0**	**446,086**	**100.0**	**595,272**	**100.0**	**621,243**	**100.0**

Table 71. Freight traffic volume

(in million ton-km)

Classification	1991		1993		1995		1996	
		%		%		%		%
Road	10,530	21.1	12,666	19.1	18,213	23.9	19,114	24.3
Railway	14,494	29.1	14,658	22.1	13,838	18.2	12,947	16.5
Air	79	0.2	105	0.2	123	0.2	134	0.2
Ship	24,737	49.6	38,765	58.6	43,936	57.7	46,452	59.0
Total	**49,840**	**100.0**	**66,194**	**100.0**	**76,110**	**100.0**	**78,647**	**100.0**

Table 72. Passenger volume

(million passengers)

Classification	1991		1993		1995		1996	
		%		%		%		%
Road	12,854	86.8	12,117	85.1	11,289	83.2	11,480	83.2
Railway	679	4.6	723	5.0	790	5.8	819	5.9
Inland waterway	1,249	8.4	1,375	9.7	1,449	10.7	1,470	10.6
Air	12	0.1	15	0.1	21	0.2	23	0.2
Ship	8	0.1	7	0.1	8	0.1	9	0.1
Total	**14,802**	**100.0**	**14,237**	**100.0**	**13,557**	**100.0**	**13,801**	**100.0**

Table 73. Passenger traffic volume

(in million passenger-km)

Classification	1991		1993		1995		1996	
		%		%		%		%
Road	87,697	63.5	77,998	59.6	72,324	58.5	72,871	58.7
Railway	33,470	24.3	33,693	25.7	29,292	23.7	29,580	23.8
Subway	11,891	8.6	13,168	10.1	14,048	11.4	12,859	10.4
Air	4,447	3.2	5,511	4.2	7,406	6.0	8,288	6.7
Ship	524	0.4	468	0.4	502	0.4	547	0.4
Total	**138,029**	**100.0**	**130,838**	**100.0**	**123,572**	**100.0**	**124,145**	**100.0**

As indicated in tables 70 and 72, about 83 per cent of passengers and 69 per cent of freight transport rely on road transport.

The modal share of international freight and passenger movements is shown in tables 74, 75, 76 and 77. The figure in table 68 shows there is no international freight movement through road and railway because of the closed borders with the Democratic People's Republic of Korea.

Table 74. Freight volume

(in ' 000 tons)

Classification	1991		1993		1995		1996	
		%		%		%		%
Air	787	0.3	951	0.3	1,291	0.3	1,431	0.3
Ship	262,972	99.7	316,872	99.7	404,424	99.7	441,120	99.7
Total	**263,759**	**100.0**	**317,823**	**100.0**	**405,715**	**100.0**	**442,551**	**100.0**

Table 75. Freight traffic volume

(in million ton-km)

Classification	1991		1993		1995		1996	
		%		%		%		%
Air	4,470	0.2	6,183	0.2	8,096	0.2	9,043	0.3
Ship	2,168,582	99.8	2,768,396	99.8	3,263,717	99.8	3,575,745	99.7
Total	**2,173,052**	**100.0**	**2,774,579**	**100.0**	**3,271,813**	**100.0**	**3,584,788**	**100.0**

Table 76. Passenger volume

(thousand passengers)

Classification	1991		1993		1995		1996	
		%		%		%		%
Air	10,271	96.8	11,651	97.5	14,603	97.4	15,992	96.8
Ship	335	3.2	296	2.5	395	2.6	523	3.2
Total	**10,606**	**100.0**	**11,947**	**100.0**	**14,998**	**100.0**	**16,515**	**100.0**

Table 77. Passenger traffic volume

(in million passenger-km)

Classification	1991		1993		1995		1996	
		%		%		%		%
Air	38,521	99.7	47,627	99.8	61,613	99.8	70,490	99.7
Ship	113	0.3	112	0.2	136	0.2	198	0.3
Total	**38,634**	**100.0**	**47,739**	**100.0**	**61,749**	**100.0**	**70,688**	**100.0**

The modal share of vehicle composition is shown in table 78.

Table 78. Trend in road vehicle fleet composition

(vehicle/day)

Vehicle class		1991	1993	1995	1997
Total		**28,140**	**38,904**	**44,634**	**49,993**
4 or more wheelers	**Subtotal**	**28,070**	**38,849**	**44,573**	**49,936**
	Percentage	**(99.7)**	**(99.9)**	**(99.9)**	**(99.9)**
	Passenger car	12,030	18,373	22,354	26,818
	percentage	(42.8)	(47.2)	(50.1)	(53.7)
	Buses	4,287	5,748	5,659	5,955
	percentage	(15.2)	(14.8)	(12.7)	(11.9)
	Trucks	11,753	14,728	16,560	17,163
	percentage	(41.7)	(37.9)	(37.1)	(34.3)
Others		70	55	61	57
	Percentage	(0.3)	(0.1)	(0.1)	(0.1)

(c) *Road traffic*

According to the forecast of the Ministry of Construction and Transportation, the traffic volume on rural roads in 2011 will increase by 2.5 times the present traffic and vehicle registration will increase by three times.

The yearly traffic by vehicle class is shown in table 79.

Table 79. Traffic volume

(vehicle/day)

Vehicle class	1991		1993		1995		1996	
		%		%		%		%
Cars	16,974	43.43	26,271	48.48	34,198	53.18	43,190	56.67
Buses	6,243	15.97	8,229	15.18	7,039	10.95	8,015	10.52
Trucks	15,704	40.18	19,558	36.09	22,990	37.75	24,912	32.68
Others	162	0.42	130	0.25	84	0.12	102	0.13
Total	**39,083**	**100.0**	**54,188**	**100.0**	**64,311**	**100.0**	**76,219**	**100.0**

The short distance between cities characterizes the geographical features of the country. The average annual distance travelled is shown in table 80.

Table 80. Average annual distance travelled

(in thousand vehicle-kms)

Vehicle class	1993	1995	1997
Cars	112,802	164,299	215,006
Buses	35,844	23,270	28 653
Trucks	77,221	91,953	109,038
Others	979	325	563

The major origins and destinations of international transport in the Republic of Korea are shown in table 81.

Table 81. Major origins and destinations of international transport in the Republic of Korea

Major origins/destinations of international transport	Remarks
Seoul	Capital
Cheju	International tourist centre
Inch'on	International port
Pusan	International port
Kwangyang	International port

(d) *Status and condition of the national road network*

Roads are classified according to the Road Legislation into seven classes, national expressways, national highways, special city roads, city roads, provincial roads, county (*Gun*) roads and district (*Gu*) roads. The length of roads in the Republic of Korea is shown in table 82. Figure 19 indicates the road network in the Republic of Korea.

Table 82. Classification of roads

(as of 1997)

Classification	Length (km)
National expressway	1,889
National highway	12,459
Special greater city road	17,243
Provincial road	17,089
City road	36,288
Country (*Gun*) road	
District (*Gu*) road	
Total	**84,968**

The national expressway is the main artery of the country and used exclusively by high-speed motor vehicles for linking major urban centres.

National highways links the major urban and industrial areas, including ports and harbours, airports and tourist resorts. Together with the national expressways, they are part of the national principal road network.

The roads in Seoul are classified as special greater city roads, and roads in large cities with one million or more, including Pusan, Taegu, Inch'on, Kwangju and Taejon, are classified as city roads.

Provincial roads are roads of a secondary network, which provides linkages between the provinces, municipalities and counties. County (*Gun*) roads connect villages with their county centres or with neighbouring towns. District (*Gu*) roads connect subdistricts within the boundaries of each district.

The Ministry of Construction and Transportation is responsible for the administration, planning, design, construction and maintenance of all public roads. The local governments are responsible for their respective road networks under the supervision of the Ministry of Construction and Transportation.

Figure 19. Highway network in the Republic of Korea

The road length by technical standards is shown in table 83 and road length by categories is shown in table 84.

Table 83. Road length by technical standards

(as of 1997)

Road classification	Length by technical standard(km)					Total length (km)
	I	II	III	IV	V	
Motor way (access-controlled highway)	1,420	469	-	-	-	1,889
Main or national highway	-	520	2,521	9,161	257	12,459
Secondary or regional highway	-	-	60	247	16,936	17,243
Other roads	-	-	-	3,153	50,224	53,377
Total	**1,420**	**989**	**2,581**	**12,561**	**67,417**	**84,968**

Table 84. Road length by category

(length in km)

Sections		1991	1993	1995	1997
National expressway	**Subtotal**	**1,597**	**1,602**	**1,825**	**1,889**
	Paved only	1,597	1,602	1,825	1,889
	(Percentage)	(100)	(100)	(100)	(100)
National highway	**Subtotal**	**12,114**	**12,057**	**12,053**	**12,459**
	Paved only	11,140	11,800	11,993	12,202
	(Percentage)	(92)	(98)	(99.5)	(97.94)
Special greater city road	**Subtotal**	**12,717**	**13,336**	**14,082**	**17,243**
	Paved only	10,717	11,444	12,759	15,673
	(Percentage)	(84)	(86)	(91)	(91)
Provincial road	**Subtotal**	**10,643**	**10,656**	**13,854**	**17,089**
	Paved only	7,725	9,120	9,853	12,726
	(Percentage)	(73)	(86)	(71)	(74)
City road and country road and district road	**Subtotal**	**21,016**	**23,644**	**32,424**	**36,288**
	Paved only	13,198	17,922	19,956	20,378
	(Percentage)	(63)	(76)	(62)	(56)
Total	**Subtotal**	**58,088**	**61,295**	**74,237**	**84,968**
	Paved only	44,378	51,888	56,386	62,868
	(Percentage)	(76)	(85)	(76)	(74)

The length of roads by classification and surface type and condition of roads are shown in tables 85 and 86.

Table 85. Length of roads by classification and surface type

[as of 1997]

Classification	Length (km)	Road surface type					
		paved		Unpaved		others	
		km	%	km	%	km	%
National expressway	1,889	1,889	100	-	-	-	-
National highway	12,459	12,202	98	46	0.3	211	1.7
Special greater city road	17,243	15,673	91	1,070	9	-	-
Provincial road	17,089	12,726	74	3,047	18	1,316	8
City road & country road and district road	36,288	20,378	56	12,955	36	2,955	8
Total	**84,968**	**62,868**	**74**	**17,118**	**20**	**4,482**	**6**

Table 86. Road condition

(length in km)

Section		1997
Paved	Asphalt (percentage)	52,676 (83.79)
	Cement (percentage)	10,192 (16.21)
	Subtotal (percentage)	62,868 (100)
Unpaved		22,100
Total		**84,968**

Most roads in the Republic of Korea have two lanes. Detailed data for the number of lanes and missing links concerning road classification are shown in table 87.

Table 87. Length of roads by road classification, number of lanes and missing links

Classification	Length (km)	More then 6 lanes	4 lanes	2 lanes	Missing link
National expressway	1,889	271	1,148	469	-
National highway	12,459	520	2,521	9,161	257
Special greater city road	17,243	2,101	1,912	11,660	1,570
Provincial road	17,089	60	247	12,419	4,363
City road, country road and district road	36,288	1,052	2,025	17,301	15,910
Total	**84,968**	**4,004**	**7,853**	**51,010**	**22,100**

The major roads of the national road network, their length, and average daily traffic, including composition of traffic according to classification of vehicle types, are shown in tables 88, and 89. Average daily traffic is shown in figure 20.

Table 88. Traffic characteristics on major road networks

No.	Section	Classification of road	ADT
1	SongnamSampyung 17.1 km from Seoul	Kyungbu highway	245,783
2	Yongin Giheung 30.0 km from Seoul	Kyungbu highway	200,975
3	SongnamGungnae 20.5 km from Seoul	Kyungbu highway	196,713
4	Seoul Yangjae 6.8 km from Seoul	Kyungbu highway	188,805
5	Seoul Wonji 12.2 km from Seoul	Kyungbu highway	187,128
6	Yongin Giheung 34.0 km from Seoul	Kyungbu highway	169,017
7	Seoul Seocho 4.0 km from Seoul	Kyungbu highway	165,891
8	Puch'on Dodang 3.5 km from Seoul	Kyungin highway	161,366
9	Suwon-Seoul	National Road No.1	159,907
10	Hwasung Dongtan 40.0 km from Seoul	Kyungbu highway	153,091
11	Inch'on Seochang 8.0 km from Seoul	Kyungin highway	143,941
12	Yongin Namsa 51.9 km from Seoul	Kyungbu highway	138,382
13	Chungwon Nami 128.0 km from Seoul	Kyungbu highway	127,520
14	Daeduk Moksang 141.7 km from Seoul	Kyungbu highway	126,879
15	Anyang-Seoul	National Road No.47	125,143
16	Inch'on Seoun 6.3 km from Seoul	Kyungin highway	123,986
17	Daeduk Dukam 143.8 km from Seoul	Kyungbu highway	122,891
18	Ch’onan Jiksan 78.5 km from Seoul	Kyungbu highway	119,301
19	Kangdong Hail 23.0 km from Pankyo	Pankyo-Kuri highway	119,099
20	Seoul Sinsa 2.3 km from Seoul	Kyungbu highway	118,817
21	Daeku Sungseo 4.4 km from Keumho	Kuma highway	114,450
22	Kuri Topyung 26.9 km from Pankyo	Pankyo-Kuri highway	106,951
23	Dalsung Hawon 10.7 km from Keumho	Kuma highway	106,735
24	Hanam Dukpung 21.0 km from Pankyo	Pankyo-Kuri highway	104,017
25	Inch'on Gajung 13.2 km from Seoul	Kyungin highway	102,491
25	Suwon-Seoul	National Road No.1	101,316
27	Ansan Bukok 20.0 km from Singal	Singal-Ansan highway	100,052
28	Ch’onan Songnam96.2 km from Seoul	Kyungbu highway	99,111
29	Inch'on Gajwa 17.5 km from Seoul	Kyungin highway	99,021
30	Seoul Sinsa 1.0 km from Seoul	Kyungbu highway	98,486

Note: ADT = average daily traffic

Table 89. Composition of road traffic by classification

Vehicle type		ADT [volume/day]
Total		49,993
Composition of traffic	Cars percentage	26,818 (53.7)
	Buses percentage	5,955 (11.9)
	Trucks percentage	17,163 (34.3)
	Others percentage	57 (0.1)

(e) *International road links to neighbouring countries*

The Republic of Korea has a single land boundary on the north with the Democratic People's Republic of Korea. The location of border-crossing points of the Republic of Korea with the Democratic People's Republic of Korea are shown in table 90.

Table 90. Border-crossing points

Countries	Republic of Korea	Democratic People's Republic of Korea
Cities	Paju-si Musan Paju-si Nulno-ri Yonchon-gun Mageo-ri	Kaesong Jangpung-gun Limgang-ri Jangpung-gun Janghak-ri
	Ch'orwon Oechon-ri Ch'orwon Eupnae-ri Ch'orwon Eupnae-ri Ch'orwon Oechon-ri Ch'orwon Jupa-ri	Pyonggang-ri Pyonggang Pyonggang-ri Chonam-ri Kimhwa-gun Sutae-ri Ch'orwon-gun Majang-ri Kimhwa-gun Yonghyun-ri
	Kosong-gun Pohwajin-ri Yanggu-gun Bia-ri Yanggu-gun Gunsol-ri Yanggu-gun Gajun-ri	Kosong-gun Kueup-ri Keumgang-gun Soksa-ri Changdo-gun Baekhyun-ri Kosong-gun Soksa-ri

The condition of roads leading to the border-crossing points is shown in table 91.

Table 91. Condition of roads leading to border-crossing points

Country	Democratic People's Republic of Korea
Border-crossing point	Munsan - Kaesong
Road classification	National road
Number of lanes	4 lanes
Road condition (surface type)	paved

Figure 20. Average daily traffic in the Republic of Korea

(f) *Major container terminals*

There are 25 private container yards in the region of Pusan and two inland container depots.

Table 92. Existing inland container terminals

Description	Kyongin ICD	Yangsan ICD
Location	Euiwang in Kyonggi-do	Yangsan in Kyongnam
Area (m^2)	760,000	960,000
Facilities	Five container yards Two container freight stations	Ten container yards Ten container freight stations
Access by rail	Possible (3 lanes)	Possible (2.1 km)
Capacity	1,357,000 TEU/year	980,000 TEU/year

Note: ICD = inland container depots

The development plans for container terminals are shown in table 93.

Table 93. Development plans for container terminals

Description	Chungbu ICD	Yongnam ICD	Honam ICD
Location	Near Yonki	Near Daeku	Near Kwangju
Area (sq. m.)	660,000	760,000	1,100,000
Facilities	Container yards and container freight stations	Container yards and container freight stations	Container yards and container freight stations
Access by rail	Possible	Possible	Possible
Capacity	1,299 TEU/day	616 TEU/day	1,104 TEU/day

Note: ICD = inland container depots

To supplement container terminals, the construction of logistics centre networks in the Republic of Korea is planned to strengthen the function of the existing inland logistics hubs and establish logistics centres near the seaside, and to develop port-based logistics hubs for export and import freight. To improve the coastal transportation construction of distribution networks connecting inland and seaside, ten hub ports and five multi-transport terminals are planned.

(g) *Development plans*

The Government of the Republic of Korea has long-term, mid-term and short-term national road network development plans. The following table illustrates the long-term, mid-term and short-term development plans with regard to development of highways in the Republic of Korea.

Table 94. Highway development plans

Plans	Description	Period	Estimated cost (US$ million)
Long-term	Highway - new construction : 1,999 km - widen : 392 km	2003-2011	26,538
	National road - new construction : 1,580 km - Bypass road : 1,194 km - Maintenance	2003-2011	36,538
	Provincial road 1,358 km (government sponsored)	2003-2011	13,708
	Special project	2003-2011	9,650
Short-term	Highway - new construction : 931 km - widen : 409 km	1998-2002	22,121
	National road - new construction : 1,283 km - Bypass road : 213 km - Maintenance	1998-2002	16,064
	Provincial road 185 km (government sponsored)	1998-2002	1,214
	Special project	1998-2002	394

Notes: Exchange rate in 1997

The fundamental policy and basic framework of the development plan are:

(i) *Fundamental policy*

- Organize a road network to prepare for the unification of the Korean peninsula and to play a key role in the Pacific rim economic bloc in the era of globalization
- For balanced national land use, organize an arterial network to lead regional development by maintaining a similar level of access roads through the country
- In order to meet the level of a twenty-first century economy, maintain and expand a road network to ensure the arterial function to enable all citizens to receive equal benefits
- On the basis of the status of and future plan for industrial facilities, organize a road network with transport efficiency to promote industrial competitiveness
- Plan transport share with other traffic modes in terms of increased demand of traffic and change in the pattern of travel
- Assure road traffic safety and smooth traffic through improved road traffic policy which emphasizes the shift from construction to the operation of roads

(ii) *Basic framework*

- Seek balanced regional development by maximizing productivity through balanced national land use

- Maximize the convenient use and diversify the choice of routes through the establishment of a road network system to cope with rapidly growing traffic demand
- Promote industrial competitiveness and eliminate bottlenecks in traffic by providing linkages among major cities, large-scale industrial complexes, harbours and ports
- Establish an arterial network system to prepare for the unification of the Korea peninsula and to play a role as the centre of North-East Asia

The major national arterial network plan aims to establish a grid of arterial networks consisting of seven north-south corridors and nine east-west corridors to provide equal access to every region in the country. It plans to construct the following north-south routes to link the Republic of Korea and the Democratic People's Republic of Korea:

a. Mokp'o-Seoul-Sinuiju-China;
b. Kwangju-Seoul-Manp'o;
c. Masan-Wonju-Hyesan;
d. Pusan-Kangnung-Sonbong-Russian Federation.

Furthermore, the plan proposes to construct about 2,600 kilometres of additional highways in the long term in addition to 1,885 kilometres of network currently being undertaken or planned. The total length of the national arterial network will be 6,160 kilometres on completion of the national arterial network plan. Table 95 shows the national arterial network plan of the Republic of Korea.

Table 95. National arterial network plan

(length in km)

Corridors	Total length	Present	Current plan			Long -term plan
			Subtotal	Under construction	Planned	
7 N-S corridors	3,291	878	1,125	994	131	1,288
9 E-W corridors	2,869	1,007	562	341	221	1,300
Total	**6,160**	**1,885**	**1,687**	**1,335**	**352**	**2,588**

Notes: As of 1996

There is a disparity between the growth of the vehicle fleet and road networks as the vehicle fleet is growing about four times that of the road network. Low road density and problems of financing are some of the major problems encountered in the development of the national road network.

6. The Russian Federation

(a) *Basic data*

The Russian Federation, the world's largest country, stretches over a vast expanse of Eastern Europe and North-East Asia. Following the emergence of newly independent states from the former Soviet Union in 1991, the Russian Federation joined with other former Soviet Union countries in forming CIS.

The Russian Federation covers 17,076,400 square kilometers. Most of the population is concentrated in a great triangle in the western, or European, part of the country, although over the past

three centuries and particularly during the twentieth century, there has been a steady flow of people eastward to the Asiatic section commonly referred to as Siberia. The total population was 146,560,000 in 1999 and the population is currently decreasing at a rate of 0.5 per cent.

Although the Russian Federation and the former Soviet Union as a whole had made significant progress in industrial development since 1917, and especially since 1945, the economy was in serious decline by the 1980s. GDP was 4,545,490,000,000 roubles in 1999. The Russian Federation is an industrial country, the manufacturing sector having about 63 per cent share of GDP and the agriculture sector about 13 per cent share of GDP.

(b) *General transport*

Land transport in the Russian Federation is well developed. The Trans-Siberian Railway and its feeder branches are very popular. The total length of railways is 87,000 kilometres.

The national road network is not well developed compared with the rail network. The total length of the road network is 569,036 kilometres. Maritime transport with 75,000 kilometres of navigation length is an important mode, on sea, river and canal. "Aeroflot" is among the world's largest airlines in terms of quantity of fleet and flights. There are 60 international airports in the Russian Federation. The road development indicators are shown in table 96.

Table 96. Road development indicators

Classification	1991	1993	1995	1997
Population (thousands)	148,543	148,673	148,306	147,502
Population density (person/sq. km)	8.69	8.71	8.69	8.64
Road density (km/sq. km)	0.027	0.029	0.031	0.033
Number of vehicles	23,265,556	27,191,443	31,418,643	33,848,900

The modal share of domestic transport (including to/from CIS countries) freight and passenger movement are shown in tables 97, 98, 99 and 100.

Table 97. Freight movement

(in '000 tons)

General-purpose transport	1991	%	1993	%	1995	%	1997	%
Road	2,731,000	43.01	2,570,000	50.49	1,441,000	41.68	1,002,000	35.15
Railway	1,957,000	30.82	1,348,000	26.48	1,028,000	29.73	911,000	31.95
Inland waterway	514,000	8.09	215,000	4.22	140,000	4.05	100,000	3.51
Pipe line	1,042,000	16.41	873,000	17.15	783,000	22.64	783,000	27.47
Air	2,200	0.03	900	0.02	600	0.02	800	0.03
Ship	104,000	1.64	83,000	1.63	65,000	1.88	54,000	1.89
Total	**6,350,200**	**100.0**	**5,089,900**	**100.0**	**3,457,600**	**100.0**	**2,850,800**	**100.0**

Table 98. Freight traffic volume

(in million ton-km)

General-purpose transport	1991	%	1993	%	1995	%	1997	%
Road	65,000	1.19	53,000	1.27	31,000	0.88	26,000	0.77
Railway	2,326,000	42.62	1,608,000	38.68	1,214,000	34.37	1,130,000	33.52
Inland waterway	196,000	3.59	103,000	2.48	90,000	2.55	71,000	2.11
Pipe line	2,404,000	44.05	2,019,000	48.56	1,899,000	53.76	1,913,000	56.75
Air	2,400	0.04	1,600	0.04	1,600	0.05	2,100	0.06
Ship	464,000	8.50	373,000	8.97	297,000	8.41	227,000	6.79
Total	**5,457,400**	**100.0**	**4,157,600**	**100.0**	**3,532,600**	**100.0**	**3,369,100**	**100.0**

Table 99. Passenger volume

(million passengers)

General-purpose transport	1991	%	1993	%	1995	%	1997	%
Bus	27,302	55.12	24,124	50.14	22,817	50.66	23,185	51.33
Taxi	526	1.06	139	0.29	66	0.15	43	0.10
Tram	7,619	15.38	8,125	16.89	7,564	16.79	7,518	16.64
Trolley-bus	8,005	16.16	9,102	18.92	8,547	18.98	8,783	19.44
Metro	3,229	6.52	4,212	8.75	4,150	9.21	4,173	9.24
Railway	2,677	5.40	2,324	4.83	1,833	4.07	1,418	3.14
Inland waterway	75	0.15	40	0.08	25	0.05	18	0.04
Air	86	0.17	42	0.09	32	0.07	28	0.06
Ship	14	0.03	6	0.01	3	0.01	2	0.004
Total	**49,533**	**100.0**	**48,114**	**100.0**	**45,037**	**100.0**	**45,168**	**100.0**

Table 100. Passenger traffic volume

(in million passenger- Km)

General-purpose transport	1991	%	1993	%	1995	%	1997	%
Bus	250,700	33.35	200,300	30.30	188,200	34.04	181,300	35.17
Taxi	7,900	1.05	2,000	0.30	1,000	0.18	600	0.12
Tram	24,100	3.21	26,300	3.98	25,400	4.59	25,200	4.89
Trolley-bus	23,900	3.18	28,300	4.28	26,900	4.86	27,700	5.37
Metro	35,600	4.73	46,800	7.08	46,200	8.35	46,600	9.04
Railway	255,000	33.92	272,200	41.18	192,200	34.76	168,700	32.72
Inland waterway	3,700	0.49	1,600	0.24	1,100	0.20	800	0.16
Air	150,400	20.00	83,200	12.59	71,700	12.97	64,500	12.51
Ship	500	0.07	300	0.05	200	0.04	100	0.02
Total	**751,800**	**100.0**	**661,000**	**100.0**	**552,900**	**100.0**	**515,500**	**100.0**

The modal share of international freight and passenger movements is shown in tables 101, 102, 103 and 104.

Table 101. Freight volume

(in '000 tons)

General-purpose transport	1991	%	1993	%	1995	%	1997	%
Road	1,450	0.02	1,810	0.04	2,050		2,620	
Railway	5,789,000	98.4	4,063,000	97.86	-		-	
Inland waterway	17,000	0.29	17,200	0.41	23,500		23,200	
Air	80	0.001	100	0.002	200		300	
Ship	76,200	1.29	69,600	1.68	57,400		48,800	
Total	**5,883,730**	**100.0**	**4,151,710**	**100.0**	**83,150**		**74,920**	

Table 102. Freight traffic volume

(in million ton-km)

General-purpose transport	1991	%	1993	%	1995	%	1997	%
Road	2,800	0.56	1,800	0.44	2,400		2,200	
Railway	44,800	9.01	31,500	7.62	-		-	
Inland waterway	27,200	5.47	28,700	6.94	40,300		38,400	
Air	500	0.10	700	0.17	900		1,400	
Ship	421,900	84.85	350,800	84.84	286,700		218,700	
Total	**497,200**	**100.0**	**413,500**	**100.0**	**330,300**		**260,700**	

Table 103. Passenger volume

(million passengers)

General-purpose transport	1991	1993	1995	%	1997	%
Bus	0.3	0.7	1.0	10.53	2.5	19.50
Railway			1.1	11.58	0.9	7.02
Inland waterway	0	0.2	0.2	2.10	0.1	0.78
Air	3.6	4.7	7.1	74.74	9.3	72.54
Ship	0.1	0.1	0.1	1.05	0.02	0.16
Total	**4.0**	**5.7**	**9.5**	**100.00**	**12.82**	**100.00**

Table 104. Passenger traffic volume

(in million passenger- km)

General-purpose transport	1991	1993	1995	%	1997	%
Bus	100	200	500	2.05	600	2.02
Railway			600	2.46	700	2.35
Inland waterway	1	10	3	0.01	3	0.01
Air	15,900	18,200	23,200	95.07	28,400	95.52
Ship	200	100	100	0.41	30	0.1
Total	**16,201**	**18,510**	**24,403**	**100.0**	**29,733**	**100.0**

The modal share of vehicle fleet composition is shown in table 105.

Table 105. Trend in road vehicle fleet composition

(million vehicles)

Vehicle type		1991	1993	1995	1997
Total		**23.05**	**27.19**	**29.80**	**32.40**
	Subtotal	12.94	16.46	19.50	22.40
	Passenger cars	8.96	11.78	14.7	17.63
	Buses	0.43	0.60	0.60	0.49
	Trucks	3.55	4.08	4.20	4.28
Motorcycles		10.11	10.73	10.30	10.00

(c) *Road traffic*

Table 106 shows the traffic volumes according to the class of vehicles and the increase in the volume of cars and trucks in 1997.

Table 106. Traffic volumes

(million vehicles)

Vehicle class	1991	%	1993	%	1995	%	1997	%
Cars	8.96	38.9	11.78	43.3	14.7	49.3	17.63	54.4
Buses	0.43	1.9	0.60	2.2	0.6	2.0	0.49	1.5
Trucks	3.55	15.4	4.08	15.0	4.2	14.1	4.28	13.2
Two-wheelers	10.11	43.8	10.73	39.5	10.3	34.6	10.00	30.9
Total	**23.05**	**100.00**	**27.19**	**100.00**	**29.8**	**100.00**	**32.40**	**100.00**

The major origins and destinations of international transport in the Russian Federation are shown in table 107.

Table 107. Major origins and destinations of international transport

No.	Major origins and destinations of international transport	Description
1.	Moscow	Capital
2.	Sankt - Peterburg	Major administrative and industrial centre in the region. It is connected by road, railway, inland waterway, air and ship, and has container terminals.
3.	Rostov-na-Donu	Big administrative and industrial centre. It is connected by road, rail, air and water transport with neighbouring regions and countries.
4.	Novorossiysk	Big administrative and industrial centre. Major sea port. It is connected by road and rail transport and has a container terminal.
5.	Ryazan	Big administrative and industrial centre. It is connected by road and rail transport.
6.	Penza	Big administrative and industrial centre. It is connected by road, air and rail transport and has a container terminal.
7.	Samara	Big administrative and industrial centre. It is connected by road, rail, air and water transport, and has a container terminal.
8.	Ufa	Big administrative and industrial centre. It is connected by road, rail, air and water transport, and a container terminal is planned.
9.	Chelyabinsk	Big administrative and industrial centre. It is connected by road, air and rail transport and a container terminal is planned.
10.	Yekaterinburg	Big administrative and industrial centre. It is connected by road, air and rail transport and has a container terminal.
11.	Kurgan	Big administrative and industrial centre. It is connected by road, air and rail transport and has three container terminals.
12.	Omsk	Big administrative and industrial centre. It is connected by road, air and rail transport.
13.	Novosibirsk	Big administrative and scientific centre. It is connected by railway, air and water transport and a container terminal is planned.
14.	Krasnoyarsk	Big administrative and industrial centre. It is connected by road, water, air and rail transport and has a container terminal.
15.	Irkutsk	Big administrative and industrial centre. It is connected by road, air and rail transport and a

No.	Major origins and destinations of international transport	Description
		container terminal is planned.
16.	Khabarovsk	The capital of the Khabarovsk region. It is connected by road, air, water and rail transport.
17.	Vladivostok	The capital of the Primorskiy region and sea port. It is connected by road, water, air and rail transport and has a container terminal.
18.	Voronezh	Big administrative and industrial centre. It is connected by road, air and rail transport and has a container terminal.
19.	Borisoglebsk	It is connected by road and rail transport.
20.	Saratov	Big administrative and industrial centre. It is connected by road, water, air and rail transport and has a container terminal.
21.	Volgograd	Big administrative and industrial centre. Major river port. It is connected by road, water, air and rail transport and has a container terminal.
22.	Astrakhan	Big administrative centre. Major river and sea port. It is connected by road, water and rail transport.
23.	Makhachkala	The capital of Dagestan Republic. Major sea port. It is connected by road, air and rail transport. A container terminal is planned.
24.	Krasnodar	Big administrative, industrial and agriculture centre. It is connected by road, air and rail transport.
25.	Adler	Major airport. It is connected by road, air and rail transport. A container terminal is planned.

(d) *Status and condition of the national road network*

Highways are classified according to SNiP 2.05.02.-85 into four administrative groups according to their service status in the Russian Federation. They are: State highway, republican roads, regional roads and local roads. According to the Ordinance of the Government of the Russian Federation roads ares divided in three categories: Federal (national) highways, regional highways and departmental highways. The length of roads in the Russian Federation is shown in table 108. Figure 21 indicates the road network in the Russian Federation.

Table 108. Classification of roads

Classification	Length (km)
Federal highway (main or national highway)	45,931
Regional highway (secondary or regional highway)	523,105
Total	569,036

Note: Length of republican, regional and local roads is included into the length of regional highways.

Federal highways provide connections between the capitals of Republics, major industrial and agricultural centres, major towns and economic centres. They provide connections within national centres (*Krai*, Autonomous *Oblast*), as well as provide international transport connections to neigbouring countries.

Regional highways include roads of republican importance connecting regional and economic centres, provide connection within district centres, large industrial centres and connect with other modes of transport. Local roads connect district centres with major villages, local industrial centres and state farms. The Federal Highway Administration is responsible for the construction and maintenance of state roads in the Russian Federation.

The road length by catagories and technical standards is shown in tables 109 and 110.

Table 109. Road length by category

(length in km)

Classification		1991	1993	1995	1997
Main or national highway	**Subtotal**	**98,616**	**40,622**	**44,166**	**45,931**
	Paved only	83,740	36,622	40,328	41,830
	(Percentage paved)	(85.9)	(90.2)	(91.4)	(91.1)
Secondary or regional highway	**Subtotal**	**357,545**	**448,437**	**487,258**	**523,105**
	Paved only	180,763	254,030	278604	300,294
	(Percentage paved)	(50.6)	(56.6)	(57.2)	(57.4)
Total	**Subtotal**	**456,161**	**489,059**	**531,424**	**569,036**
	Paved only	**264,503**	**290,652**	**318,932**	**342,124**
	(Percentage paved)	**(58)**	**(59.43)**	**(60.0)**	**(60.12)**

Table 110. Road length by technical standards

Road	Length by technical standard					Total length (km)
Classification	**I**	**II**	**III**	**IV**	**V**	
Main or national highway	2,554	17,456	21,082	3,250	1,206	45,548
Secondary or regional highway	760	8,122	87,656	296,020	72,613	465,171
Total	**3,314**	**25,578**	**108,738**	**299,270**	**73,819**	**510,719**

The length of roads by classification and surface type is shown in table 111.

Table 111. Length of roads by classification and surface type

(as of 1997)

Classification	Length (km)	Road surface type					
		Paved		Gravel		Others	
		Km	%	Km	%	km	%
Motorway (access-controlled highway)	-						
Main or national highway	45,931	41,830	91.07	3,718	8.09	383	0.83
Secondary or regional highway	523,105	300,294	57.41	164,877	31.52	57,934	11.07
Others roads	-						
Total	**569,036**	**342,124**	**60.12**	**168,595**	**0.83**	**58,317**	**10.25**

Table 112 indicates the length of roads by pavement type.

Table 112. Road condition

(length in km)

Pavement type		1991	1993	1995	1997
Paved	Bituminous	255,040	281,288	308,951	331,485
	Cement	9,463	9,364	9,976	10,639
	Subtotal	**264,503**	**290,652**	**318,927**	**342,124**
Gravel and stabilized soil pavement		140,953	149,339	160,112	168,595
Unpaved		50,705	49,068	52,385	58,317
Total		**456,161**	**489,059**	**531,424**	**569,036**

Most of the state roads have two lanes. Detailed data for the number of lanes and missing links concerning road classification are shown in table 113.

Table 113. Length of roads and classification by number of lanes

Classification	Length (km)	6 lanes and more	4 lanes	2-3 lanes	Single lane
Main or national highways	41,071	138	2,258	38,675	-

Figure 21: National highway network in the Russian Federation

The major national road networks, their lengths, average daily traffic and composition of traffic according to the classification of vehicle types are shown in tables 114 and 115.

Table 114. Traffic characteristics on major road networks

No.	Roads	Length (km)	Traffic volume, 1000 vehicles
1.	M – 1 “Belarys”	440	4.0 – 24.0
2.	M – 2 “Krym”	701	5.0 – 20.5
3.	M – 3 “Ykraina”	489	3.0 – 10.5
4.	M – 4 “Don”	1,523	5.0 – 25.0
5.	M – 5 “Yral”	1,779	5.0 – 33.5
6.	M – 6 “Kaspiy”	1,236	4.0 – 12.5
7.	M – 7 “Volga”	1,361	2.5 – 31.5
8.	M – 8 “Holmogory”	1,211	1.5 – 31.0
9.	M – 9 “Baltiya”	597	3.5 – 13.0
10.	M – 10 “Rossiya”	644	4.5 – 32.5
11.	M – 11 “Narva”	112	7.1 – 8.2
12.	M – 18 “Kola”	1,321	2.5 – 11.5
13.	M – 29 “Kavkaz”	1,147	4.0 – 10.0
14.	M-51, M-53, M-55 “Baykal”	4,189	1.0 – 9.0
15.	M – 52 “Chyuyskiy trakt”	908	1.5 – 12.5
16.	M – 54 “Enisey”	1,054	1.0 – 3.6
17.	M - Chita – Habarovsk	721	1.0 – 1.6
18.	M - 56 “Lena”	1,160	0.5 – 1.0
19.	M – 60 “Ussuri”	745	2.0 – 12.0
20.	M – 27 Dzhubga – Sochi	219	4.6 – 12.5
21.	M – 32 Samara – B. Chernigovka	182	1.0 – 4.0
22.	M – 36 Chelyabinsk – Troitsk	140	4.0 – 6.0
23.	M – 38 Omsk – Cherlak	175	1.8 – 2.6
24.	A – 164 Kultuk – Mondy	206	1.0 – 2.0
25.	A – 165 Ulan-Ude – Kyakhta	235	1.5 – 4.5
26.	A – 166 Chita – Zabaykal’sk	476	1.5 – 5.0
27.	A – 349 Novoaltaysk – Rubtsovsk	323	2.5 – 4.2
28.	A - 184 Ussuriysk – Pogranichny	116	0.5 – 1.6
29.	A – 188 Vladivostok – Nahodka	147	5.0 – 14.0
30.	A – 189 Razdol’noye – Hasan	224	1.0 – 1.5
31.	A – 340 Astrakhan – Aktyubinsk	58	1.0 – 3.3
32.	1 P 216, 1 P 279 Astrakhan – Mahachkala	525	1.5 – 3.5
33.	1 P 468 Blagoveshchensk – Svobodnyy	143	1.0 – 3.5

Composition of road traffic by classification is shown in table 115.

Table 115. Composition of road traffic by classification

Vehicle type	Modal share (percentage)
Cars	51.60
Buses	6.20
Trucks and containers	28.09
Special traffic	6.56
Two-wheelers	7.55

Average daily traffic is shown in figure 22.

(e) *International road links to neighbouring countries*

The Russian Federation is bounded in the west by Finland, Estonia, Latvia, Lithuania, Belarus, and Ukraine (with the western exclave of Kaliningrad Oblast [province] touching Poland) and is bounded in the south by Georgia, Azerbaijan, Kazakhstan, Mongolia, China, and the Democratic People's Republic of Korea. It faces the Baltic and Black Seas in the west, the Arctic Ocean and seas in the north, and the Pacific Ocean, Sea of Japan and Bering Sea in the east.

The locations of border-crossing points in the Russian Federation with neighbouring countries are shown in table 116.

Figure 22: Average daily traffic in the Russian Federation

Table 116. Border-crossing points to neighbouring countries

No.	Neighbouring country	Border-crossing point
1.	Georgia, Armenia	Adler (Psou)
2.		Nignij Zaramag
3.		Verhniy Lars
4.	Azerbaijan	Kazmalyarskiy
5.	Kazakhstan	Kurlik
6.		Ilek
7.		Troitsk
8.		Petuhovo
9.		Sukul
10.		Cherlak
11.		Veseloyarsk
12.		Kotyaevka
13.		Ozinki
14.	Mongolia	Tashanta
15.		Handagayty
16.		Cagan-Tologoy
17.		Mondy
18.		Jeltura
19.		Kyakhta
20.		Verkhniy Ul'khun
21.		Shara-Sur
22.		Novy Durulguy
23.		Altan
24.		Solov'yevsk
25.	China	Zabaykal'sk
26.		Abagaytuy
27.		Starotsuruhaytuy
28.		Olochi
29.		Djalinda
30.		Ushakovo
31.		Blagoveshchensk
32.		Konstantinovka
33.		Poyarkovo
34.		Pashkovo
35.		Amurzet
36.		Nizhneleninskoye
37.		Pokrovka

No.	Neighbouring country	Border-crossing point
38.		Markovo
39.		Turiy Rog
40.		Pogranichny
41.		Poltavka
42.		Kraskino
43	Democratic People's Republic of Korea	Hasan

Detailed data for incoming/outgoing traffic registered by customs in 1996 is indicated in table 117.

Table 117. Volume of incoming/outgoing road traffic by vehicle type, 1996

№	Customs	Incoming road traffic				Outgoing road traffic				Total
		Trucks	Cars	Buses	Subtotal	Truck	Cars	Bus	Subtotal	
1.	Altayskaya	2,880	158,177	14,182	**175,239**	3,336	134,187	1,098	**138,621**	**313,860**
2.	Astrakhanskaya	11,580	16,772	2,930	**31,282**	1,548	16,740	2,740	**21,028**	**52,310**
3.	Birobidzhanskaya	564	26	101	**691**	780	35	101	**916**	**1,607**
4.	Blagoveshchenskaya	10,824	130	1,124	**12,078**	28,032	130	1,124	**29,286**	**41,364**
5.	Borzinskaya	72	600	119	**791**	12	584	116	**712**	**1,503**
6.	Vladivostokskaya	0	0	0	**0**	0	0	0	**0**	**0**
7.	Gorno-Altayskaya	3,468	1,448	6	**4,922**	780	1,211	3	**1,994**	**6,916**
8.	Grodekovskaya	25,848	475	2,032	**28,355**	5,412	494	2,021	**7,927**	**36,282**
9.	Zabaykal'skaya	3,372	10,283	8,025	**21,680**	11,460	10,133	7,278	**28,871**	**50,551**
10.	Kurganskaya (1)	19,356	409,918	5,184	**434,458**	11,928	56,052	4,917	**72,897**	**507,355**
11.	Kurganskaya (2)	9,684	60,286	659	**70,629**	4,356	63,364	630	**68,350**	**138,979**
12.	Magnitogorskaya	4,128	132,851	2,190	**139,169**	9,372	148,526	2,190	**160,088**	**299,257**
13.	Makhachkalinskaya	924	0	0	**924**	1,836	0	0	**1,836**	**2,760**
14.	Mondinskaya	0	627	0	**627**	240	632	0	**872**	**1,499**
15.	Naushkinskaya	756	7,547	395	**8,698**	2,172	10,347	399	**12,918**	**21,616**
16.	Nizhnevolzhskaya	60	4,812	544	**5,416**	24	5,111	545	**5,680**	**11,096**
17.	Novosibirskaya	1,308	31,289	1,809	**34,406**	1,992	11,264	1,112	**14,368**	**48,774**
18.	Omskaya	29,544	155,231	4,219	**188,994**	8,364	120,066	4,273	**132,703**	**321,697**
19.	Orenburgskaya	4,548	93,457	3,122	**101,127**	10,212	93,760	2,699	**106,671**	**207,798**
20.	Orskaya	3,012	20,142	1,406	**24,560**	11,604	18,086	1,355	**31,045**	**55,605**
21.	Samarskaya	420	0	0	**420**	1,776	0	0	**1,776**	**2,196**
22.	Saratovskaya	984	1,382	40	**2,406**	3,312	4,193	80	**7,585**	**9,991**
23.	Severo-Osetinskaya	792	28,660	5,402	**34,854**	1,428	25,700	5,166	**32,294**	**67,148**
24.	Tuvinskaya	72	550	6	**628**	12	517	8	**537**	**1,165**
25.	Tyndinskaya	0	0	0	**0**	120	0	0	**120**	**120**
26.	Tyumenskaya	24	0	0	**24**	1,872	0	0	**1,872**	**1,896**
27.	Ussuriyskaya	0	0	0	**0**	180	0	0	**180**	**180**
28.	Khabarovskaya	0	0	0	**0**	132	0	0	**132**	**132**
29.	Khasanskaya	0	390	123	**513**	84	393	2,196	**2,673**	**3,186**

The status of roads leading to border-crossing points is shown in table 118.

Table 118. Status of roads leading to border-crossing points

No.	Neighbouring country	Location	Road classification	Number of lanes
1.	Georgia, Armenia	Adler (Psou)	III	2
2.		Nignij Zaramag	III	2
3.		Verhniy Lars	IV	2
4.	Azerbaijan	Kazmalyarskiy	IV-V	2
5.	Kazakhstan	Kurlik	III	2
6.		Ilek	III	2
7.		Troitsk	III	2
8.		Petukhovo	III	2
9.		Sukul	III	2
10.		Cherlak	II	2
11.		Veseloyarsk	II	2
12.		Kotyaevka	IV	2
13.		Ozinki	IV	2
14.	Mongolia	Tashanta	III	2
15.		Handagayty	IV	2
16.		Cagan-Tologoy	IV	2
17.		Mondy	IV	2
18.		Jeltura	IV	2
19.		Kyakhta	III	2
20.		Verkhniy Ul’khun	IV	2
21.		Shara-Sur	IV	2
22.		Novy Durulguy	IV	2
23.		Altan	IV-V	2
24.		Solov’yevsk	IV	2
25.	China	Zabaykal'sk	III-IV	2
26.		Abagaytuy	IV	2
27.		Starotsuruhaytuy	IV	2
28.		Olochi	IV	2
29.		Djalinda	IV	2
30.		Ushakovo	IV	2
31.		Blagoveshchensk	III	2
32.		Konstantinovka	IV	2
33.		Poyarkovo	IV	2
34.		Pashkovo	IV	2
35.		Amurzet	IV	2

No.	Neighbouring country	Location	Road classification	Number of lanes
36.		Nizhneleninskoye	IV	2
37.		Pokrovka	IV	2
38.		Markovo	IV	2
39.		Turiy Rog	IV	2
40.		Pogranichny	IV	2
41.		Poltavka	IV	2
42.		Kraskino	IV-V	2
43.	Democratic People's Republic of Korea	Hasan	IV-V	2

(f) *Major container terminals*

Container traffic in the Russian Federation has an important modal share in freight movement. All cities, where the terminals are located, are connected by railway. The locations of the major container terminals are shown in table 119.

Table 119. Location of major container terminals

No.	Town	Region	Capacity (ton/day)
1.	Sankt - Peterburg	Leningradskaya	5,000
2.	Sankt - Peterburg	Leningradskaya	1,000
3.	Voronezh	Voronezhskaya	1,500
4.	Bryansk	Bryanskaya	500
5.	365 km road Moscow – Kiev	Bryanskaya	500
6.	Klintsy	Bryanskaya	500
7.	Bryansk	Bryanskaya	1,000
8.	Vyaz'ma	Smolenskaya	2,000
9.	Roslavl	Smolenskaya	2,000
10.	Smolensk	Smolenskaya	5,000
11.	Smolensk	Smolenskaya	5,000
12.	Smolensk	Smolenskaya	3,000
13.	Smolensk	Smolenskaya	2,000
14.	Ivanovo	Ivanovskaya	400
15.	Ivanovo	Ivanovskaya	1,000
16.	Odintsovo	Moscow	500
17.	Mytishchi	Moscow	1,000
18.	Noginsk	Moscow	500
19.	Podol'sk	Moscow	700
20.	Naro-Fominsk	Moscow	500

No.	Town	Region	Capacity (ton/day)
21.	Vidnoye	Moscow	1,000
22.	Dmitrov	Moscow	5,000
23.	Himki	Moscow	200
24.	Sergiyev Posad	Moscow	2,000
25.	Mozhaysk	Moscow	700
26.	Lyubertsy	Moscow	800
27.	Pavlovskiy Posad	Moscow	1,000
28.	Klin	Moscow	500
29.	Serpukhov	Moscow	800
30.	Elektrostal	Moscow	300
31.	Tuchkovo	Moscow	400
32.	27 km road Moscow – Kiev	Moscow	500
33.	Malye Vyazyemy	Moscow	1,000
34.	Moscow “Sovinteravtoservis”	Moscow	5,000
35.	Moscow “Sovtransavtoekspeditsiya”	Moscow	5,000
36.	Krasnogorsk	Moscow	1,000
37.	Domodedovo	Moscow	1,000
38.	Lobnya	Moscow	1,000
39.	Stupino	Moscow	1,000
40.	Kraskino	Primorskiy	1,000
41.	Ussuriysk	Primorskiy	2,500
42.	Lesozavodsk	Primorskiy	500
43.	Kamen’ – Rybolov	Primorskiy	500
44.	Vladivostok	Primorskiy	1,500
45.	Pogranichny	Primorskiy	1,000
46.	Nahodka	Primorskiy	1,500
47.	Vladivostok	Primorskiy	1,500
48.	Vladimir	Vladimirskaya	1,500
49.	Kurgan	Kurganskaya	1,000
50.	Kurgan	Kurganskaya	1,000
51.	Kurgan	Kurganskaya	100
52.	Nizhniy Novgorod	Nizhegorodskaya	1,000
53.	Vetluzhskiy	Nizhegorodskaya	2,000
54.	Arzamas – 3	Nizhegorodskaya	1,500
55.	Uzhovka	Nizhegorodskaya	1,500
56.	Semenov	Nizhegorodskaya	1,500
57.	Kimry	Tverskaya	2,000

No.	Town	Region	Capacity (ton/day)
58.	Tver	Tverskaya	2,000
59.	Novgorod	Novgorodskaya	150
60.	Kaliningrad	Kaliningradskaya	1,000
61.	Dyagilevo	Ryazanskaya	1,000
62.	Maykop	Rep. Adygeya	1,500
63.	Samara	Samarskaya	100
64.	Surgut	Tyumenskaya	1,500
65.	Krasnoyarsk	Krasnoyarskiy	3,000
66.	Nal'chik	Rep. Kabardino-Balkarskaya	200
67.	Irkutsk	Irkutskaya	1,000
68.	Arkhangel'sk	Arkhangel'skaya	250
69.	Makhachkala	Rep. Dagestan	1,000
70.	Ul'yanovsk	Ul'yanovskaya	250
71.	Novosibirsk	Novosibirskaya	1,500
72.	Orsk	Orenburgskaya	1,500
73.	Orenburg	Orenburgskaya	1,000
74.	Kursk	Kurskaya	1,500
75.	Perm'	Permskaya	500
76.	Ufa	Rep. Bashkiria	500
77.	Syktyvkar	Rep. Komi	100
78.	Tyumen'	Tyumenskaya	1,000
79.	Minvody	Stavropol'skiy	100
80.	Tula	Tul'skaya	500
81.	Kamensk-Ural'skiy	Sverdlovskaya	200
82.	Rezh	Sverdlovskaya	100
83.	Revda	Sverdlovskaya	250
84.	Yekaterinburg	Sverdlovskaya	250
85.	Petrozavodsk	Rep. Kareliya	500
86.	Pskov	Pskovskaya	1,000
87.	Magadan	Magadanskaya	3,000
88.	Chelyabinsk	Chelyabinskaya	1,000
89.	Orel	Orlovskaya	200
90.	Vladikavkaz	Rep. North Osetiya	500
91.	Cherkessk	Rep. Karachayevo-Cherkesskaya	200
92.	Barnaul	Altayskiy	1,000
93.	Biysk	Altayskiy	1,000
94.	Rubtsovsk	Altayskiy	500

No.	Town	Region	Capacity (ton/day)
95.	Adler	Krasnodarskiy	500
96.	Novorossiysk	Krasnodarskiy	3,000
97.	Volgograd	Volgogradskaya	5,000

(g) *Development plans*

The following table 120 illustrates the long-term, mid-term and short-term development plans with regard to the development of highways in the Russian Federation.

Table 120. Development plans

Plans	Description	Plan period	Approximate cost
Long-term plan	The federal programme "Highways XXI centuy"	2000 – 2030	
Mid-term plan	The federal programme “Development of the international transportation of cargoes and passengers by motor transport”	1996 – 2000	7.15 billion US$ (for whole programme) 3.15 billion US$ (For construction and reconstruction of roads)
	The Presidential programme of perfection and development of highways of the Russian Federation, “Roads of Russia”.	1995 – 2000	32.3 billion US$
	The subprogramme of the development of highways for the international automobile passage (1996 – 2010)	1996-2010	74.9 billion US$
Short-term and ongoing project	The annual programmes of construction and reconstruction of highways	1997	9.87 billion US$ (1997)

IV. ASIAN HIGHWAY ROUTES

A. Asian Highway route criteria

The following basic principle and route criteria for the Asian Highway network were endorsed by the Commission at its forty-eighth session, as part of the ALTID project.

1. The basic principle should be to minimize the number of roads to be included in the network and make the maximum possible use of the existing infrastructure.

2. In regard to the principles of the ALTID project as far as road, rail and road-cum-rail routes are concerned, existing and potential trade flows should be the main criteria which would include, where appropriate:

(a) Capital-to-capital links (for international transport);

(b) Connections to main industrial and agricultural centres as well as "growth triangles/zones" (links to important origin and destination points);

(c) Connections to major sea and river ports (integration of land and sea transport networks);

(d) Connections to major container terminals and depots (integration of rail and road networks).

B. Proposed Asian Highway routes and assessment

The routes proposed by China, Kazakhstan, Mongolia, the Republic of Korea and the Russian Federation have been reviewed, following the above basic principle and Asian Highway route criteria. In addition, some important national roads that are part of regional and subregional routes in the project participating countries are also proposed to be included in the Asian Highway network.

1. China

Based on the national study on the Asian Highway, China proposed the following 11 routes during the Expert Group Meeting, which would link China to the Democratic People's Republic of Korea, Kazakhstan, the Lao People's Democratic Republic, Mongolia, Myanmar, Nepal, Pakistan, the Russian Federation, Thailand and Viet Nam:

- Kunming-Jinghong-Mohan (to Lao People's Democratic Republic and Thailand)
- Kunming-Hekou (to Viet Nam)
- Kunming-Ruili (to Myanmar)
- Lhasa-Zhangmu (to Kodari, Nepal)
- Urumqi-Hongqilafu (to Pakistan)
- Urumqi-Korgas (to Kazakhstan)
- Kuytun-Alashankou (to Dostyk, Kazakhstan)
- Harbin-Heihe (to the Russian Federation)
- Harbin-Suifenhe (to the Russian Federation)
- Shenyang-Dandong (to the Democratic People's Republic of Korea)
- Shanghai-Xi'an

Considering the existing road and national trunk highway system, an outline of the Ninth Five-year Plan; existing international and subregional Asian Highway routes, the proposal of

neighbouring countries to provide connections to the capital and the main industrial and business centres in China, the following potential Asian Highway routes in China have also been proposed.

The highway routes provide connection to the main industrial centres, sea ports such as Shanghai; Xi'an; Zhengzhou; Nanjing; Lianyungang; Hong Kong, China; Urumqi; Kunming; and Changsha, and important growth centres in north-east China such as Shenyang, Changchun and Harbin, with the capital Beijing. The identified routes extend to the borders, Dandong, Heihe, Saynshand, Korgas, and Hongqilafu, to link to the Democratic People's Republic of Korea, the eastern part of the Russian Federation, Mongolia, Kazakhstan and Jammu and Kashmir. Routes to Central Asia and Jammu and Kashmir had been identified during a previous study.

In consideration of these points, the followings are the Asian Highway routes recommended by the Expert Group Meeting in China.

Route 1: Border of Viet Nam (to Hanoi) – Hongkong, China – Changsha – Zhengzhou - Beijing – Shenyang – Dandong- Border of the Democratic People's Republic of Korea (to Sinuiju)

This route is an extension of the existing Asian Highway route A-1 from Hanoi, the capital of Viet Nam to Beijing, the capital of China, and extends to Pyongyang and Seoul. The stretch between Hong Kong, China to Changsha is the existing Asian Highway route A-82 and the stretch between Changsha, Zhengzhou and Beijing is the existing Asian Highway route A-3.

Route 2: Border of Kazakhstan (Korgas) – Urumqi – Lanzhou –Xi'an - Shanghai

This route had been identified as A-4 in the Asian Highway Study in 1995 and provides a connection to the Central Asian republics from the east coast of China.

Route 3: Border of the Russian Federation (to Chita) – Manzhouli – Harbin – Changchun – Tumen - Border of the Democratic People's Republic of Korea (to Najin)

This route provides a short link to the seaport in the "growth zone" Tumen River area from the Russian Federation and Mongolia. It also connects to the Trans-Siberian Trunk Highway from China.

Route 4: Mong La and Mohan (Ban Bo)- Jinghong – Kunming – Changsha – Zhengzhou – Beijing – Border of Monglia (to Saynshand)

This is part of Asian Highway route A-3, identified previously, providing a link to Ulaanbaatar, capital of Mongolia in the north and connecting the capitals of Myanmar, the Lao People's Democratic Republic and Thailand through Asian Highway route A-2.

Route 5: Border of Jammu and Kashmir (Khunjerab)- Hongqilafu – Kashi – Urumqi

This route provides a connection to the seaport of Karachi in Pakistan for the Central Asian republics and western China. This is part of Asian Highway route A-4 identified in 1995.

Route 6: Hong Kong, China - Shanghai - Liayungang – Shenyang – Changchun - Harbin –Heihe - Border of the Russian Federation (to Blagoveshchensk)

This is a coastal route in south-eastern China connecting major seaports and industrial centres. It also provides a connection to the growth centres Shenyang, Changchun, Harbin and Heihe in eastern China and links to Blagoveshchensk in the Russian Federation.

Route 7: Harbin – Suifenhe

This route provides a link to Ussuriysk and Vladivostok in the Russina Federation.

Route 8: Beijing – Tanggu

This is part of the existing Asian Highway route A-81 connecting the capital Beijing to the seaport Tanggu.

Route 9: Kashi- Turugart (to Kyrgyzstan)

This route is proposed to provide a connection to Kyrgyzstan and to link to existing Asian Highway routes A-61. It further provides a connection to the planned road corridor in Uzbekistan and Krygyzstan.

Route 10: Lhasa- Choksum- Kodari (border of Nepal)

This route is proposed to provide a connection between Lhasa and Kathmandu.

Route 11: Kuitun- Alashankou (Druzhba)

This route is proposed to provide a connection between Kazakhstan and Urumqi through Druzhba and existing route A-72.

Route 12: Urumqi-Eratai-Yarantai (to Mongolia)

This route is proposed to provide a connection between Urumqi and western part of Mongolia.

Route 13: Kunming - Ruili (to Myanmar)

This route is proposed to provide a connection between Kunming and Myanmar.

Route 14: Kunming- Hekou (to Viet Nam)

This route is proposed to provide a connection between Kunming and Viet Nam.

Route 15: Changchun-Baicheng-Ulanhot-Yirshi- border of Mongolia (to Sumber)

This route is proposed to provide a connection between eastern Mongolia and Changchun, Tumen River area and connection to sea ports.

The Asian Highway routes recommended by the expert group meeting are shown in figure 23.

Figure 23. Asian Highway routes in China

2. The Democratic People's Republic of Korea

Bearing in mind the need to provide international links to capital cities in neighbouring countries and to main industrial and business centres, the existing road network in the country and the proposals of neighbouring countries for international routes linkages to the Democratic People's Republic of Korea, potential Asian Highway routes have been identified.

The proposed routes provide connection to the main industrial centres, seaports and important growth centres, such as Wonsan, Sinp'o, Ch'ongjin, Najin, Kaesong and Sonch'on with the capital Pyongyang. The routes have been extended to the borders, to Sinuiju, Kaesong, and Tumengang to link to China, the Republic of Korea, and eastern part of the Russian Federation respectively.

The Asian Highway routes in the Democratic People's Republic of Korea recommended by the expert group meeting are as follows:

Route 1: Border of the Republic of Korea (to Seoul) – Kaesong – Pyongyang –Anju – Sinuiju - Border of China (to Dandong)

This route provides links to the capital of China and the Republic of Korea from Pyongyang, the capital of the Democratic People's Republic of Korea.

Route 2: Border of the Republic of Korea (to Kaesong) – Wonsan - Sinp'o – Ch'ongjin – Rason – Border of China (to Yanji)

This route provides a connection to major seaports, industrial centres and access to seaports for eastern China.

Route 3: Pyongyang - Wonsan

This route provides a link between the above two routes in the Democratic People's Republic of Korea.

Route 4: Rasong- border of the Russian Federation

This route provides connection to Hasan and Vladivostok in the Russian Federation from the Democratic People's Republic of Korea and link to the above route 2.

The Asian Highway routes recommended by the expert group meeting in the Democratic People's Republic of Korea are shown in figure 24.

Figure 24. Asian Highway routes in the Democratic People's Republic of Korea

3. Kazakhstan

The routes proposed for inclusion in the Asian Highway network in Kazakhstan are shown in table 121 and figure 25.

Table 121. Asian Highway routes proposed by Kazakhstan

Number	Road	Length (km)	Note
1.	Korday-Merke	150	Approaches Merke (A-5) and Korday (Georgiyevka).(A- 5)
2.	Merke-Burubaital	275	Approaches Merke (A-5), Burubaital (A-4)
3.	Zhezkazgan-Karaganda-Pavlodar	957	Approaches Zhezkazgan (A- 62), Karaganda (A-74), Pavlodar (A- 60)
4.	Astana-Shiderti-Pavlodar	422	Approaches Astana (A-74), Pavlodar (A-60)
5.	Astana-Petropavlovsk	473	Approaches Petropavlovsk (A-62), Astana (A- 74)
6.	Kokshetau - Ruzayevka	196	Approaches Ruzayevka (A-74)
7.	Georgiyevka-Maykapshagai	416	Approaches Georgiyevka (A-60)
8.	Semipalatinsk - Border of Kazakhstan	113	Approaches Semipalatinsk (A- 60)
9.	border of the Russian Federation - Petropavlovsk-border of the Russian Federation	190	Approaches Petropavlovsk (A- 62)
10.	Almaty-Kokpekti-Koktal-Korgas	360	Section of A- 5

The following paragraphs provide a brief description and assessment of each of the proposed routes.

Route 1: Korday-Merke

This intermediate route connects Almaty and Tashkent, the capital of Uzbekistan.

As this route is very close to the existing international route A-5, following the principle of minimizing the number of routes in the Asian Highway network and avoiding parallel routes, this route may not qualify for inclusion in the network.

Route 2: Merke-Burubaital

This route connects two existing Asian Highway routes A-5 and A-74 and the international significance of the route is not clear.

Route 3: Zhezkazgan-Karaganda-Pavlodar

This route provides connections to the major industrial centres and container terminals of Kazakhstan (Zhezkazgan, Karaganda, and Semipalatinsk) and also provides connections from/to Mongolia with countries in Central Asia, and Asian Highway routes A-60, A- 62 and A-74.

Therefore this route meets Criteria: 1(b) connections to main industrial and agricultural centres and (d) connections to major container terminals and depots.

Route 4: Astana-Shiderti- Pavlodar

This route provides a short link between Ulaanbaatar, the capital of Mongolia, through the Russian Federation via Barnaul with Semipalatinsk, Pavlodar to the capital of Kazakhstan, Astana. The route also links major industrial centres and container terminals in Kazakhstan and the Russian Federation.

Therefore this route meets Criteria: 1(a) capital-to-capital links; (b) connections to main industrial and agricultural centres; and (d) connections to major container terminals and depots.

Route 5: Astana-Petropavlovsk

The route connects to the Trans-Siberian Trunk Highway through Kokshetau, Petropavlovsk from Astana. This route also links major industrial centres and container terminals in Kazakhstan and the Russian Federation.

Therefore this route meets Criteria: 1(a) capital-to-capital links; (b) connections to main industrial and agricultural centres; and (d) connections to major container terminals and depots.

Route 6: Kokshetau-Ruzayevka

This intermediate route provides a link between Route 5 and Asian Highway route A-74 and is a short stretch. The international significance of this route is not clear.

Route 7: Georgiyevka-Maykapshagai

Route 7 is considered a parallel route to the existing Asian Highway route A-72, and there is no connecting route identified in China. The inclusion of this route depends on the identification of a connecting route in China.

Route 8: Semipalatinsk-border of Kazakhstan

This route provides a short link between Ulaanbaatar through the Russian Federation via Barnaul with Semipalatinsk, Pavlodar to the capital of Kazakhstan, Astana, and connects to the Trans-Siberian Trunk Highway through Kokshetau, Petropavlovsk and also links major industrial centres and container terminals in Kazakhstan and the Russian Federation.

Therefore this route meets Criteria: 1(a) capital-to-capital links; (b) connections to main industrial and agricultural centres; and (d) connections to major container terminals and depots.

Route 9: Border of the Russian Federation – Petropavlovsk - border of the Russian Federation

This route is part of the Trans-Siberian Trunk Highway, the main road of the Russian Federation along the southern border that links major industrial centres in Siberia and the far east of the Russian Federation.

Therefore, this route meets Criteria: 1(a) capital-to-capital links; (b) connections to main industrial and agricultural centres; (c) a connection to major sea and river ports; and (d) connections to major container terminals and depots.

Route 10: Almaty-Kokpekti-Koktal-Korgas

The route is parallel to the existing Asian Highway route A-72, and there is no connecting route identified in China. The inclusion of this route depends on the identification of connecting links in China.

The new routes recommended for inclusion in the Asian Highway network in Kazakhstan by the expert group meeting are shown in figure 26 and table 122.

Table 122. New Asian Highway routes in Kazakhstan

Route	Length	Criteria
The Russian Federation border–Semipalatinsk-Pavlodar-Astana-Kokshetau-Petropavlovsk	1,322	1(a) capital-to-capital links; (b) connections to main industrial and agricultural centres; (d) connections to major container terminals and depots
Zhezkazgan-Karaganda-Pavlodar	957	(b) connections to main industrial and agricultural centres; (d) connections to major container terminals and depots
The Russian Federation border-Petropavlovsk-the Russian Federation border	190	1-(a) capital-to-capital links; (b) connections to main industrial and agricultural centres; (d) connections to major container terminals and depots

Figure 25. Proposed Asian Highway routes in Kazakhstan

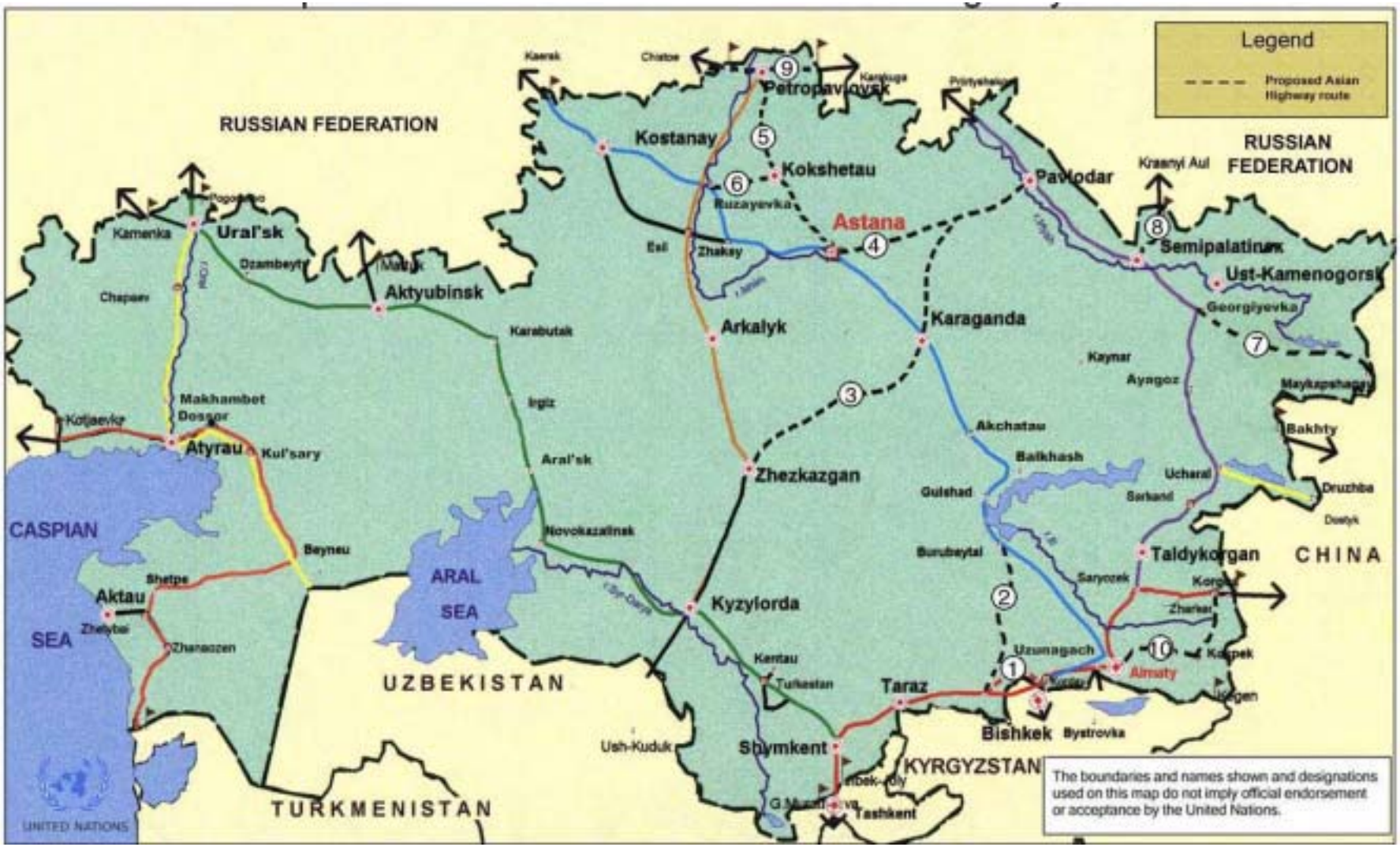


Figure 26. Asian Highway routes in Kazakhstan

4. Mongolia

Mongolia has developed a Millennium road plan in 2001 by resolution of the Parliament of Mongolia, with the purpose of connecting neighbouring and regional countries. The Millennium Road includes one east-west horizontal arterial road and five north-south vertical arterial roads. As a result, Mongolia has proposed the inclusion of the horizontal east-west link of the Millennium Road in the Asian Highway network.

The route proposed for inclusion in the Asian Highway network in Mongolia is shown in table 123 and figure 27.

Table 123. Asian Highway route proposed by Mongolia

Number	Road	Length (km)	Note
1	Border of Mongolia-Tsagaannuur-Olgiy-Tosontsengel- Tsetserleg- Harhorin-Ulaanbaatar-Ondorhaan-Sumber- border of Mongolia	2,619	Connects east and west of Mongolia

The length, number of lanes and classification by category for the proposed route is given in table 124.

Table 124. Conditions of the Asian Highway route proposed by Mongolia

Routes	Major points on the route	Length (paved)	Width, number of lanes
Ulaanbaatar-Harhorin-Tsetserleg-Tosontsengel-Olgiy-Tsagaannuur-border of Mongolia	Ulaanbaatar-Elsentasarhai	280	7m, 2 lanes
	Elsentasarhai-Harhorin	65	
	Harhorin-Tsetserleg	128	
	Tsetserleg-Tosontsengel	372	
	Tosontsengel-Olgiy	662	
	Olgiy-Tsagaannuur	69	
	Tsagaannuur-border of Mongolia	35	
Ulaanbaatar-Ondorhaan-Sumber- border of Mongolia	Ulaanbaatar-Nalayh	27	6m, 2 lanes
	Nalayh-Erdene sum	37	7m, 2 lanes
	Erdene sum- Baganuur	51	
	Baganuur- Ondorhaan	196	
	Ondorhaan-Choybalsan	327	
	Choybalsan- Sumber	338	
	Sumber -border of Mongolia	32	

During the Expert Group Meeting Mongolia proposed an additional route, Ulaanbaishint - Hovd-Bulgan Sum- Yarantai, for inclusion in the Asian Highway network.

A brief description and assessment of the proposed routes are provided in following paragraphs.

Route 1: Ulaanbaishint -Tsagaannuur-Olgiy-Hovd- Tsetserleg- Harhorin-Ulaanbaatar-Ondorhaan-Choybalsan-Sumber- border of Mongolia

The western horizontal link of the Millenium Road from Ulaanbaatar to Olgiy is planned to connect the capitals of Mongolia and the Russian Federation. It provides a short link with Kazakhstan's capital through Barnaul and also connects to the other Central Asian republics. The eastern link of the Millenium Road connects Mongolia with the Korean peninsula through Changchun, China.

As the existing route A-83, Darhan-Borshoo is parallel to the proposed western link of the Millenium Road, the existing A-83 is to be realigned to the proposed route from Ulaanbaishint to Ulaanbaatar and to continue on to Sumber and the border of Mongolia.

Route 2: Ulaanbaishint -Hovd-Bulgan Sum- Yarantai- (to Urumqi, China)

The proposed route is one of the vertical links of the Millenium Road in the western part of Mongolia connecting Urumqi in China and Novosibirsk in the Russian Federation.

The Asian Highway network recommended by the Expert Group Meeting in Mongolia is shown in figure 28.

Figure 27. Proposed Asian Highway routes in Mongolia

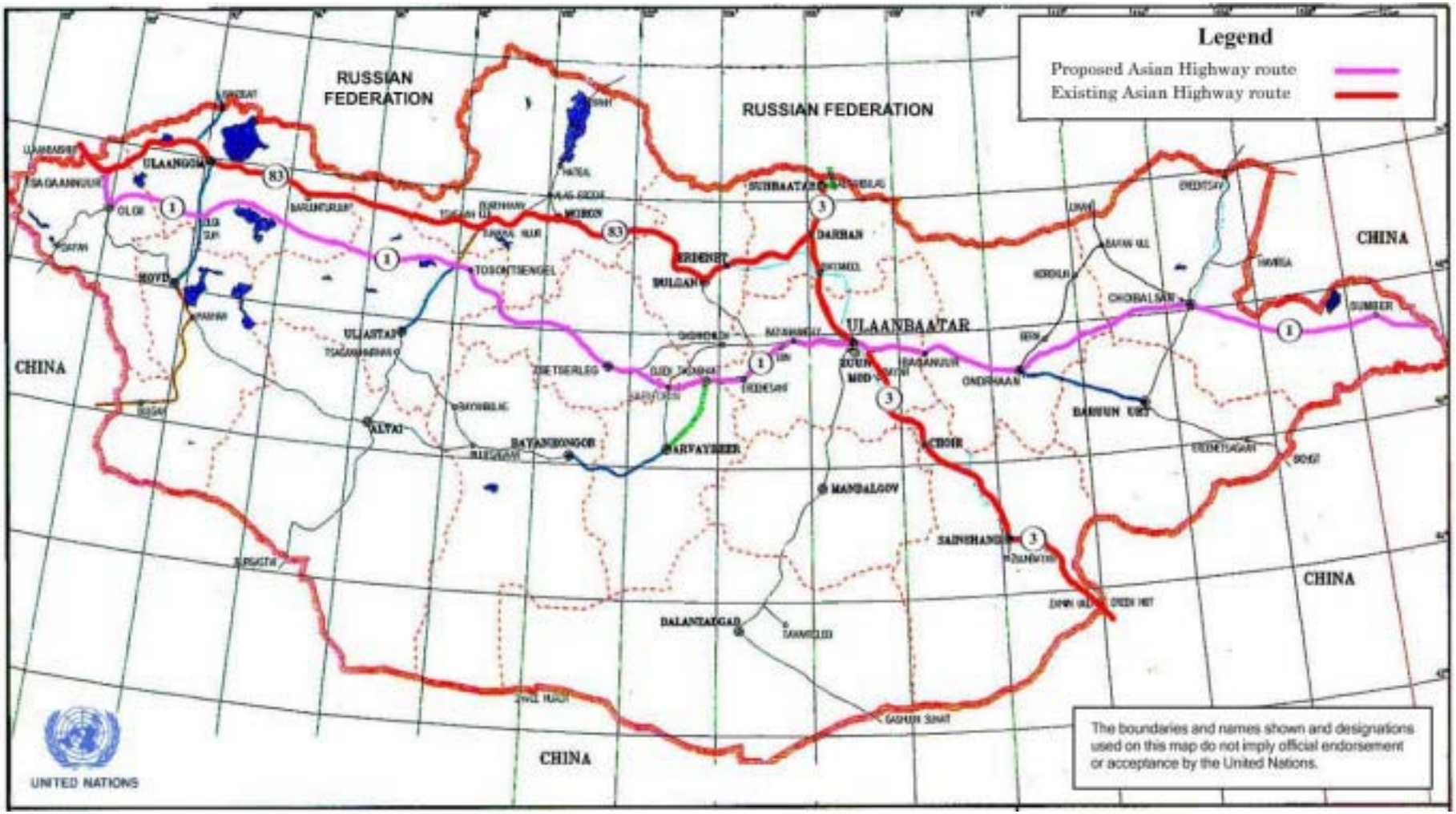
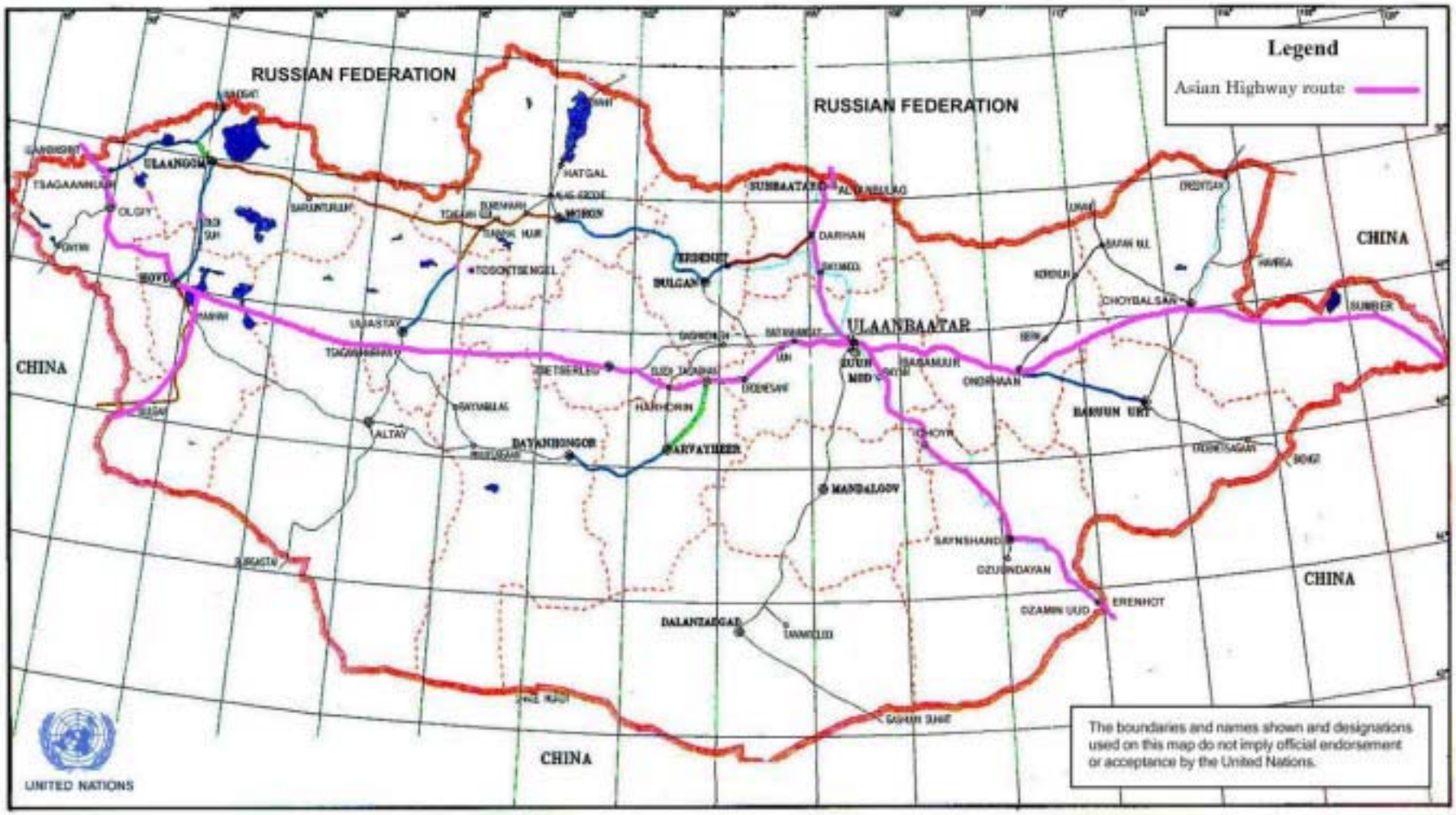


Figure 28. Asian Highway routes in Mongolia



5. The Republic of Korea

The routes proposed for inclusion in the Asian Highway network in the Republic of Korea according to Asian Highway route criteria, are shown in table 125 and figure 29.

Table 125. Asian Highway routes proposed by the Republic of Korea

Route	Sections	Length (km)
1	Pusan-Seoul- Munsan-border of the Republic of Korea	444
2	Pusan-P'ohang-Kosong	456

The length, number of lanes and classification by category for the proposed routes are shown in table 126.

Table 126. Conditions of Asian Highway routes proposed by the Republic of Korea

Routes (Priority)	Major points on the route	Length (Paved)	Number of lanes	Conformity to Asian Highway Standards
1	Pusan-Taejon Taejon-Seoul Seoul-Munsan (border of the Republic of Korea)	286 118 40	4 4 4	Primary
2	Pusan-P'ohang P'ohang-Tonghae Tonghae-Kosong (border of the Republic of Korea)	146 270 40	4 4 4	Class 1

Figure 29. Proposed Asian Highway routes in the Republic of Korea

A brief description and assessment of each of the proposed routes is provided in the following paragraphs.

Priority route 1: Pusan-Seoul- Munsan-border of the Republic of Korea

This route provides links between the capitals of three countries, the Republic of Korea, the Democratic People's Republic of Korea and China, and also provides access to other international routes included in the Asian Highway network in China and Mongolia to connect the major sea ports, industrial, agricultural centres and container terminals.

Therefore, this route meets Criteria: 1(a) capital-to-capital links; (b) connections to main industrial and agricultural centres as well as the "growth zone"; (c) connections to major sea and river ports; and (d) connections to major container terminals and depots.

Priority route 2: Pusan-P'ohang-Kosong

This route provides connections between the Korean peninsula and Central Europe, through Pusan- Wonsan (the Democratic People's Republic of Korea) and China (Changchun and Harbin), to Mongolia and the Russian Federation. It also provides connections to seaports on the east cost of the Korean peninsula, a growth zone (TRADP), capitals, major industrial and agricultural centres and major container terminals. This route also provides access to other international routes and to the Trans-Siberian Highway in the Russian Federation.

This route meets Criteria: 1(b) connections to main industrial and agricultural centres as well as the "growth zone"; (c) connections to major sea and river ports; and (d) connections to major container terminals and depots.

Both of the above routes originate from Pusan, the southern port in the Republic of Korea, therefore it opens up the possibility of extending the Asian Highway Route A-1 to Japan through a ferry link or possibly a submarine tunnel to Shimonoseki from Pusan.

The routes recommednded by the expert group meeting for inclusion in the Asian Highway network in the Republic of Korea are shown in figure 30 and table 127.

Table 127. Asian Highway routes in the Republic of Korea

Route	Length (km)	Asian Highway criteria
Pusan-Seoul- Munsan-border of the Republic of Korea	444	1(a) capital-to-capital links (b) connections to main industrial and agricultural centres as well as "growth zones" (c) connections to major sea and river ports (d) connections to major container terminals and depots
Pusan-P'ohang-Kosong- border of the Republic of Korea	456	1(b) connections to main industrial and agricultural centres as well as "growth zones" (c) connections to major sea and river ports (connections to major container terminals and depots

Figure 30. Asian Highway routes in the Republic of Korea

6. The Russian Federation

The routes proposed for inclusion in the Asian Highway network in the Russian Federation in accordance with Asian Highway route criteria are shown in table 128 and figure 31.

Table 128. Asian Highway routes proposed by the Russian Federation

Routes (Priority)	**Major points on the route**	**Length (km)**	**Criteria**
P–1	Minsk (border of Belarus) - Moscow – Ryazan – Penza – Samara – Ufa – Chelyabinsk – Kurgan – Omsk – Novosibirsk – Krasnoyarsk – Irkutsk – Ulan-Ude – Chita – Svobodnyy – Zavitinsk – Obluch'ye– Birobidzhan– Khabarovsk – Vladivostok	8,760	Connection to North Europe and North-East Asia Capital-to-capital links Connection to main industrial and agricultural centres Connection to major sea and river ports Connection to major container terminals and depots
	Connecting links		
P-1-1	Samara – B. Chernigovka	187	
P-1-2	Chelyabinsk – Troitsk	117	
P-1-3	Omsk – Cherlak	178	
P-1-4	Novosibirsk – Biysk	935	
P-1-5	Barnaul – Rubtsovsk	319	
P-1-6	Krasnoyarsk – Kyzyl	1,066	
P-1-7	Kultuk – Mondy	218	
P-1-8	Ulan-Ude – Kyakhta	219	
P-1-9	Chita – Zabaykal'sk	482	
P-1-10	Svobodnyy – Blagoveshchensk	143	
P-1-11	Ussuriysk – Pogranichny	117	
P-1-12	Vladivostok –Nakhodka	143	
P-1-13	Vladivostok – Hasan	221	
	Subtotal	**4,345**	
P-2	Kursk – Voronezh – Saratov – Ozinki	970	Connection to Central Europe and Asia Capital-to-capital links Connection to main industrial and agricultural centres
P-3	Border of Kazakhstan – Astrakhan – Volgograd – Kamensk-Shakhtinskiy	801	Connection to Central Europe and Asia Capital-to-capital links
P-4	Border of Finland-Vyborg – St. Peterburg – Novgorod - Moscow – Tambov – Volgograd – Astrakhan – Makhachkala – border of Azerbaijan	2,801	Connection to Europe and Central Asian republics Capital-to-capital links Connection to main industrial and agricultural centres
	Total	**17,677**	

Note: The letter "P" stands for the priority of the proposed routes in the Russian Federation.

Figure 31. Proposed Asian Highway routes in the Russian Federation

Traffic characteristics, length, number of lanes and classification by category for the proposed routes are shown in table 129.

Table 129. Condition of Asian Highway routes proposed by the Russian Federation

Routes (Priority)	Major points on the route	Length (km)	Class	Number of lanes	Traffic volume, veh/day (in 1000)
P-1	Minsk (border of Belarus)	437	I	6-4	3.7-24.0
	Moscow - Ryazan	186	I-II	4-2	9.5-33.4
	Ryazan - Penza	450	II-III	2	4.5-8.1
	Penza - Samara	390	II-III	2	6.7-17.8
	Samara - Ufa	437	III	2	4.5-8.8
	Ufa - Chelyabinsk	394	II-III	2	4.6-9.8
	Chelyabinsk - Kurgan	278	II-III	2	2.8-7.1
	Kurgan - Omsk	316	II-III	2	3.0-3.8
	Omsk - Novosibirsk	613	II-III	2	1.3-5.4
	Novosibirsk - Krasnoyarsk	734	I-II-III	4-2	2.3-8.6
	Krasnoyarsk - Irkutsk	1,008	II-III	2	1.0-8.8
	Irkutsk - Ulan-Ude	433	II-III	2	1.9-2.7
	Ulan-Ude - Chita	656	II-III	2	2.0-3.4
	Chita - Chernyshevsk	154	III	2	1.6
	Chernyshevsk - Never	510	No road		
	Never - Svobodnyy	410	No road		
	Svobodnyy - Zavitinsk	116	III	2	0.7
	Zavitinsk - Bureya	45	No road		
	Bureya - Obluch'ye	120	III	2	0.8
	Obluch'ye - Birobidzhan	161	III	2	1.2
	Birobidzhan - Khabarovsk	173	III	2	1.4
	Khabarovsk - Vladivostok	740	I-II-III	4-2	1.3-12.0
	Subtotal	**8,760**			
P-1-1	Samara – Bol'shaya Chernigovka	187	III	2	1.2-3.9
P-1-2	Chelyabinsk - Troitsk	117	I,III	2	3.7-6.0
P-1-3	Omsk - Cherlak	178	II	2	1.8-2.6
P-1-4	Novosibirsk - Biysk	935	II-III	2	1.1-12.0
P-1-5	Barnaul - Rubtsovsk	319	II-III	2	2.5-4.2
P-1-6	Krasnoyarsk - Kyzyl	1,066	II-III	2	1.2-4.1
P-1-7	Kultuk - Mondy	218	III-IV	2	0.9-1.9
P-1-8	Ulan-Ude - Kyakhta	219	II-III	2	1.2-4.5
P-1-9	Chita - Zabaykal'sk	482	III-IV	2	1.5-4.8
P-1-10	Svobodnyy - Blagoveshchensk	143	I,IV	2	0.8-3.5
P-1-11	Ussuriysk - Pogranichny	117	III-IV	2	0.4-1.6
P-1-12	Vladivostok - Nakhodka	143	II-III	2	5.0-14.0

Routes (Priority)	Major points on the route	Length (km)	Class	Number of lanes	Traffic volume, veh/day (in 1000)
P-1-13	Vladivostok - Hasan	221	IV	2	0.5-1.0
	Subtotal	**4,345**			
P-2	Kursk - Voronezh	216	II-III	2	3.1-4.8
	Voronezh - Saratov	459	III	2	3.6-9.8
	Saratov - Ozinki	295	II-III	2	0.9-3.5
	Subtotal	**970**			
P-3	Border of Kazakhstan - Astrakhan	58	II-III,V	2	0.8-3.3
	Astrakhan – Volgograd	378	II-III	2	3.9-4.5
	Volgograd - Kamensk-Shakhtinskiy	365	II-III	2	2.0-4.5
	Subtotal	**801**			
P-4	Vyborg – St. Peterburg	138	II-III	2	1.9-14.0
	St. Peterburg – Novgorod	161	I-II	4-2	4.5-10.9
	Novgorod – Moscow	472	I-II	4-2	4.5-32.1
	Moscow – Tambov	325	I-II	6-2	4.0-25.0
	Tambov – Volgograd	615	II	2	3.3-12.4
	Volgograd – Astrakhan	378	II-III	2	3.9-4.5
	Astrakhan – Makhachkala	525	II-III,IV	2	1.5-3.5
	Makhachkala – border of Azerbaijan	187	I	4	6.0-7.5
	Subtotal	**2,801**			
	Total	**17,677**			

A brief detailed description and assessment of the proposed routes is provided in the following paragraphs.

Priority route P-1: Border of Belarus (to Minsk) -Moscow – Samara – Ufa – Chelyabinsk – Kurgan – Omsk – Novosibirsk – Krasnoyarsk – Irkutsk – Ulan-Ude – Chita – Never - Svobodnyy – Khabarovsk – Vladivostok-Hasan

This route connects Central Europe with North-East Asia, through Moscow, Ufa, Chelyabinsk Omsk, Novosibirsk, Irkutsk, Ulan-ude, Chita, Never, Svobodnyy, Khabarovsk and Vladivostok to the Korean Peninsula, using the Trans-Siberian Trunk Highway. It provides links to the capital, Moscow, from Astana, the capital of Kazakhstan through A-83, Ulaanbaatar, the capital of Mongolia through A-3, and the capitals of the Democratic People's Republic of Korea and the Republic of Korea. It also provides a connection to major container terminals, and industrial and agricultural centres in European and Asian parts of the Russian Federation located along the southern border. It connects sea ports in the far eastern part of the Russian Federation, the "growth zone" in the Tumen River region in the Korean peninsula and Europe. This route is under study as part of a feasibility study of the international route Paris-Moscow-Vladivostok-New York. This route is included in the CIS

network and part of this route is included in the E-network which connects the Asian part of the Russian Federation with the E-road network (route E-30 Moscow-Minsk).

Therefore, this route meets Criteria: 1 (a) capital-to-capital links; (b) connections to main industrial and agricultural centres as well as the "growth zone"; (c) connections to major sea and river ports; and (d) connections to major container terminals and depots.

Priority route P-2: Kursk – Voronezh – Saratov – Ozinki

This route provides connections to container terminals in the Russian Federation (Saratov, Borisoglebsk, Voronezh, Kursk), and links industrial and agricultural centres in Kazakhstan, the Russian Federation and Central Europe through the E-road network (route E-38). This route is also included in the CIS network.

Therefore, this route meets Criteria: 1(b) connections to main industrial and agricultural centres as well as the "growth zone"; and (d) connections to major container terminals and depots.

Priority route P-3: Border of Kazakhstan – Astrakhan – Volgograd – Kamensk-Shakhtinskiy

It provides connections to the main industrial centres, agricultural centres, sea and river ports (Astrahan, Volgograd) and container terminals (Astrahan, Volgograd). It connects to the existing Asian Highway route A-70 in Kazakhstan and provides a link to central Europe. This route is included in the CIS network.

Therefore, this route meets Criteria:1 (b) connections to main industrial and agricultural centres as well as the "growth zone"; (c) connections to major sea and river ports; and (d) connections to major container terminals and depots.

Priority route P-4: Border of Finland-Vyborg – St. Peterburg – Novgorod - Moscow – Tambov – Volgograd – Astrakhan – Makhachkala – Derbent - border of Azerbaijan

This route provides connections to Northern Europe and Central Asia, through major industrial centres container terminals (Sankt - Peterburg, Volgograd, Astrakhan, Tambov, Novgorod), river ports and sea ports (Tambov, Volgograd, Astrahan, Makhachkala). It also provides a connection to the capitals of the Russian Federation and Azerbaijan; through Asian Highway route A-5 from Volgograd, further it provides connection to Central Asia through Asian Highway routes A-5 and A-70. This route is a part of the E-road network (E-105 and E-115) and is also included in the CIS network. Part of this route is included in the Crete corridor No.9 (Moscow-Astrakhan).

Therefore, this route meets Criteria: 1(a) capital-to-capital links; (b) connections to main industrial and agricultural centres as well as the "growth zone"; (c) connections to major sea and river ports; and (d) connections to major container terminals and depots.

Route P-1-1: Samara – Bol'shaya Chernigovka

This route provide links to existing Asian Highway routes A-61 and A-63 from the Trans-Siberian Trunk Highway through Bol'shaya Chernigova, connecting industrial and agricultural centres in Kazakhstan and the Russian Federation..

This route meets the Criteria: 1 (b) connections to main industrial and agricultural centres as well as the "growth zone" and is recommednded for inclusion in the Asian Highway network as extension of route A- 63.

Route P-1-2: Yekaterinburg-Chelyabinsk – Troitsk

This route is an extension of the existing Asian Highway route A-74 from Troitsk and provides a connection between capitals, industrial and agricultural centres in Kazakhstan and the Russian Federation.

This route meets the Criteria: 1 (b) connections to main industrial and agricultural centres as well as the "growth zone".

Route P-1-3: Omsk – Cherlak

This route is an extension of the existing Asian Highway route A-60 from Cherlak and connects industrial and agricultural centres in Kazakhstan and the Russian Federation.

This route meets the criteria: 1 (b) connections to main industrial and agricultural centres as well as the "growth zone".

Routes P-1-4: Novosibirsk – Biysk - Tashanta

This route connect Mongolia from Novosibirsk in the Trans-Siberian Trunk Highway and thus providing link between the capitals of Mongolia and the Russian Federation as well as industrial and agricultural centres.

This route meets the criteria: 1 (a) capital-to-capital links; and (b) connections to main industrial and agricultural centres as well as the "growth zone".

Route P-1-5: Barnaul – Rubtsovsk

This route provides a link to existing Asian Highway route A-60 and also provides a short connection between the capitals of Kazakhstan and Mongolia as well as providing a link to industrial and agricultural centres in Mongolia, Kazakhstan and the Russian Federation.

This route mests the Criteria: 1 (a) capital-to-capital links; and (b) connections to main industrial and agricultural centres as well as the "growth zone".

Route P-1-6: Krasnoyarsk – Kyzyl

Although this route is proposed to provide connections to Mongolia, as there is no link identified in Mongolia, its inclusion in the Asian Highway network depends on the identification of connecting links in Mongolia.

Route P-1-7: Kultuk – Mondy

The route is close and parallel to the route P-1-8 and its inclusion in the Asian Highway network depends on the identification of connecting links in Mongolia.

Routes P-1-8: Ulan-Ude – Kyakhta

This route is an extension of the existing Asian Highway route A-3, and provides connections to the Trans-Siberian Trunk Highway, links the capitals of the Russian Federation and Mongolia, and also connections to industrial and agricultural centres, major container terminals and river ports that are located along the southern border of the Russian Federation.

This route meets the Criteria: 1(a) capital-to-capital links; (b) connections to main industrial and agricultural centres as well as the "growth zone"; and (d) connections to major container terminals and depots.

Routes P-1-9: Chita – Zabaykal'sk

This route provides a connection to the industrial and agricultural centres in north-east China with industrial and agricultural centres located along the Trans-Siberian Trunk Highway in the Russian Federation. This route could also provide a short link for Siberia with the port Najin in the Democratic People's Republic of Korea and Nakhodka in the Russian Federation through Harbin and Changchun, China.

This route meets the Criteria: 1(a) capital-to-capital links, (b) connections to main industrial and agricultural centres as well as the "growth zone", and (c) connections to major sea and river ports.

Route P-1-10: Svobodnyy – Blagoveshchensk

This route is proposed to connect North-east China with Siberia and the far eastern part of the Russian Federation. The road connection to China is also well developed from Hiehe, currently the border traffic is about 250 vehicles a day.

Route P-1-11: Ussuriysk – Pogranichny

This route is proposed to connect north-east China with Siberia and the far eastern part of the Russian Federation. It provides a short link to Vladivostok and Nakhodka from the eastern part of China. It provides connection to Harbin, China through Suifenhe.

Route P-1-12: Vladivostok –Nakhodka

This route connects major industrial centres in the far eastern part of the Russian Federation through the Trans-Siberian Trunk Highway with the sea port in Nakhodka which has a complementary role for Vladivostok, functioning as a major port connecting to Siberia.

This route meets the Criteria: 1 (b) connections to main industrial and agricultural centres as well as the "growth zone"; and (c) connections to major sea and river ports.

Route P-1-13: Vladivostok – Hasan

This route connects all major industrial centres in the far eastern part of the Russian Federation through the Trans-Siberian Trunk Highway with sea ports in the Korean peninsula (with the Democratic People's Republic of Korea).

This route meets the Criteria: 1 (b) connections to main industrial and agricultural centres as well as the "growth zone"; and (c) connections to major sea and river ports.

The routes recommended by the expert group meeting for inclusion in the Asian Highway network in the Russian Federation are shown in table 130 and on figure 32.

Table 130. Asian Highway routes in the Russian Federation

Route	Length	Remarks
Border of Belarus (to Minsk) –Smolensk-Moscow – Ryazan – Penza – Samara – Ufa – Chelyabinsk – Kurgan – Omsk – Novosibirsk – Krasnoyarsk – Irkutsk – Ulan-Ude – Chita – Never - Svobodnyy – Zavitinsk – Bureya – Obluch'ye– Birobidzhan– Khabarovsk – Vladivostok-	8,981	(a) Capital-to-capital links (b) Connection to main industrial and agricultural centres as well as "growth zones" (c) Connection to major sea and river ports (d) Connection to major container

Route	Length	Remarks
Hasan		terminals and depots
Connecting links		
Samara – Bol'shaya Chernigovka	187	
Chelyabinsk – Troitsk	117	
Omsk – Cherlak	178	
Novosibirsk – Tashanta	935	
Barnaul – Rubtsovsk	319	
Ulan-Ude – Kyakhta	219	
Vladivostok-Nakhodka	142	
Svobodnyy – Blagoveshchensk	143	
Ussuriysk – Pogranichny	117	
Yekaterinburg -Chelyabinsk		
Border of Ukraine - Kursk – Voronezh – Saratov – Ozinki	970	(b) Connection to main industrial and agricultural centres as well as "growth zones" (d) Connection to major container terminals and depots
Border of Kazakhstan – Astrakhan – Volgograd – Kamensk-Shakhtinskiy - border of Ukraine	801	(b) Connection to main industrial and agricultural centres as well as "growth zones" (c) Connection to major sea and river ports (d) Connection to major container terminals and depots
Border of Finland-Vyborg – St. Peterburg – Novgorod - Moscow – Tambov – Volgograd – Astrakhan – Makhachkala – Derbent-border of Azerbaijan	2,801	(a) Capital-to-capital links (b) Connection to main industrial and agricultural centres as well as "growth zones" (c) Connection to major sea and river ports (d) Connection to major container terminals and depots

Figure 32. Asian Highway routes in the Russian Federation

C. Numbering system of identified Asian Highway routes

1. Existing route numbering system for the Asian Highway network

The existing numbering system for the new Asian Highway network was approved by the Expert Group Meeting held from 29 November to 3 December 1993 in Bangkok, attended by fifteen Asian Highway member countries, Bangladesh, Cambodia, China, India, Indonesia, Islamic Republic of Iran, the Lao People's Democratic Republic, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand and Viet Nam.

The existing numbering system is outlined in the following paragraphs:

1. Route numbers begin with "A", which stands for "Asian", followed by one or two digits. This is an application of the same principle used for the development of the European "E" road network numbering system, based on the "European Agreement on Main International Traffic Arteries, 1975". The purpose is to make the numbering system for the Asian Highway uniform with the European system, and to make these two regional road networks fully compatible in the future.

2. As some countries use the letter "A" symbol on national roads, the "AH" letters, which stand for "Asian Highway", instead of "A", will be used on road signs. Each member country will decide the colour to be used to distinguish the Asian Highway network signs from other national road signs.

3. The identified Asian Highways in these countries are classified as international routes and subregional routes. International routes are those, that will facilitate uninterrupted transportation across the subregions (zones) and subregional routes are those routes that facilitate transport across countries within one subregion (zone). Accordingly, the international and subregional route numbers are assigned to the identified routes.

4. Route numbers 1 to 9 are assigned to international routes, which run across the zones described below.

5. The whole region is divided into four zones (subregions) as follows:

Zone 1: Cambodia, Indonesia, the Lao People's Democratic Republic, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Viet Nam

Zone II: Bangladesh, India, Nepal and Sri Lanka

Zone III: Afghanistan, Islamic Republic of Iran and Pakistan

Zone IV: China and Mongolia

Note: The Commission at its fiftieth session in 1994 endorsed the revised regional subgrouping which covers the above-mentioned zones. These zones are to be replaced with the following subregional groupings: Subregional Group 1 for Zone III, Subregional Group 2 for Zone IV, Subregional Group 3 for Zone II, Subregional Group 4 for Zone 1.

6. Route numbers 10 to 39, 40 to 59, 60 to 79, and 80 to 99 are assigned to subregional routes, which run within Zone I, II, III and IV, respectively.

7. The present route numbers (of the existing Asian Highway routes) are kept unchanged where possible to avoid confusion.

As the current study includes the Democratic People's Republic of Korea, the Republic of Korea, and the Russian Federation as new members, all these countries are proposed to be included in Zone IV (Group 2) owing to their location in North-East Asia. Additionally, as the Russian Federation is a big country extending to Europe and Central Asia, it is also proposed to be included in Zone III (group 1). Therefore, the revised zoning for the numbering system is shown in the following table.

Table 131. Revised subregional groupings

Zone (Group)	Countries	Subregional Route Numbers
Zone I (Group 4)	Brunei Darussalam, Cambodia, China, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Viet Nam	10-39
Zone II (Group 3)	Bangladesh, Bhutan, India, Myanmar, Nepal, Pakistan, and Sri Lanka	40-59
Zone III (Group 1)	Afghanistan, Armenia, Azerbaijan, China, India, Islamic Republic of Iran, Kazakhstan, Kyrgyzstan, Pakistan, the Russian Federation, Tajikistan, Turkey Turkmenistan, and Uzbekistan	60-79
Zone IV (Group 2)	China, the Democratic People's Republic of Korea, Kazakhstan, Mongolia, the Republic of Korea and the Russian Federation	80-99

2. Numbering of the Asian Highway routes

(a) International routes

There are five routes that could potentially be designated as international Asian Highway routes in North-East Asia as they pass through more than one zone, as indicated above. Among the five routes, four routes are considered to be extensions of the existing international routes in those countries and one route is a new international route.

The route from the border of Viet Nam-Hong Kong, China-Changsha-Zhengzhou-Beijing-Shenyang-Sinuiju-Pyongyang- Seoul- Pusan is considered an extension of the existing route, A-1. The route Changsha – Zhengzhou – Beijing is the existing A-3 route. After renumbering, the proposed link to Pyongyang and Seoul will also be part of Asian Highway route A-1. Route A-82, from Hong Kong, China to Changsha is now considered an international route connecting Beijing with Pyongyang and Seoul, and thus it is proposed to renumber A-82 to A-1.

The route from Mong La and Ban Bo -Jinghong-Kunming-Changsha- Zhengzhou -Beijing-Saynshand-Ulaanbaatar- Altanbulag is existing route A-3, which will be extended to Ulan-Ude in the Russian Federation.

The route Urümqi-Kashi- Hongqilafu-Khunjerab is part of route A-4 identified by a previous study as connecting sea ports in Pakistan to the Central Asian republics and western China.

Route A-4 from Shanghai to Urumqi in China, which was identified during a previous study, is now proposed for renumbering as A-5. It will be extended to Korgas, Kazakhstan to link to the existing international route A-5 in Central Asia and will continue from Baku to the newly proposed route in the Russian Federation through Derbent, Volgograd, Moscow, St. Peterburg, to the border of Finland.

The proposed route from Pusan- Seoul-Pyongyang- Changchun- Harbin-Chita--Moscow-Smolensk to the border of Belarus is a new international route and is designated as A-6. The route from Hasan - Vladivostok -Khabarovsk-Chita is also considered as an alternate international route and has been assigned route number 6A.

(b) Subregional routes

The identified subregional routes provide links to the identified new international routes, or are an extension of already identified subregional routes in those countries or are new subregional routes in North-East Asia. The individual routes identified in the countries are linked to form 16 subregional routes. Most of these subregional routes are assigned an existing route number or a new route number from 80-99, corresponding to Zone IV (Group 2). As two of the proposed routes in China provide connections to Myanmar and the Lao People's Democratic Republic which belong to Zone I (Group 4), two new route number 14 and 16, corresponding to Zone I are assigned to these routes because of the proximity to the region. One of the proposed routes connects to Nepal which belongs to Zone II (Group 3), so the existing route number 42, corresponding to Zone II, is assigned to this route. Six proposed routes provide connections to western China and the Russian Federation from Central Asia, which corresponds to Zone III (Group 2), therefore the existing route numbers A-60, A-61, A-70, A-72, and A-74 from Zone III have been assigned to the identified routes.

(c) Proposed route numberings

Route numbers A-1, A-3, A-4, A-5, and A-6 (6A) have been assigned to the identified international Asian Highway routes and route numbers A-14, A-16, A-42, A-60, A-61, A-63, A-70, A-72, A-74, A-81, A-83, A-87, A-88, A-89, A-90 and A-91 have been assigned to identified subregional Asian Highway routes.

The recommended Asian Highway routes and route numbers for the identified international and subregional routes in China, Kazakhstan, Mongolia, the Russian Federation, the Democratic People's Republic of Korea and the Republic of Korea, are shown in table 132 and figure 33.

Table 132. The Asian Highway routes and numbering

International routes:

A-1	Border of Viet Nam-Pingxiang-Shenzhen-Changsha-Zhengzhou-Beijing-Shenyang-Dandong- Shinuiju-Pyongyang-Kaesung-Seoul-Taejon-Pusan
A-3	Daluo (to Myanmar)/Mohan(to Lao People's Democratic Republic)-Mengla-Jinghong-Kunming -Changsha- Zhengzhou -Beijing-Erdenet-Dzamiin-Uud-Ulaanbaatar- Altanbulag –Ulan-Ude
A-4	Urumqi- Khasi- Hongqilafu-Khunjurab
A-5	Shanghai-Xi'an-Lanzhou-Urumqi-Khargos-Almaty-Tashkent-Ashgabat-Turkemenbashi-Baku-Derbent-Makhachkala- Astrakhan-Volgograd- -Tambov-Moscow- St. Peterburg- Vyborg- Border of Finland

A-6	Busan-Seoul-Pyongyang-Wonsan- Ch'ongjin-Rason-Hunchun-Yanji—Changchun-Harbin-Manzhouli- Chita-Ulan-Ude-Novosibirsk- Omsk-Petropavlovsk-Chelyabinsk-Samara- Moscow-Smolensk-Border of Belarus
6A	Hasan-Vladivostok-Khabarovsk-Birobidzhan-Svobodnyy-Never-Chita
Subregional routes:	
A-14	Kunming-Hekou (to Viet Nam)
A-16	Kunming-Ruili (to Myanmar)
A-42	Kodari (Border of Nepal) - Choksum- Lhasa
A-60	Omsk- Cherlak- Pavlodar
A-61	Border of Ukraine -Kursk-Voronezh–Saratov-Ural'sk – Aktyubinsk-Kyzylorda-Shymkent-Bishkek- Turugart- Kashi
A-63	Samara-Bol'shaya Chernigovka- Ural'sk- Atyarau
A-70	Border of Ukraine-Kamensk-Shakhtinskiy – Volgograd- Astrakhan-Atyrau
A-72	Kuytun-Alashankou (Dostyk)
A-74	Yekaterinburg-Chelyabinsk-Troitsk-Kostanay-Astana-Balkhash-Almaty
A-81	Beijing- Tanggu
A-83	Petropavlovsk- Astana- Pavlodar-Rubtsovsk- Barnaul-Tashanta-Ulaanbaishint-Tsagaannuur-Olgiy-Hovd-Tseterleg-Harhorin- Ulaanbaatar- Ondorhaan-Choybalsan-Sumber – Yirshi-Ulanhot-Baicheng- Changchun
A-87	Harbin- Suifenhe- Ussuriysk-Vladivostok- Nakhodka
A-88	Pusan-P'ohang-Kosong-Wonsan
A-89	Hong Kong, China-Shanghai-Lianyungang-Shenyang-Changchun-Harbin- Heihe-Blagoveshchensk-Svobodnyy
A-90	Novosibirsk- Barnaul-Tashanta- Ulaanbaishint -Hovd-Bulgan Sum-Yarantai-Ertai-Urumqi
A-91	Zhezkazgan-Karaganda- Pavlodar

As the present study covers six countries, the above numbering of the Asian Highway routes will be reviewed while considering overall numbering of the Asian Highway routes during the expert group meeting planned for all Asian Highway member countries in 2002.

Figure 34 shows the overall Asian Highway network including the existing Asian Highway network in other countries and the routes recommended by the study.

Figure 33. Asian Highway network connecting China, Kazakhstan, Mongolia, the Russian Federation and the Korean Peninsula

Figure 34. Overall Asian Highway routes

V. CONCLUSIONS

The study on the “Road Network connecting China, Kazakhstan, Mongolia, the Russian Federation and the Korean Peninsula" was carried out with the participation of six member countries, China, the Democratic People's Republic of Korea, Kazakhstan, Mongolia, the Republic of Korea, and the Russian Federation. The main objective of the study was to identify highway routes of international importance in those countries connecting North-East Asia with Central Asia, the Caucasus and Europe.

All participating countries apply national standards for the construction and improvement of road networks. Most of the provisions of the Technical Standards of Highway Engineering in China, the Construction Rules and Procedure (SNiP 2.05.02-85) in Kazakhstan, the Highway Design Standards in Mongolia, the Code for Structures of Road and Facilities being used in the Republic of Korea and the revised design standard (SNiP 2.05.02-85) in the Russian Federation conform with the Asian Highway design standard.

The study has identified Asian Highway routes in the member countries for inclusion in the Asian Highway network following the basic principal and Asian Highway route criteria. The proposed routes are based on the existing road network and future plans for the development of the highway network and are planned to provide connection to existing Asian Highway routes in neighbouring countries. The proposed routes in the countries are classified as international or subregional routes, depending on their connectivity to other subregions.

The existing route numbering system as endorsed by the fiftieth session of the Commission in 1994 was used to assign route numbers to the proposed new routes. Route numbers A-1, A-3, A-4 and A-5, which are currently in use, and one new route number A-6, are proposed for the international routes. The route numbers A-42, A-60, A-61, A-63, A-70, A-72, A-74, A-81 and A-83, which are currently in use and seven new route numbers A-14, A-16, A-87, A-88, A-89, A-90 and A-91 are proposed for the subregional routes. As the present study is limited to six countries, a review of the proposed numbering of the recommended routes in the context of review of Asian Highway network in the whole of Asia, will be necessary during the expert group meeting planned for all Asian Highway member countries.

The findings of the study have been presented and considered by the Policy-level Expert Group Meeting (EGM) held on 10-12 October 2001, in Bangkok. The expert group meeting considered the proposed Asian Highway routes, the Asian Highway design standard and formalization of the Asian Highway network.

The Meeting recommended 21 new routes comprising five international and 16 subregional routes for inclusion in the Asian Highway network. The proposed routes provide connection to Central Asia, the Caucasus and Europe from North-East Asia. The coverage of the Asian Highway network has now reached to 29 member countries as the Meeting recommended that the proposed new routes in the Democratic People’s Republic of Korea, the Republic of Korea and the Russian Federation be included in the Asian Highway network. Some of the major routes recommended by the Meeting are:

- Pusan-Pyongyang-Harbin-Chita-Moscow-Smolensk- to Europe
- St. Peterburg-Moscow-Volgograd-Baku
- Shanghai-Urumqi-Korgas- to Central Asia
- Changchun-Yirshi- Ulaanbaatar- Barnaul-Astana-Petropavlovsk

The Meeting also considered that the Asian Highway design standard provides useful guidance for the development and upgrading of the routes and supported ESCAP initiatives for the

formalization of the Asian Highway network through a regional agreement. The report of the Meeting is included as annex IV.

The study has contributed substantially to the task of completing the formulation of the Asian Highway network as outlined in the refined implementation strategy of the ALTID project. The network identified by the study and recommended by the Meeting will be incorporated in another ongoing study, "Promotion, Development and Formalization of Asian Highway Project (Phase III and IV)", which is reviewing and formulating the Asian Highway network in other Asian Highway member countries. A policy-level expert group meeting for all Asian Highway member countries is planned in 2002 to consider and complete the formulation of the Asian Highway network to cover the whole of Asia.

Annex I

ASIAN HIGHWAY CLASSIFICATION AND DESIGN STANDARDS

1. General

New Asian Highway classification and design standards were proposed and endorsed as general guidelines for Asian Highways by the Expert Group Meeting held from 29 November to 3 December 1993 in Bangkok, attended by fifteen Asian Highway member countries, Bangladesh, Cambodia, China, India, Indonesia, Iran (Islamic Republic of), the Lao People's Democratic Republic, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand and Viet Nam. This was the first revision of both the classification and the design standards from the original "Classification and Design Standards for the Asian Highway" developed in 1974, taking into consideration recent progress in highway design, construction and maintenance as well as in road transport technology.

Since most Asian Highway member countries have their own design standards (most of them are based on the American AASHTO standards), the revised "Classification and Standards for the Asian Highway" was simplified to provide only the necessary "minimum" standards and guidelines to facilitate international road traffic.

2. Classification

Asian Highways are classified as shown in table 1.

Table 1. Asian Highway classification

Classification	Description	Pavement Type
Primary	Access-controlled motorway	Asphalt or cement concrete
Class I	4 or more lanes highway	Asphalt or cement concrete
Class II	2 lanes	Asphalt or cement concrete
Class III	2 lanes (narrow)	Double bituminous treatment

"Primary" class in the classification is access-controlled motorways. Access-controlled motorways are used exclusively by automobiles. Access to the motorway is at grade-separated interchanges only. Motorcycles, bicycles and pedestrians will not be allowed to enter the motorway in order to ensure traffic safety and the high running speed of automobiles. At-grade intersections shall not be designed on the motorway and the carriageway will be divided by a median strip.

"Class III" can be used only when the funding for the construction and/or land for the road is limited. The type of pavement should be upgraded to asphalt concrete or cement concrete as soon as possible in the future. Since Class III is also regarded as the minimum desirable standard, the upgrading of any road sections below Class III to comply with the Class III standard should be encouraged.

Future traffic volume projected for 20 years after completion of road construction/ improvement (called projected daily traffic volume) should be used to determine the classification of roads as described below.

It is recognized internationally that the presence of heavy vehicles and slow-moving vehicles greatly influence the design of a highway. Therefore, in this classification, the approach of "passenger car unit (pcu)" which is widely used for design purposes in Asian countries has been used. The flow coefficients shown in table 2 are used to convert vehicles into "pcu".

Table 2. Flow coefficients

Vehicle type	Flow coefficient
Bicycles	0.5
Motorcycles	0.5
Light, commercial motor vehicles (gross weight 10 tons)	1
Passenger cars	1
Trucks and buses	2
Semi-trailers and trailers	3

The traffic volume of light vehicles does not need to be taken into account if exclusive lanes for light vehicles are provided. Flow coefficients for heavy vehicles can be increased if the road is located in a mountainous area.

The classification of a road is determined as follows using "pcu" as an index representing traffic volume:

(i) *Determine "PDT" or "projected daily traffic volume (pcu/day)" using projected traffic volume by vehicle type (vehicle/day) and flow coefficients;*

(ii) *Determine "K value" which is the ratio of the 30th highest hourly traffic volume over one year (pcu/hour) to annual average daily traffic (pcu/day). Traffic count data on a road section which has similar characteristics to the planned road can be used. K value is usually around 0.10;*

(iii) *Determine "D value" which is the ratio of heavy directional peak hour (30th highest) traffic volume {pcu/hour) to both directional peak hour (30th highest) traffic volume (pcu/hour). D value usually ranges from 0.55 to 0.60;*

(iv) *Calculate "PPHT" or "planning peak hour traffic volume (pcu/hour)" using a formula PPHT = PDT xK x D. PPHT represents projected heavy directional 30th highest hourly traffic volume (pcu/hour);*

(v) *Divide PPHT (per/hour) by 1,800 (pcu/hour) which is widely recognized as standard capacity per one lane and round up the calculated value to determine the number of lanes in one direction. Multiplying by 2 gives the required number of lanes (both directions);*

(vi) *Determine the class according to the required number of lanes determined in step (v). "Primary" class can be used if the development of access-controlled motorway is needed.*

3. Design standards

(a) Terrain classification

Terrain classification is shown in table 3

Table 3. Terrain classification

Terrain classification	Cross slope
Level (L)	0 to 9.9%
Rolling (R)	10 to 24.9%
Mountains (M)	25 to 60%
Steep (S)	Greater than 60%

(b) Design speed

The design speed of 120, 100, 80, 60, 50, 40 and 30 kilometres per hour is to be used. The relation between design speed, highway classification and terrain classification is shown in table 4. Design speed of 120 km/h will be used only for Primary class (access-controlled motorways) which has median strips and grade-separated interchanges.

Table 4. Design speed, highway classification and terrain classification

(Unit: km/h)

Terrain	Primary	Class I	Class II	Class III
Level (L)	120	100	80	60
Rolling (R)	100	80	60	50
Mountain (M)	80	60	50	40
Steep (S)	60	60	40	30

(c) Cross-section

The dimension, such as right of way width, lane width, shoulder width, median strip width, pavement slope and shoulder slope for each highway classification are shown in table 5.

It is highly recommended that pedestrians, bicycles and animal-drawn carts be separated from through traffic by provision, where practical, of frontage roads and/or sidewalks for the sections where smooth traffic is impeded by the existence of this local traffic.

Table 5. Asian Highway design standards 1993

Highway classification		Primary (4 or more lanes)				Class I (4 or more lanes)				Class II (2 lanes)				Class III (2 lanes)			
Terrain classification		L	R	M	S	L	R	M	S	L	R	M	S	L	R	M	S
Design seeped (km/h)		120	100	80	60	100	80	60		80	60	50	40	60	50	40	30
Width (m)	Right of way	50				40				40				30(40)			
	Lane	3.75				3.50				3.50				3.00(3.25)			
	Shoulder	3.00		2.50		3.00		2.50		2.50		2.00		1.5(2.0)		1.0(1.5)	
	Median strip	4.00		3.00		3.00		2.50		N/A		N/A		N/A		N/A	
Min. horizontal curve (m)		520	350	210	115	350	210	115		210	115	80	50	115	80	50	30
Pavement slope (%)		2				2				2				2 - 5			
Shoulder slope (%l		3 - 6				3 - 6				3- 6				3 - 6			
Type of pavement		Asphalt/cement concrete				Asphalt/cement concrete				Asphalt/cement concrete				Dbl. bituminous treatment			
Max. superelevation (%)		10				10				10				10			
Max. vertical grade (%)		4	5	6	7	4	5	6	7	4	5	6	7	4	5	6	7
Structure loading (minimum)		HS20-44				HS20-44				HS20-44				HS20-44			

Notes: Figures bracket are desirable values.

Minimum horizontal curve shall be determined in conjunction with superelevation.

(d) Horizontal alignment

Horizontal alignment of the road should be consistent with the topography of the terrain through which it passes. Minimum curve radii should be applied only when necessary and should be used in conjunction with transition curves. Compound curves should be avoided whenever possible. The minimum radii of horizontal curve is shown in table 6 for each highway class.

Table 6. Minimum radii of horizontal curve (Asian Highway standards)

(Unit: m)

Terrain	Primary	Class I	Class II	Class III
Level (L)	520(1000)	350(600)	210	115
Rolling (R)	350(600)	210(350)	115	80
Mountain (M)	210(350)	115(160)	80	50
Steep (S)	115(160)	115(160)	50	30

Note: The values in parentheses should be considered as the ordinary standards.

It is recommended that the application of the minimum curve radii be limited to unavoidable cases and values larger by 50 to 100 per cent should be considered as the normal minimum ones.

Transition curves should be applied to connect curves with radii smaller than the values shown in table 7. It is also recommended that transition curves be applied even in cases where the radii are as large as twice the values in table 7.

Table 7. Radii for which transition curves should be applied (Asian Highway standards)

(Unit: m)

Terrain	Primary	Class I	Class II	Class III
Level (L)	2,100	1,500	900	500
Rolling (R)	1,500	900	500	350
Mountain (M)	900	500	350	250
Steep (S)	500	500	250	130

The minimum transition curve length shown in table 8 is recommended.

Table 8. Minimum transition curve length (Asian Highway standards)

(Unit: m)

Terrain	Primary	Class I	Class II	Class III
Level (L)	100	85	70	50
Rolling (R)	85	70	50	40
Mountain (M)	70	50	40	35
Steep (S)	50	50	35	25

The maximum super elevation should be 10 per cent for all the terrain classification.

(e) Vertical alignment

The vertical alignment of any highway should be as smooth as economically feasible, that is, there should be a balance of cutting and filling to eliminate the rolling nature of land. In the use of the maximum vertical gradient, it should be kept clear in the mind of the designer that, once constructed to a given vertical grade, the highway cannot be upgraded to a lesser gradient without the loss of the entire initial investment.

The maximum vertical grade shown in table 9 should be used for all highway classes.

Table 9. Maximum vertical grade (Asian Highway standards)

Terrain classification	Maximum vertical grade
Level (L)	4%
Rolling (R)	5%
Mountains (M)	6%
Steep (S)	7%

The critical length of gradient section for the provision of a climbing lane is recommended to highway classifications Primary and Class I, as shown in table 10.

Table 10. Critical length of gradient section for the provision of a climbing lane (Asian Highway standards)

Terrain Classification	Primary	Class I
Level (L)	3% - 800m	3% - 900m
	4% - 500m	4% - 700m
Rolling (R)	4% - 700m	4% - 800m
	5% - 500m	5% - 600m
Mountains (M)	5% - 600m	5% - 700m
	6% - 500m	6% - 500m
Steep (S)	6% - 500m	6% - 500m
	7% - 400m	7% - 400m

It is desirable to provide a climbing lane to the up-gradient highways with heavy truck traffic where the length of the gradient exceeds the above values.

(f) Pavement

Carriageways should be paved with cement concrete or asphalt concrete. However, as mentioned before, Class III (double bituminous treatment) could be included in the classification and standards tentatively, only if pavement types will be upgraded in the near future.

The pavement of many road sections in the Asian Highway member countries is damaged owing to insufficient load capacity. The design load for pavement should, therefore, be determined carefully to prevent damage to the road surface and consequently to reduce maintenance costs.

However, road pavement should be designed taking into account:

(i) Maximum wheel load;

(ii) traffic volume;

(iii) Quality of materials to be used for basecourse and subgrade (as the quality of road construction materials vary from country to country), the pavement load specification was not included in the Asian Highway standards.

(g) Structure loading

Increasingly heavy traffic, particularly container traffic, requires properly designed load capacity (maximum axle load). In order to prevent serious damage to road structures, and also to reduce maintenance costs, the Asian Highway network, as an international road network, should have a high design load capacity.

The minimum design loading of HS 20-44, which is the international standard corresponding to full-size trailer loading, should therefore be used for the design of structures.

(h) Vertical clearance

Minimum vertical clearance should be 4.5 metres, which is the requirement for safe passage of standard ISO containers. However, in cases where sufficient clearance cannot be secured because of the high cost of rebuilding existing structures such as bridges, gooseneck trailers with low vehicle bed clearance could be used.

Annex II

STUDY TEAM

ESCAP secretariat

Transport, Communications, Tourism and Infrastructure Development Division

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Mr M. Rahmatullah, Director**
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Mr V. N. Timopheyev, Chief, Land Transport Section**
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* Involved in the study, now relocated
** Involved in the study, now retired

Annex III

OFFICIALS CONTACTED DURING MISSIONS

Mission to the Russian Federation (22- 27 November 1998)

Officials and representatives of the Ministry of Transport, Federal Highway Administration, and RosdorNii Institute

Mr Oleg V. Skvortsov
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Mr Y. Tegin, Mr S. Beliyakov, Mrs T. Kovaleyova, Mr L. Kozirev
Mr B. Kononienko, Mr V. Chokov, Mr A. Zenkin, Mr D. Chebishev

Mr V. Belov, National Expert

Mission to Kazakhstan (28 November– 1 December 1998)

Mr S. L. Larichev
Head of Road Administration

Mission to China (02– 05 March 1999)

Mr Ju Chengzhi
Deputy Director General Department of International Cooperation
Ministry of Communications

Mr. Ruyu Zhao
Vice Director of Transport Planning and Research Institute
Ministry of Communications

Mr. Xue Huihua
Senior Engineer
Foreign Capital Utilization Office, Ministry of Communications

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Mr. Wu Yong
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Mission to Mongolia (6-10 March 1999)

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Mrs D. Sarandulam
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Mission to the Republic of Korea (11 – 15 March 1999)

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Ministry of Construction and Transportation

Mr Youngsoo Chang
Deputy Director, Road Construction Division
Ministry of Construction and Transportation

Mr Dong-Min Han
Deputy Director, International Cooperation Division
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Mr Gyeong-Seok Kim, National Expert

Mission to China (9-11 August 2000)

Mr Ju Chengzhi
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Annex IV

ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC

Report of the Policy-level Expert Group Meeting on the Road Networks connecting China, Kazakhstan, Mongolia, the Russian Federation and the Korean Peninsula

10-12 October 2001, Bangkok

I. INTRODUCTION

A. Background

The Asian Highway project was initiated with the objective of assisting member countries in developing road transport infrastructure, both within Asia and between Asia and Europe, thereby promoting regional development and opening new opportunities for international trade and tourism. As part of the Asian Highway project for developing international road transport linkages between North-East Asia, Central Asia, the Caucasus and Europe, the secretariat completed a study on the road networks connecting China, Kazakhstan, Mongolia, the Russian Federation and the Korean peninsula. The study has identified potential Asian Highway routes in these countries.

Following the completion of the study, a Policy-level Expert Group Meeting was suggested to consider the Asian Highway routes proposed by the participating countries for inclusion in the Asian Highway network; to review the technical standards of the routes; and to introduce the proposed formalization of the Asian Highway network.

B. Organization of the Meeting

The Policy-level Expert Group Meeting on Road Networks Connecting China, Kazakhastan, Mongolia, the Russian Federation and the Korean Peninsula was organized by the Transport, Communications, Tourism and Infrastructure Development Division of ESCAP. It was held from 10 to 12 October 2001 in Bangkok.

C. Attendance

The Meeting was attended by representatives of China, the Democratic People's Republic of Korea, Mongolia, the Republic of Korea, the Russian Federation and the United Nations Development Programme (UNDP) Tumen Secretariat. Mr H. Nishimura, Manager, Central Consultants Inc., also attended as an observer. The list of participants and the programme of the Meeting are given in annexes V and VI, respectively.

D. Opening of the Meeting

The Meeting was inaugurated by the Chief of the Transport, Communications, Tourism and Infrastructure Development Division of ESCAP. In his opening address, the Chief warmly welcomed the participants. He noted that adequate and efficient access to the global market was a prerequisite for the socio-economic development of countries, and stressed the importance of developing transport infrastructure to provide access to markets. Recognizing the growing demands for improved regional transport, ESCAP was implementing the Asian Land Transport Infrastructure Development (ALTID)

project with support and cooperation from member countries. The Chief further mentioned that the Asian Highway project was an important part of ALTID and had been instrumental in developing international highway routes which already transited 26 member countries. Following this Policy-level Expert Group Meeting, the Asian Highway would include routes covering 29 countries. He mentioned that an ESCAP Ministerial Conference on Infrastructure would be held in Seoul, 12-17 November 2001 and that the development of the Asian Highway would be one of the important issues to be discussed. In addition an expert group meeting for all Asian Highway member countries was planned for 2002 which would complete the formulation of the Asian Highway network. He expressed his hope that the Meeting would provide valuable contributions to both of those events.

The Chief thanked the Government of the Republic of Korea for its generous financial assistance, and concluded by wishing the participants success in their deliberations and a pleasant stay in Bangkok.

II. SUMMARY OF PROCEEDINGS

A. Introduction to the ALTID project

The Chief of the Land Transport Section introduced ESCAP and the ALTID project which, comprised the Trans-Asian Railway, the Asian Highway and land transport facilitation. After outlining the implementation strategy of the ALTID project, he briefed the Meeting on the progress to date, including several studies that had been completed for the formulation of the Asian Highway network. Lastly, he introduced some of the issues that would be discussed at the forthcoming ESCAP Ministerial Conference on Infrastructure, to be held in Seoul, 12-17 November 2001.

B. Asian Highway network development and introduction to the study

The secretariat briefly outlined ESCAP activities in the development of the Asian Highway network and introduced the objectives and activities of the current study, outlining the work being undertaken and planned for the periodic revision of the Asian Highway network. That included completion of the formulation of the Asian Highway to cover the whole of Asia, revision of the design standards, extension of the Asian Highway database and formalization of the networks.

C. Transport development in the Tumen River Area

The Team Leader of the UNDP Tumen Secretariat outlined the transport development strategy of the Tumen River Area Development Programme (TRADP). The geographic coverage of the Tumen transport corridor was described with maps showing the Primorsky region (Russian Federation), Yanbian prefecture (China), and the Rajin Sonbong zone (Democratic People's Republic of Korea). Details of the current TRADP activities were provided including the development of transport infrastructure in the land, sea and air transport sectors, and other initiatives to strengthen cooperation in transport facilitation, including bilateral talks on cross-border problems. He suggested several areas for increased cooperation and coordination between TRADP and ESCAP, particularly with respect to activities related to the implementation of priority transport projects in the subregion, promotion of the transport network, including the work being implemented under the ALTID project, and the development of a transport facilitation agreement for the subregion.

D. Statements from the country representatives

Representatives from each of the countries attending the Meeting presented the details of recent developments in the highway sector of their countries with particular reference to proposed international routes, brief details of which are provided below. Following each statement, the floor was opened for questions and clarifications.

China

The representative of China informed the Meeting that the Tenth Five-year Plan of national economic and social development had recently been issued. For the highway sector the goals were primarily to support economic growth and spread its benefits to wider hinterlands through the development of transport networks and services. Two particular priority areas in the plan were to improve commercial and personal mobility and to establish a national and international trunk network to serve economic globalization. In that regard, the importance of cooperation with neighbouring countries was emphasized. It was noted that infrastructure projects, such as the Asian Highway network, would expand opportunities for regional economies to cooperate and integrate. In that process, subregional infrastructure projects, in particular, would be important to the region's development.

At present, China's highway network was estimated to be about 1.4 million kilometres, including 16,300 kilometres of expressways and about 20,000 kilometres of other high-grade (Class I) highways. All levels of the government have embarked on major highway investment programmes. Two core high-grade highway systems were the National Trunk Highway System and the Western Development Inter-Provincial Corridors. He mentioned that the National Highway 107 (Beijing-Guangzhou-Shenzhen) was first proposed to be included in the Asian Highway network by China in 1987. Since then, the secretariat and the Government of China have been discussing other potential routes. Based on the national study, the representative proposed 11 possible alternatives for consideration. Those Asian Highway routes would link China to the Democratic People's Republic of Korea, Kazakhstan, the Lao People's Democratic Republic, Mongolia, Myanmar, Nepal, Pakistan, the Russian Federation, Thailand and Viet Nam. He also stressed that the proposed Asian Highway alternatives of China were subject to the approval of the Chinese Government and the final inclusion needed to be confirmed by official documents.

In closing, the representative noted that China would give high priority to the Asian Highway projects in China and actively cooperate with other countries to improve transport mobility and efficiency; to improve road safety; to develop logistical systems, particularly for container transport from ports to the hinterland; and to develop a market economy in the construction and operation of infrastructure and the provision of transport services.

Democratic People's Republic of Korea

The representative of the Democratic People's Republic of Korea expressed his thanks to the secretariat for its efforts to support the development of infrastructure in the region. He noted that his government is focusing on road transport as an important transport mode. In the beginning of 2000, the government called on the people to develop a prosperous nation through the development of priority sectors, including transport. Subsequently, an expressway linking Nampo with Pyongyang was completed. At present a road construction programme in the countryside was being implemented as part of a national campaign. The representative stated that the present Meeting was of interest to his government because it involved the development of road networks at the regional level. In that regard, he noted his government's participation in the Tumen River Area Development project.

Mongolia

The representative of Mongolia informed the Meeting that his government had been involved in the Asian Highway project since 1993. He noted that owing to the geographic position of Mongolia, the sparsely distributed population and the limited reach of the railways, road transport was the primary means of transport for passengers and freight. During the last few years, a number of policies relating to the road network had been developed with support from the Asian Development Bank, the World Bank, the Kuwaiti Fund and the Government of Japan. For example, in January 2001 the "Millenium Road" project, which comprised both East-West and North-South roads, was approved by the Parliament. He proposed to include the East-West link of the "Millenium Road" to the Asian Highway network, by realigning the current route A-83 that would connect Changchun, China and the Tumen River Area. The representative also proposed one North-South link to connect

the city of Novosibirisk in the Russian Federation through Hovd in Mongolia with the city of Urumqi in China and requested China and the Russian Federation to investigate the potential for this subregional connection.

Republic of Korea

The representative of the Republic of Korea outlined the national system of classification of roads, which were based mainly on comprehensive technical standards. He noted that two types of roads, the national expressways and the national highways, met the agreed Primary, Class I and II Asian Highway standards and other roads in the country conformed with the Asian Highway design standards. As of 1997, the total length of the road network in the Republic of Korea was estimated to be 84,968 kilometres. At present, road transport was the dominant mode for both passenger and freight traffic (in passenger-km and tonne-km). With the rapidly increasing number of motor vehicles in the country, there was still a strong demand for additional road infrastructure.

The representative further outlined the status of the transport links between the Democratic People's Republic of Korea and the Republic of Korea and mentioned that Munsan-Kaesung, Chulwon, and Kosung crossing points were of particular importance. He suggested a slight change in the alignment of the proposed Pusan-Seoul route and agreed to the proposed Pusan-Pohang-Kangreung route along the eastern coast of the Republic of Korea. The representative noted that two corridors had been identified: the "West Coastal Axis" corridor linking Tokyo-Seoul-Beijing, and the "East Coastal Axis" corridor, which stretched from Niigata (Japan) – Pusan (Republic of Korea) – Vladivostok (Russian Federation).

Russian Federation

The representative of the Russian Federation informed the Meeting of the extensive development of the road transport sector over recent years. He noted that the political and economic reforms, which had been introduced in the country, had substantially influenced the transport system, particularly the road sector. Traffic had grown at a rapid rate, creating new challenges including congestion in and around large cities. Given that situation, the government had decided in 1995 to adopt a special programme to develop its national highway system. The total length of the road network was estimated to be 1 million kilometres. Road construction had concentrated in the European part of the country. However in the new 10-year national highway programme launched in June 2001, more attention is being given to the development of the Asian part of the Russian Federation, including Siberia and the Russian Far East.

It was further pointed out that the development of international road networks on the territory of the Russian Federation was given the highest priority. Two corridors of particular interest and which were highly relevant to the Asian Highway were the "North-South" corridor, linking Scandinavia with the Caucasus and Central Asian subregion, and the East-West corridor linking Eastern Europe and the Far East through the Russian Federation. Those corridors included both road and rail transport options, which provided customers with a choice. He stated that the existing links with neighbouring countries would form the basis of the Asian Highway routes in the Russian Federation. In parallel with infrastructure development, it was noted that serious consideration was being given to the development of border-crossing facilities, and that the government was actively perusing ways of harmonizing customs procedures with neighbouring countries.

In closing, the representative noted that his government supported the ESCAP's ALTID project, and was interested in developing projects that would provide opportunities for increased trade with all its neighbours, particularly those in the far eastern areas.

E. Asian Highway routes

The secretariat presented an overview of its study on the road networks connecting China, Kazakhstan, Mongolia, the Russian Federation and the Korean peninsula. This included the proposed Asian Highway routes in the member countries, illustrated on a subregional Asian Highway route map and suggested a numbering system for the routes. The secretariat also informed the Meeting that as the present study was limited to six countries, the route numbering would be further reviewed by an expert group meeting for all Asian Highway member countries in 2002.

F. Design standards

The secretariat introduced the provision of Asian Highway design standards, which were developed in 1993. A comparison was also made between the Asian Highway design standards, the national standards of the participating countries and the European arterial road standards, as they were reflected in the European Agreement on Main International Traffic Arteries, 1975.

G. Proposal for the formalization of the Asian Highway network

The Director of the Transport, Communications, Tourism and Infrastructure Development Division introduced the proposed formalization of the Asian Highway network to the Meeting. He mentioned the need for the coordinated development of the Asian Highway network and the benefits it could bring to member countries. He noted that a regional agreement could include the agreed Asian Highway routes, the Asian Highway design standards and route signs and be open for voluntary accession by the member countries. A comparable agreement had been in existence since 1975 to guide the development of the main international road traffic arteries in Europe. He further mentioned that there could be a built-in mechanism for the revision of the network in the agreement through the establishment of a working party comprising the Asian Highway member countries.

III. MAJOR CONCLUSIONS AND RECOMMENDATIONS

The Meeting discussed the following international and subregional Asian Highway routes and recommended the following routes for inclusion in the Asian Highway network. The Meeting prepared a sketch of the agreed routes, which is attached (figure 33) to this report.

The Asian Highway routes

International routes:

A-1	Border of Viet Nam-Pingxiang-Shenzhen-Changsha-Zhengzhou-Beijing-Shenyang-Dandong- Shinuiju-Pyongyang-Kaesung-Seoul-Daejon-Pusan
A-3	Daluo (to Myanmar)/Mohan(to Lao People's Democratic Republic)-Mengla-Jinghong-Kunming -Changsha- Zhengzhou -Beijing-Erenhot-Dzamiin-Uud-Ulaanbaatar- Altanbulag –Ulan-Ude
A-4	Urumqi- Khasi- Hongqilafu-Khunjurab
A-5	Shanghai-Xi'an-Lanzhou-Urumqi-Korgas-Almaty-Tashkent-Ashgabat-Turkemenbashi-Baku-Derbent-Makhachkala- Astrakhan-Volgograd- -Tambov-Moscow- St. Peterburg- Vyborg- Border of Finland

A-6	Pusan-Seoul-Pyongyang-Wonsan- Chongjin-Rason-Hunchun-Yanji—Changchun-Harbin-Manzhouli- Chita-Ulan-Ude-Novosibirsk- Omsk-Petropavlovsk-Chelyabinsk-Samara- Moscow-Smolensk-Border of Belarus
A-6A	Hasan-Vladivostok-Khabarovsk-Birobidzhan-Svobodnyy-Never-Chita

Subregional routes:

A-14	Kunming-Hekou (to Viet Nam)
A-16	Kunming-Ruili (to Myanmar)
A-42	Kodari (Border of Nepal) - Choksum- Lhasa
A-60	Omsk- Cherlak- Pavlodar
A-61	Border of Ukraine -Kursk-Voronezh–Saratov-Ural'sk – Aktyubinsk-Kyzylorda-Shymkent-Bishkek- Turugart- Kashi
A-63	Samara-Bol'shaya Chernigovka- Ural'sk- Atyarau
A-70	Border of Ukraine-Kamensk-Shakhtinskiy – Volgograd- Astrakhan-Atyrau
A-72	Kuytun-Alashankou (Dostyk)
A-74	Yekaterinburg-Chelyabinsk-Troitsk-Kostanay-Astana-Balkhash-Almaty
A-81	Beijing- Tanggu
A-83	Petropavlovsk- Astana- Pavlodar-Rubtsovsk- Barnaul-Tashanta-Ulaanbaishint-Tsagaannuur-Olgiy-Hovd-Tseterleg-Harhorin- Ulaanbaatar- Ondorhaan-Choybalsan-Sumber – Yirshi-Ulanhot-Baicheng- Changchun
A-87	Harbin- Suifenhe- Ussuriysk-Vladivostok- Nakhodka
A-88	Pusan-Pohang-Kangreung-Wonsan
A-89	Hong Kong, China-Shanghai-Lianyungang-Shenyang-Changchun-Harbin- Heihe-Blagoveshchensk-Svobodnyy
A-90	Novosibirsk- Barnaul-Tashanta- Ulaanbaishint -Hovd-Bulgan Sum-Yarantai-Ertai-Urumqi
A-91	Zhezkazgan-Karaganda- Pavlodar

The Meeting noted the proposed numbering of the Asian Highway routes and that a review of the overall numbering of the routes would be necessary during the expert group meeting planned for all Asian Highway member countries in 2002.

The Meeting considered that the Asian Highway design standard provided useful guidance for the development and upgrading of the identified routes. The Meeting recommended that, while undertaking any revision or upgrading of the Asian Highway standard, the existing state of highway

development and national standards being used in the member countries should be carefully considered. The need to provide design flexibility was also considered important, particularly to accommodate economic considerations in the planning process. The Meeting recommended retaining Class III in the classification of the Asian Highway as the recommended minimum standard.

The Meeting considered the proposed formalization of the Asian Highway network through a regional agreement to be a very important initiative that should be brought to the attention of decision makers at the highest level.

Noting the importance of the issues discussed and the substantial progress achieved in the development of the Asian Highway, the Meeting recommended its report be presented by the secretariat to the Ministerial Conference on Infrastructure to be held in Seoul and to the fifty-eighth session of the Commission for final consideration.

The Meeting noted with satisfaction the arrangements made by the secretariat in preparing and organizing the Meeting. In closing the Meeting expressed its appreciation to the Government of the Republic of Korea for its financial support.

IV. ADOPTION OF THE REPORT

This report of the Policy-level Expert Group Meeting was adopted on 12 October 2001.

Annex V

ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC

Policy-level Expert Group Meeting on
the Road Networks connecting China, Kazakhstan, Mongolia, the Russian Federation and the Korean Peninsula

10 – 12 October 2001
Bangkok

LIST OF PARTICIPANTS

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Annex VI

ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC

Policy-level Expert Group Meeting on
the Road Networks connecting China, Kazakhstan, Mongolia, the Russian Federation and the Korean Peninsula

10-12 October 2001
Bangkok

PROGRAMME OF THE MEETING

10 October 2001

0830	Registration
0930	Agenda Item 1: Opening of the Meeting
1000	Agenda Item 2: Introduction to transport development in the region (a) ALTID project (b) Development of the Asian Highway network and introduction to the study (c) Transport development in the Tumen River Area
1100	*Coffee break*
Session I	
1130	Agenda Item 3: Potential Asian Highway routes in member countries, country statements: (a) China (b) Democratic People's Republic of Korea (c) Kazakhstan (d) Mongolia (e) Republic of Korea (f) Russian Federation
1230	*Lunch break*
1400	Continuation of Agenda Item 3: Proposed routes
1530	*Coffee break*
1600	Continuation of Agenda Item 3
1700	*Close of Day One*

11 October 2001

9000	Continuation of Agenda Item 3
1030	*Coffee Break*
1100	Continuation of Agenda Item 3
1230	*Lunch break*
Session II	
1400	Agenda Item 4: Asian Highway design standard, national standards and E-Road standards
1500	Coffee Break
Session III	
1530	Agenda Item 5: Formalization of the Asian Highway network
1630	Agenda Item 6: Other matters
1700	*Close of Day Two*

12 October 2001

0900	Agenda Item 7: Drafting of the report
1430	Agenda Item 8: Consideration and adoption of report
1600	Closing