

The Transport Infrastructure of the DPRK

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This paper provides an overview of the DPRK's transport infrastructure, as well as an outline of the problems relating to this infrastructure. However, as the DPRK does not publish official data, I have used data published by the government of the ROK and various research institutions. I have also used different data for reference purposes in order to grasp general trends, although their accuracy cannot be guaranteed. Moreover, I have drawn upon facts that I have heard from foreign visitors to the DPRK and things that I myself have seen there.

The Characteristics of Transport Infrastructure in the DPRK and the Political Background to the Characteristics

First, the main role of the DPRK's transport infrastructure is the smooth transport of cargo such as military supplies, industrial resources, and output and energy resources between regions, while passenger transport has a considerably lesser role. This priority stems from the policy of restricting the movement of the general public between regions.

Second, the development of transport infrastructure—which is essential to productive activity, as well as the import, export, and distribution of commodities—is a low priority. In fact, it would be fair to say that the country has managed to continue to use existing transport infrastructure. Most of the railways, ports, and roads of the DPRK were constructed during the 1930s under Japanese colonial rule and one receives the impression that they have been used well while only being repaired as necessary. As a result, the infrastructure is old-fashioned and decrepit.

Third, railways are the primary mode of transport. The proportion of cargo transport accounted for by the railways seems to be about 74% on a ton basis and 93% on a ton/kilometer basis. The railways also account for about 60% of passenger transport. In comparison, the share of rail transport in the ROK is only about 7% on a ton basis and around 18% on a ton/kilometer basis (Table 1 and 2).

At the same time, the roads are positioned in the DPRK as an ancillary mode of transport, being considered a short-distance mode of transport between railway stations in mountainous and rural areas. The disregard for road transport is linked to the “self-reliant national economy” policy promoted by the DPRK. The DPRK, which does not produce oil, has adopted an industrial policy that curbs—as far as possible—the use of oil, which it would have to import. Instead of the petrochemical industry, the DPRK has promoted the coal-chemical industry and its power generation facilities use coal and hydropower. Relatedly, the DPRK has restricted the use of cars, which require oil, and has focused on electrified railways that use electricity generated by coal and hydropower. There are few cars in large cities such as Pyongyang, and still fewer in the provinces.

Table 1. Freight Transport by Mode (ton) (%)

	ROK (2000)	DPRK (1989)
Railway	6.9	73.8
Road	72.8	18.3
Sea	20.2	7.9
Air	0.1	--

Source: ROK National Statistical Office, Korea Trade-Investment Promotion Agency

Table 2. Freight Transport by Mode (ton/km) (%)

	ROK (2000)	DPRK (1989)
Railroads	17.8	92.8
Roads	18.8	N/A
Sea	63.1	N/A
Air	0.1	--

Source: ROK National Statistical Office

Fourth, the disparity between transport infrastructure in large cities such as Pyongyang and that in the northeastern region (Hamgyongbuk-Do) is considerable. In Pyongyang, the wide roads are paved as smoothly as mirrors, whereas the provinces have bumpy, winding roads. It would appear that the kind of heavy machinery used in road construction in Pyongyang is rarely used in provincial areas.

Finally, border-crossing routes (such as ports and land borders) for foreign trade are limited and it is still very much a country closed to the outside world.

Railways

The role of the railways, which are the most important mode of transport in the DPRK, is as an industrial railway for transporting industrial supplies and resources, as well as agricultural and marine produce. No importance is attached to its role in the transport of passengers. The total length of the country's railways is 5,224km (as of 2001), about 70% longer than the ROK's railway network (Table 3).

Its technical features include the fact that double-track rails account for only a small proportion of the country's railways (3%), the rate of electrification is high (81%), and the Automatic Signaling System is hardly used (1%). Overall, the lines built in the 1930s were electrified later

on. The electrification standard is direct current (DC3kV), unlike the ROK's standard (AC25kV). Due to the country's policy of avoiding the use of oil wherever possible, diesel locomotives have not been introduced. Reflecting the fact that the country is quite mountainous, there are many curves in the railway line, and its tunnels and bridges are severely dilapidated. The average speed of trains on domestic lines is just 30–40km/h. In addition, its locomotives and rolling stock are old and there is a lack of freight wagons, in particular.

Table 3. Comparison of Railways in the ROK and the DPRK (2001)

		ROK	DPRK
Length of route (km)		3,125	5,224
Electrification	Length (km)	661	4,211
	(%)	21	81
Double track	Length (km)	901	156
	(%)	29	3

Source: KOTI

The rail network consists of 10 main lines and 90 branch lines. By region, it is composed of west coast lines, east coast lines, east-west lines, inland lines, and the west circular lines.

Along the west coast, the DPRK is linked to China by the Pyongui Line (Pyongyang–Sinuiju, 225km), and there is a plan to link it to the ROK by means of the Pyongbu Line (Pyongyang–Kaesong, 187km). These two main lines are complemented by such branch lines as the Pyongbuk Line, the Pyongdeok Line, and the Pyongnam Line.

The Pyongna Line (Ganri–Rajin, 781km) runs across the peninsula to the east coast from Pyongyang, linking the capital with Rajin in the northeast. North of Rajin, the Hambuk Line (Rajin–Hoeryong/Banjuk, 327km) runs in a loop along the Tumen River, and a line that branches off this route from Hongui crosses the Tumen River and links the DPRK with Khasan in Russia. In the opposite direction, the Mt. Kungang Youth Line extends southward along the east coast.

With regard to east-west railway lines, to the south of the aforementioned Pyongna Line there are the Youth Icheon Line (Pyongsan–Sepo) and the Kangwon Line (Kowon–Pyonggang), which connect up to link Wonsan on the east coast with the Pyongbu Line on the west coast.

As far as inland lines are concerned, the Manpo Line (Sunchon–Manpo–border, 303km) stretches from the capital to the Yalu River in the northeast. The Mt. Paekdu Line runs to the northeastern city of Hyesan, near the border with China, while the Baekmu Line and the Musan Line run to the mine at Musan.

On the west circular lines, the Hwanghae Youth Line (Sariwon–Haeju, 100km) runs to Haeju Port.

The DPRK's railways are linked to China in three places and to Russia in one place. Its links to China are at Sinuiju–Dandong, Namyang–Tumen, and Manpo–Jian, while its link to Russia is at Tumangan–Khasan. Using these routes, international passenger trains operate regularly on the Pyongyang–Sinuiju–Dandong–Beijing route (1,347km, 22 hours, 4 services per week) and the Pyongyang–KhasanTSR–Moscow route (10,214km).

Furthermore, TKR linkage work implemented with the ROK is progressing. Work to link up the Kyongui Line on the west coast has been taking place in the section between Kaesong and Dorasan; the technical linkage has been completed and trial services are now being awaited. On the east coast, construction work on the Donghae line is taking place on both sides of the border.

The main commodities transported on the DPRK's railways are coal (32%), minerals (12%), construction materials (8%), metal (6%), lumber (6%), grain (4%) and chemical fertilizer (3%), accounting for 71% of all cargo. From this, we can see that the focus of rail transport is on the transport of fuels and raw materials for industry.

Looking at transport by region, we can see that regions with coalmines, other mines, and bases for heavy industry are dominant, with South Pyongan Province accounting for 30%, North Hamgyong Province for 24%, South Hamgyong Province for 17%, and North Pyongan Province for 10%.

The biggest problem with the DPRK's railways at present is the dilapidation of railway facilities. Many facilities were built in the 1930s and the country has been reluctant to modernize them, resulting in problems with almost every aspect of the railways in the DPRK, including tunnels, bridges, signals, locomotives, passenger carriages, and freight wagons. There are some areas where dangerous impediments to transport have emerged. Moreover, the railway lines that run through the DPRK's numerous mountainous areas are winding, so speed restrictions have been imposed. If modern, cutting-edge, civil engineering technology were used, long tunnels could be excavated and it would be possible to select a route that was almost a straight line, but such technology does not exist in the DPRK, nor does the money required to implement it. Furthermore, energy shortages are becoming an obstacle to the operation of the electrified sections of railway. Although it normally takes one day to get from Pyongyang to Rajin, one hears stories of the journey taking three days due to power failures.

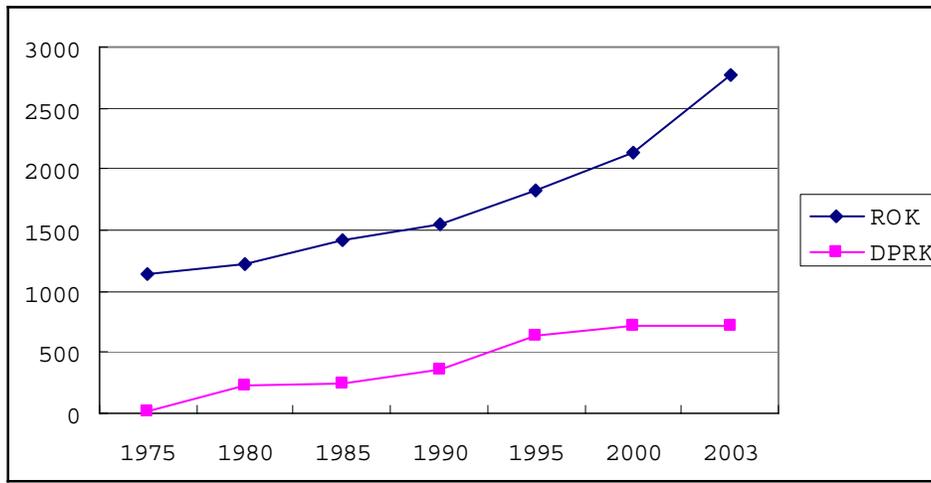
Roads

In the DPRK, roads are assigned only a peripheral transportation role, being used for transport over short distances, transport to railway stations, and access to remote areas. Consequently, apart from roads in Pyongyang, roads throughout the country are underdeveloped. Moreover, there are few cars using those roads. This can be attributed not only to the fact that the DPRK has many mountainous areas but also to controls on the use of cars, which use imported oil. In addition, there are restrictions on travel and the movement of the populace between regions.

There are seven types of roads in the DPRK: highways and Level I–VI roads.

Highways are completely paved and are deemed to be roads along which it is possible to travel at high speeds.¹ The construction of highways began in the 1970s and there were seven highways as of 2003,² with a total length of 724km: Pyongyang–Sunan (15km), Pyongyang–Wonsan (189km), Pyongyang–Nampo (44km & 46km), Pyongyang–Kaesong (170km), Pyongyang–Huichon (120km), Wonsan–Mt. Kungang (114km) and Sariwon–Sinchon (30km). However, the total length of the DPRK’s highways is only about one-quarter of the figure for highways in the ROK. Geographically, they are concentrated around Pyongyang and there are no highways at all in the northeast of the country (Graph 1).

Graph 1. Comparison of Progress in Extending Highways (km)



Source: ROK National Statistical Office

Level I roads are major roads linking the capital with major cities in the provinces. There are ten of these, with a total length of 2,289.7km.; however, less than half of these are paved. Most of these roads run alongside railway lines. The ten routes are: Pyongyang–Kaesong, Pyongyang–Nampo, Pyongyang–Wonsan, Pyongyang–Sinuiju, Pyongyang–Manpo, Wonsan–Rajin, Bukchong–Hyesan, Sariwon–Haeju, Wonsan–Goseong, and Wonsan–Gimhwa.

Level II–IV roads are provincial roads that cars can use, but hardly any of them are paved. Level V and VI roads are narrow and do not appear to be suitable for use by cars.

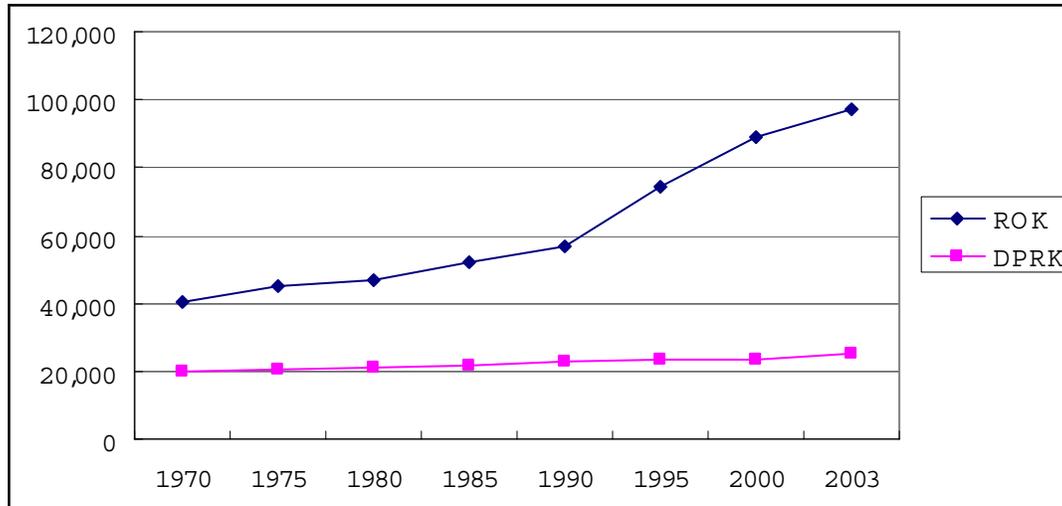
The total length of highways plus Level I–IV roads is 24,879km (as of 2003). It is clear that the total length of roads in the DPRK is low in comparison with the figure for the ROK. Whereas the total length of roads grew by 2.4 times on the 1970 level by 2003, in the DPRK the figure increased by only 1.2 times during this period (Graph 2). Furthermore, of these roads, almost all ROK roads are paved, while it is estimated that less than 10% of the roads in DPRK are. If Level V and VI roads were included, the rate of road paving in the DPRK would seem likely to be even lower. Theories for the factors behind this low rate of road paving include the fact that there is

¹ The quality of the DPRK’s highways differs from international levels and they are not completely separate from ordinary roads. I myself have encountered farmers leading flocks of sheep along the highway.

² There are some who say that there are eight highways, with two highways running between Pyongyang and Nampo.

little production of asphalt, which is extracted from oil, and the fact that there is a lack of heavy machinery for road construction.

Graph 2. Comparison of Progress in Extending Roads: Highways and Level I–IV Roads for the DPRL (km)



Source: ROK National Statistical Office

In a similar way to the railways, the road network consists of west coast roads, east coast roads, east-west roads and northern inland roads, but unlike the railways, there is a road linking Shinuiju–Chosan–Manpo–Hyesan–Musan–Onsong, running along the Yalu and Tumen Rivers on the border with China.

With regard to road linkages with China, there are 11 routes linking the two countries by bridge across the Yalu and Tumen Rivers. The volume of traffic is highest on the Sinuiju–Dandong, Namyang–Tumen, and Wonjong–Quanhe routes. With regard to road linkages with Russia, the Friendship Bridge across the Tumen River is also used by cars.

The main problems with the DPRK’s roads are the lack of a high-speed road network covering the entire country and the low paving rate of roads as a whole. Roads in mountainous areas are narrow, unpaved, and winding, and lack a shoulder in many cases; in addition, the dilapidation of tunnels and bridges is pronounced. The road between Wonjong and Sonbong (about 50km) in the Rajin-Sonbong region, which I have visited many times, is an unpaved road with no tunnels that wind through the mountains. Large trucks traveling between Hunchun in China and Rajin Port use this road, but they cannot always negotiate the curves and many fatal accidents occur on it. This rough road is a bottleneck for the development of the Tumen River area. Formerly, the road on the Chinese side (Hunchun–Quanhe) was a similar kind of mountain road, but it has now become more convenient since the construction of a straight highway with a number of tunnels. Such improvements are needed in the DPRK as well.

Ports

The DPRK has a coastline of 3,000km, but divided into the east and west coasts and with no routes linking the two coasts. There are eight trade ports, five pelagic marine base ports and thirty fishing ports.

The eight trade ports are Chongjin, Rajin, Sonbong, Hungnam, and Wonsan on the east coast and Nampo, Songrim, and Haeju on the west coast. Most of them were constructed in the 1930s, under Japanese colonial rule, and their total loading capacity is estimated at 35 million tons (7% of the ROK level), while the amount of freight handled is believed to be 16 million tons (2% of the ROK level)³.

At Chongjin and Rajin ports, which are located in the northeast, near the border with Russia, the railway tracks are a mix of broad gauge (the Russian standard) and standard gauge, and these ports were once used for trade in Russian cargo, but this has now come to a standstill. The capacity of Chongjin Port is 3-3.5 million tons/year and that of Rajin Port is 3 million tons/year, but the actual degree of capacity utilization is low. Rajin Port has a regular container route to Busan and transit transport to China's Yanbian Prefecture also takes place. The nearby port of Sonbong is used for oil imports. Hungnam Port is believed to be the best port on the east coast, handling magnesium, fertilizer, cement, steel, and machinery. Wonsan Port operates regular cargo and passenger services to the Japanese port of Niigata. Nampo Port is the largest port on the west coast. Songrim Port is used for oil imports. Haeju Port is relatively new, having been opened in the 1970s.

The fundamental problem with the DPRK's ports is that port facilities, such as cranes, are old. Moreover, there are few modern ships and the ports are not being utilized adequately.

Major Problems Needing to Be Addressed

The first problem common to transport infrastructure in the DPRK is decrepit, old-fashioned technology and systems. Railways and ports built in the 1930s are being used without any major modernization. The railways suffer such serious problems as an overwhelmingly large proportion of single-track lines, mountainous lines with many right curves, and dilapidated tunnels and bridges. The roads are narrow and there are many unpaved sections. At the country's ports, facilities such as those for handling cargo are old and the access roads are bad.

The second problem is the policy of neglecting roads. Accordingly, there is, in fact, no nationwide highway system and the roads are of extremely inferior quality. Compared with the railways, the cost for constructing roads is low and priority should be given to construction work.

The third problem is the issue of regional disparities. The roads in Pyongyang are splendid, but those in the northeast, for example, are abominable and hinder economic distribution between regions within the country. The policy of restricting the movement of people within the country is at the root of this and should be revised.

³ The cargo handling capacity of ports in the ROK in 2003 was 510.21 million tons, while the actual volume of cargo handled was 818.655 million tons.

Finally, the creation of a master plan for improving the DPRK's transport infrastructure from a longer-term perspective is necessary. Roads and railways linking all parts of the country must be upgraded to modern standards, using modern technology. Furthermore, it is necessary to use a common standard for the network, in order to enable it to be linked to neighboring countries.

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