

Central Asia's Rail Network and the Eurasian Land Bridge

Shigeru Otsuka

The Silk Road Reborn

There have been trade routes between Asia and Europe since the dawn of human history, culminating in the famous Silk Road that ran a magnificent 15,000 km between Xi'an in China and the Roman Empire. It carried many commodities such as silks, gems, gold, silver, carpets, glass, turquoise, paper, spices, etc., from ancient times in both directions between Asia and Europe.

In addition to trade, the Silk Road was a highway of exchange for culture, art, religion and knowledge. However, it was not a well-defined highway in the modern sense, but was more a general route for traders travelling between east and west by camel, donkey cart, and on foot. The long, difficult and dangerous journey across baking deserts, wind- and rain-swept mountains, and swollen rivers changed depending on the period, local ruler, climate and location of oases, caravan posts and bazaars. Alexander the Great, Ghengis Khan, Tamerlane and other historical figures passed this way to fight battles and establish empires that would flower and wither.

By the 16th century, European voyagers had discovered a south passage to Asia around the Cape of Good Hope and the Americas were being explored. In the 17th century, Spain, Portugal and England vied for dominance of maritime trade between Asia and Europe, sealing the fate of the slower land route. Over the following centuries, the European powers and Russia extended their sphere of influence into the territories of the Silk Road and new national boundaries changed the traders' freedom of mobility. Gradually, the Silk Road lost its purpose and its trade died out.

Four centuries later, although the Silk Road has lost its role as a transportation corridor, many of the oases have become busy towns with bustling bazaars and the blue tiles of the minarets have not lost their shine. Tourists to the area still appreciate the romance and many reminders of the Silk Road.

But now, after many vicissitudes, there is once again a trade land route between east and west—not by camel or donkey but by railway. In 1991, the existing east-west lines of national railways in Kazakhstan, Uzbekistan, Turkmenistan, Kyrgyzstan, and Tajikistan were linked to

the tracks of the Railways of the People's Republic of China. This historical event was made possible by the collapse of the Soviet Union and the new independence of these five central Asian countries. Instead of linking China to the Soviet Union, the railway suddenly connected China to Central Asia.

In 1996, the railway in Turkmenistan was extended southwards across the border with Iran to connect with the network of Iranian Islamic Republic Railways. Thus, the east-west line had reached the Persian Gulf, with links to the Caucasus and Turkey, becoming an important trade artery for Eurasia, just like the old Silk Road.

However, it still does not reach Europe—gaps remain, and in civil disturbances in other parts make passage difficult. At the present, the 'Silk Railway' links Central Asia to China and Iran, but there is no land bridge joining Central Asia to Europe.

The only other uninterrupted line permitting travel from Europe to the Pacific is the Trans-Siberian Railway.

The China Land Bridge

China's east-west main lines are the Longhai Line from Xi'an to Lanzhou, the Lanxin Line from Lanzhou to Ürümqi, and the Beiji Line from Ürümqi to Alashankou. This creates an uninterrupted rail link from east to west



The *Silk Road* express runs in Eastern Kazakhstan linking Almaty and Ürümqi.

(Author)



The origin and destination of the *Silk Road* express are shown in four languages: Kazakh (top left), Russian (bottom left), Chinese (top right) and English. (Author)



Silk Road express at Druzhba Station

(Author)



Platform at Druzhba Station with a four-rail track for trains from both directions. The carriages exchange bogies at adjacent depot while passengers are on board. (Author)

China, running more or less parallel to Tianshan Beilu, one ancient route of the Silk Road.

From Alashankou, the line continues west across the border between China and Kazakhstan. Druzhba, the first station in Kazakhstan, is 20 km west of Alashankou. From there, the tracks continue another 320 km west to Aktogay, where they link up with one of Kazakhstan's main lines. This completes China's land bridge beginning at the Pacific port of Lianyungang.

The land bridge took many years to complete, partly because of the complex and changing political landscape in China and the former USSR. China's railway network only extended as far west as Lanzhou, and there was no rail line between Druzhba and Aktogay in the Soviet Union. However, in 1954, when relations between the two countries were extremely cordial, they announced plans to construct a new railway linking the two end lines. Agreement was reached on construction of the Ürümqi–Aktogay section in 1956, and the Druzhba–Aktogay section was completed in 1959. But deteriorating relations in the early 1960s caused China to halt construction of the Ürümqi–Alashankou section although the Lanxin Line between Lanzhou and Ürümqi had opened in 1962. With construction in China halted, no trains ran on the newly completed

section between Druzhba and Aktogay, which was left abandoned for the next 30 or so years.

After the thaw in Chinese–Soviet relations in 1985, China recommenced construction of the Beijiing Line between Ürümqi and Alashankou. The line was finished in 1990, linking the Chinese and Soviet rail networks at Druzhba on 16 September 1990. Freight trains began running on the line in July 1991 followed by passenger trains in June 1992. This established a direct link between Almaty, then the capital of Kazakhstan and Ürümqi in China. Ironically, with the collapse of the Soviet Union in 1991, by the time operations officially began in September 1992, the line linked China with the newly independent Kazakhstan. Since then, trains have been providing a direct link between Lanzhou in China and Tashkent, the capital of Uzbekistan, via Almaty. However, by late 2000, the direct link has been shortened, only joining Ürümqi to Almaty, with two return runs each week, one operated by China, and the other by Kazakhstan. The train carriages bear the name *Zhibek Zholy* (meaning Silk Road) in bold letters, an appropriate name because this prestigious international train with private double sleeping carriages and restaurant car follows the route of the ancient Silk Road. Although China's rail land bridge is complete, no single passenger train

crosses the bridge from one end to the other, presumably because there is little passenger demand. Today, only freight trains operate on some sections and there are still many hurdles to overcome before the line can function as a true land bridge. The most serious are gauge differences that require time-consuming bogie changes, and bothersome Customs procedures hindering cross-border exchange of people and freight. In addition, the track between Druzhba and Aktogay was abandoned for 30 years and is in such bad condition that faster running speeds are risky. In 1995, the government of Japan provided yen loans for repairs and other improvements and work is now completed.

The East–West Line Today

The east–west line from China crossing into Kazakhstan soon links up with the most easterly of four north–south lines at Aktogay, which leads southwest to Almaty, the former capital of Kazakhstan, and then west. Almaty is at the southern edge of a large plain that suffers many serious earthquakes, explaining why the capital was relocated north to Astana (formerly Akmora and Tselinograd even further back). Astana, which means 'The Capital' in the Kazak language, is an air, rail and road hub with 2-hour connections to



Almaty Station, Kazakhstan

(Author)

major centres around the country. Although Almaty is no longer the capital, it is still the country's largest city, and remains the centre of commerce, culture and education.

About 1000 km west of Almaty, the continuance of the east–west line crosses into Uzbekistan and enters Tashkent, the capital. Tashkent is Central Asia's largest city and has a population of more than 2 million. It is the only city in Central Asia with a subway and flourished centuries ago as a Silk Road oasis and hub.

From Tashkent, the line continues westwards for about 350 km to Samarkand, an important city on the ancient Silk Road and called the City of Turquoise Blue today. The many ancient ruins at Samarkand make it a major tourist destination along with Bukhara, Khiva and Urgench.

Another 1000 km west, the line reaches Ashgabat, the capital of Turkmenistan. But before reaching Ashgabat, a southerly line branches off at Tedzhen heading for the town of Sarakhs at the border with Iran. The change of gauge at this border crossing requires a time-consuming change of bogies before trains can continue on into Iran.

A 300-km line was constructed with much difficulty from Sarakhs to Mashhad, the terminus for the Iranian Islamic Republic Railways line from Tehran. It opened in 1996.

The line south from Tehran goes via Sirjan

to Bandar-e Abbas on the Persian Gulf, giving maritime access to the landlocked countries of Central Asia. But only local passenger services are offered at present and there is no direct service from the Turkmenistan–Iran border to the sea.

The line running west from Tehran passes through Tabriz, then crosses the Iran–Turkey border at Kapicoi, about 870 km west of Tehran and continues another 100 km to the eastern bank of Lake Van. There is no line around the lake and regional conflict has made it difficult to conduct a line survey. A ferry used to connect Van, on the eastern side with the rail terminus of Tatvan on the western side, but reports indicate that it has been suspended.

From Tatvan, the line continues via Ankara, the capital of Turkey, to Haydarpaşa Station in eastern Istanbul on the eastern side of the Bosphorus Strait. There is no rail link across the Bosphorus to Sirkeci, the departure point for trains to Europe. There is talk of a rail tunnel under the Bosphorus but concrete action is still many years away.

One other line extends northwest for about 550 km from Ashkhabad, the capital of Turkmenistan, to the Caspian Sea port of Turkmenbashi, formerly called Krasnovodsk. This is the end of east–west trunk line. A ferry connects Turkmenbashi to Baku, the capital of Azerbaijan, on the west side of the sea.

As the above description shows, tracks must be laid only at Lake Van and under

the Bosphorus Strait to complete the land bridge all the way from the east coast of China through Kazakhstan, Uzbekistan, Turkmenistan, Iran and Turkey to Europe. However, the desert border between China and Kazakhstan (formerly the China–USSR border) still has watchtowers along a long metal fence, and there are also buildings that appear to be watchtowers on the border mountains between the former Soviet Union and Iran. These structures remind us of the tensions existing between countries in this region. Border tensions are also heightened by civil and other wars west of Iran.

Background to Central Asian Railway Network

The five central Asian countries of Kazakhstan, Uzbekistan, Turkmenistan, Kyrgyzstan, and Tajikistan were part of the 15 republics making up the former Soviet Union. During the Stalinist period, the various stages of industrial production—manufacturing, processing and consumption—were divided among the republics to prevent them from separating from the USSR and becoming independent. For example, crude oil produced in one republic would be refined in another and then consumed in a third. This division enabled Moscow to control regional economies and prevent the breakup of the USSR into independent nations.

Once the Communist Party in the Soviet Union collapsed, the republics quickly declared their independence, rallied around their own national identities, issued their own currency, and threw off Moscow's yoke. The previous division of the various stages of industrial production, created enormous difficulties and states without the size and advantages of countries like Russia and Ukraine began to experience serious economic difficulties. Central Asia is rich in agricultural and mineral resources, so

under the old regime, this region was treated as a provider of raw materials, most of which were transported northwest to Ukraine and north to Russia for processing. The final commodities were then sent to markets in Moscow, Europe and elsewhere.

Kazakhstan, Uzbekistan, Turkmenistan, Kyrgyzstan, and Tajikistan are all landlocked, and Uzbekistan has the unique distinction of having only landlocked neighbours too. (There are only two doubly landlocked countries and the other one is Liechtenstein, surrounded by Switzerland and Austria.) Rail and road are the only surface transport options in these countries. Road transport offers little hope because the roads are in poor condition and there are few trucks. Therefore, the railways of the region have played a major role in transportation, carrying almost 90% of all surface freight. Since most raw materials from this region moved north during the Soviet era, railways were constructed with a general north-south orientation. Likewise, passengers travelled to and from Moscow in the north, and there was little demand for east-west passenger traffic.

This political and economic history explains why the region's railway network has only one east-west line and four north-south lines. Although adequate in the days of the Soviet Union, the new independence of the five countries has seen a change to east-west passenger and freight patterns as links to China in the east and Iran in the southwest offer markets in the Pacific and Persian Gulf. The impact of the old Soviet division of industry between the various republics can also be seen in the maintenance of rolling stock. Inspection and repair of diesel and electric locomotives, electric cars, passenger carriages and freight wagons was entrusted to workshops in different republics. If a certain type of rolling stock could not be inspected or repaired in the local republic, it would

be sent to another. This was not a major problem when the Soviet Ministry of Transport issued orders from Moscow, because planning was carried out on a pan-USSR scale and work was paid for in rubles.

But problems became apparent immediately after independence and loss of central control. Rolling stock sent for repair to another country was accepted only grudgingly and repairs were postponed. Unsatisfactory work became a problem and bills had to be paid in the new currency of the country making the repair. If the country paying the bill did not have that currency, it had to pay in hard-earned US dollars.

Rolling stock cannot be used after its inspection deadline has passed and trains stop running when inspections are not carried out. Therefore, Kazakhstan, Uzbekistan, Turkmenistan, Kyrgyzstan, and Tajikistan need to build their own modern rolling stock maintenance yards. To promote these goals, the government of Japan is providing yen loans to Kazakhstan, Uzbekistan and Turkmenistan.

At independence, the rolling stock control controlled by the Ministry of Transport in

Moscow was divided among the newly independent countries. Much of it was worn out and yen loans are being provided to replace old rolling stock and construct new equipment.

In the countries of the former Soviet Union, locomotives are generally powered by AC electricity. However, DC locomotives run on DC electrified track in some areas, particularly Moscow and its surroundings. Lines that have not been electrified – including most lines in Central Asia – use diesel locomotives, of course.

Alternating voltage is 25,000 V, frequency 50 Hz. Most electric passenger locomotives have an operating power of 8400 kW. AC locomotives in Japan have a maximum operating power of 3600 kW. This difference highlights the continental nature of transportation in these countries; the power is more than one would assume necessary, even though the wider gauge track requires larger locomotives, and the longer trains travel longer distances. The maximum operating power for Central Asian freight locomotives – 10,000 kW – is even greater.

Diesel locomotive horsepower ranges from 3000 to 4000 hp, with some test



Soviet-built Class VL80 electric locomotive in Uzbekistan

(Author)

models in the 6000 hp range.

Many freight cars are huge, with 8 axles. These cars have a capacity in the range of 125 tonnes per car. (In Japan it is a mere 30 to 40 tonnes per car.) Higher capacity is needed to raise freight volume and reduce train length.

All rolling stock in former Soviet Union countries is large, and many cars are of the same type, making modernization difficult. Some locomotives from the 1950s are still in use.

Train travel can take days, so all passenger cars have sleeping accommodations. The most common type of sleeping car has four-passenger compartments, with lower and upper berths aligned at right angles to the direction of travel. Some cars have compartments for two people, others have open accommodations for groups of eight.

Each car has one conductor, a woman in many cases. Conductors provide information, check tickets, serve refreshments, and keep fuel burning in heating stoves during cold parts of the year. Each car has its own heating system – a locomotive-powered centralized system is not used because a breakdown could result in people freezing to death in mid-winter.

In some extremely rare cases, coaches are also used on long-haul routes. Since independence, Central Asian countries have introduced new coaches for short-haul travel.

The Four North–South Lines Today

As explained above, the four main lines of Central Asia have a general north–south orientation. Two connect with the Trans-Siberian Railroad in the north, and the other two converge on Moscow. The easternmost of these lines is about 1700-km long and runs from Almaty north past Aktogay to Novosibirsk on the Trans-

Siberian. The next line to the west is about 1800-km long and much has been electrified. It connects with the Trans-Siberian at Omsk and Yekaterinburg, via Petropavlovsk. From Petropavlovsk the line runs south through Astana, the new capital of Kazakhstan, and then connects with the east–west line at Chu. Almaty lies to the east of Chu on east–west line. The third and fourth (most westerly) lines begin in Moscow and its suburban and run southeast. One line passes east of the Aral Sea, while the other passes its west. They connect with the east–west line at Arys' and Chardzhou, respectively.

Major Services on Central Asian Network

During the Soviet era, express trains linked Moscow with the capitals of the various republics. And even today the *Kazakhstan* express train runs between Moscow and Almaty, the *Uzbekistan Express* between Moscow and Tashkent, and the *Kirgizia* express train between Moscow and Bishkek, the capital of Kyrgystan. The network used by these three express trains is sometimes called the Eurasian Railway.

An express that runs between Moscow and Ashgabat, the capital of Turkmenistan, on the most westerly of the north–south lines, passes close to the west coast of the Aral Sea, but is not listed in the Thomas Cook timetable for some reason.

There is little current information about train operations in Tajikistan, which is still in the throes of civil war. Several years ago, there was an express service between Moscow and Dushanbe, Tajikistan's capital, but it seems to have been suspended.

In addition to these direct services to Moscow, about seven trains also run on the north–south main lines. Eight express or rapid trains connect the Kazakhstan capital of Astana with the former capital of Almaty. Express and rapid trains bound

for Moscow or connections with the Trans-Siberian Railroad take the east–west line to main junctions, and then turn north onto the north–south lines.

Services on the east–west line include four return runs between Almaty and Tashkent, and two trains between Tashkent and Samarkand. However, there is no direct service between Almaty and Ashgabat.

Interestingly, even after independence, the connections between Russia and the five nations of Central Asia are still better than the connections between the nations, reflecting the pattern of demand.

Different Time Zones and Track Gauges

Any discussion of railways in Eurasia must mention time zones and track gauges.

Time differences

As we all know, there is a 1-hour difference in time by the sun between two locations separated by 15 degrees of longitude. Dealing with time differences is a headache for transportation managers. In the case of air travel, departure and arrival times are indicated in local times so air passengers simply adjust their watches to the local time at their destination.

On the other hand, for long-distance trains travelling east–west, the time on board the train changes each time the train crosses a time zone, but station times do not necessarily reflect local times.

For land transport, there are three ways to deal with time differences as follows:

- One standard time over entire territory
China covers a vast east–west expanse but uses only Beijing Time for the whole country. From a transport scheduling point of view, this system is the easiest because travel time is the same as the difference in time between departure and arrival. However, as a result, the time by the sun does not

correspond with the time by the clock in many parts of the country. If China used time zones, there would be three or four, but under the current system, when it is dawn at 05:00 in Beijing, it is still dark in the Uygur Autonomous Region to the northwest where it dawn arrives at 08:00 or 09:00.

- Local time

In the USA, Canada and elsewhere, train schedules use local time. Train and car travellers put their watches 1 hour forward or back each time they cross into another time zone. As a result, travel time is not the same as the difference in time between departure and arrival. In the extreme case of two adjacent stations separated by a time zone border, if the actual travel time is 5 minutes, the timetable appears to indicate a travel time of 65 minutes in one direction and 55 minutes in the other.

Using local time for schedules does not present a problem as far as the relative position of the sun is concerned.

- Standard Railway Time

This method was used in the former Soviet Union and is still used in the

five countries of Central Asia. However, only the railway uses Standard Railway Time for railway timetables and local time is followed for ordinary life. Standard Railway Time and local time are only the same in Moscow's time zone.

The former Soviet Union stretched east-west almost half way around the northern hemisphere. Kaliningrad is the most westerly location at 20°E while Cape Dezhneva is the most easterly at 170°W. Such a vast longitudinal spread should call for 12 time zones, but there are only 11 because all European parts of the former Soviet Union are in the same time zone. Consequently, when it is 07:00 in Moscow, it is 18:00 at Cape Dezhneva.

There is a difference of 7 hours along the tracks from Moscow to the eastern ports on the Pacific Ocean. Thus local time on the Pacific differs from Standard Railway Time by 7 hours.

The departure time for the express passenger train *Russia* leaving Vladivostok for Moscow is shown as 17:00 both on the station display and in the Thomas Cook timetable.

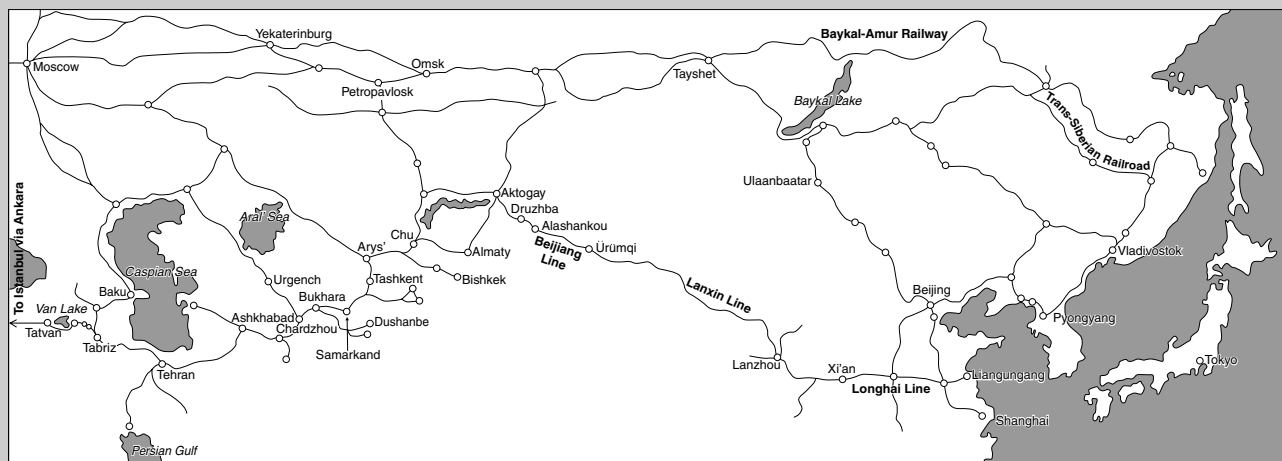
According to the schedule, the train takes 8 days to travel the full length of the Trans-Siberian line. However, the listed departure time of 17:00 is Standard Railway Time and the local Vladivostok time is actually midnight the next day. The train is scheduled to arrive in Moscow at 06:15, which is listed on the Vladivostok schedule as 13:15 the same day, meaning that the journey takes *only* 7 days for someone boarding at Vladivostok.

The Khabarovsk station building clock is famous for its three hands of one long black hand and two short hands—one black and one red. The short and long black hands indicate Khabarovsk local time while the short red and long black hand indicate Standard Railway Time (Moscow local time).

Using Standard Railway Time, the difference between arrival and departure times equals the travel time but for someone not used to this system, the difference between Standard Railway Time and local times along the line can be most confusing.

In Central Asia, there is a 3-hour time difference between Moscow and

Figure 1 Trans-Eurasia Networks





A bogie-changing track at Druzhba Station

(Author)

Almaty, and a 2-hour difference between Moscow and Tashkent. Thus, the timetable has the *Silk Road* express train departing Almaty at 18:45 although the local time is 21:45.

For many years, Thomas Cook's *World Timetables* have contained the following notice for rail services in Central Asian countries:

"At present the trains still operate to Moskva time, but a change to local time may occur in the future."

But such a changeover would involve much time and preparation. We can therefore assume that this notice will continue to appear in the timetables for some time, even though the countries are keen to demonstrate their independence by using local time.

Gauge differences

Another troublesome problem sometimes encountered is the difference in track gauges.

Generally, when the track gauge is different, a train cannot run continuously from one rail section of one gauge to a rail section of another gauge. (New automatic change-of-gauge technologies, such as Talgo in Spain and 'free gauge' in

Japan, have been developed to permit through operations on different gauges but they are not in widespread commercial use yet.)

Countries of the former Soviet Union use the broad gauge of 1520 mm while most neighbouring countries use the standard gauge of 1435 mm. As a result, trains crossing from China and Iran into Kazakhstan, and Turkmenistan must change bogies, or the passengers and goods must transfer to a new wagon.

At Druzhba on the border between China and Kazakhstan, passenger trains change bogies while most freight is transshipped. This is impractical for freight such as liquids, frozen goods and hazardous materials, so the wagon bogies are changed in these cases. Both transshipment and bogie changes require a lot of heavy lifting equipment and the *Silk Road* express stops for about 5 hours to complete the change of gauge.

The same change-of-gauge problem occurs at many other borders throughout the world. For example, in Europe, trains from Russia must change their bogies or transship freight at the border with Poland.

The Trans-Siberian Railroad

A glance at any large-scale map of the Eurasian continent will show that there are only two railway lines linking Europe and Asia—the Silk Railway through Central Asia, and the Trans-Siberian Railroad in the north. Figure 1 shows a complex network with major spurs and branch lines, but the Trans-Siberian is prominent west of Tayshet while the Silk Railway runs alone after it crosses from China into Kazakhstan. Eastwards along the Trans-Siberian, there is no railway north of the line until Tayshet, and then the Baykal–Amur Line branches off east and north. South of the Silk Railway, there are railways in various countries, but there are many gaps, such as at the borders between India and Myanmar, between Myanmar and Thailand, and between Cambodia and Viet Nam. These southern routes offer no possibility of connections between Asia and Europe.

Neither the Trans-Siberian Railroad nor the Silk Railway offer direct connections from the Pacific to western Europe, but the Trans-Siberian does make it possible to travel the entire distance by changing trains and lines in Moscow, Ukraine, Belarus and elsewhere. At 9297 km, the Trans-Siberian Railroad is still the longest in the world.

There is no space here to dwell on the Trans-Siberian Railway's importance to the economy of the USSR Far East, except to say that it has played essential roles both in war and peace.

Although the postwar period saw a rise in air travel, even today the *Russia* express train departs Vladivostok and Moscow every 2 days for the 7-day journey. Other trains from Beijing and Ulaanbaatar use the Trans-Siberian tracks too. One train from Pyongyang is coupled to the *Russian Express* at Ussuriysk for a 9-day journey between the two capitals, surely the longest regularly scheduled train service

in the world.

The long travel times and difficult transfers on the Trans-Siberian Railroad put it at a disadvantage to air travel and this is even truer for travel on the Silk Railway where the many Customs and immigration procedures are an added burden. This explains why hardly any passengers travel its entire length.

What about freight? Freight on the Trans-Siberian does not cross any border until it reaches a European country beyond Russia so Customs procedures are relatively simple. However, Russia's Far Eastern ports, especially Vladivostok, Nakhodka and Bostochyni, suffer from very dilapidated infrastructure at rail yards adjacent to port facilities, causing huge freight backlogs. Other serious problems along the Trans-Siberian include theft, damaged freight, late trains, exorbitant fees, and uncertain scheduling for return of containers.

Although marine container transport takes longer, it is safer, cheaper and more reliable, explaining why more and more freight from the Far East to Europe is sent by sea and why Trans-Siberian freight volumes are now only about 25% of their maximum. Talks have been held to explore the possibility of Japan's providing assistance to improve train operations on the line.

Freight carried on the Silk Railway from China is generally bound for Central Asia. From there, freight can be sent by rail via Russia to western Europe. This is relevant when considering Europe-bound freight from Japan. The route from Japan to Rotterdam via Central Asia is about 1000 km shorter than the route via Vladivostok and the Trans-Siberian Railway. But the longer Trans-Siberian route involves only one time-consuming transshipment or bogie change to cope with different track gauges (for example, at the border with Poland or Slovakia), while the shorter Central Asian route involves two. Furthermore, freight transported over the



The track extending to the east of Ashkhabad, Turkmenistan, across desert toward the Caspian Sea (Author)

shorter route must undergo burdensome formalities at three or four border crossings (depending on the line taken), while the longer route involves only one.

There would be advantages to using the existing shorter Silk Railway route and avoiding the Trans-Siberian's uncertain scheduling and high crime rate. But the Silk Railway will not be a viable option unless fees are reduced and customs and inspection formalities are simplified at international borders, and unless the time for transshipping and bogie changes is shortened.

The rail connection from Turkmenistan across the Iranian border to the Persian Gulf also offers potential. In the future, this link could be advantageous not only to the landlocked countries of Central Asia but also to countries like Japan. Freight could be sent from Japan by ship to the

Iranian port, then taken by train through the interior of Iran to Central Asian countries. However, conditions at the Turkmenistan/Iran border city of Serakhs will not be favorable to this scenario for some time. ■



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