

# **Comments on the Regional Railroad Network and Power Grid Interconnection**

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The social and economic situation in the Russian Far East very much depends on the level the technical and economic development of the transportation network. The regional transport system is considered one of the economy branches of region. The world markets exploration for international transit transportation can become one of the basic trends in the development of the Russian Far East economy. The shortest ground route, which connects Western Europe with the countries of the northern part of the Pacific Rim Region, are crosses its territory.

The basic transport network of the Far Eastern and Trans-Baykal regions contains two main railways: Trans-Siberian and Baykal-Amur. Both of them are sufficiently powerful, which make it possible to ensure large volumes of transportation. Moreover, the Trans-Siberian main as the basic two-way road, is practically all-electric. Large admission capacity of the Trans-Siberian railway is optimizes its use for guaranteeing cargo transportation from the countries the Pacific Rim Region into the Western part of Russia and into Europe. The electrification of the Trans-Siberian main railway through its entire length makes it possible to have the high train speeds, ensures safety, and, as a result, it makes it possible to have sufficiently high cargo delivery speed.

Nowadays the Trans-Siberian main railway is as well a powerful two-way electrified railroad line with extending to about 10 thousand km. Its technical capabilities make it possible to transport cargo in the volume up to 100 million tons per annum, including international transit containers at the level of 200 thousand containers from the countries of the Pacific Rim Region to Europe and Central Asia. We have done all the necessary maintenance and development of railway stations on the boundaries with the Mongolia, China, Republic of Korea and People's Democratic Republic of Korea; intensified approaches to the seaports; modernized container terminals for processing of 40 feet containers. Today 36 stations of Trans-Siberian main railway have terminals for operations with large-capacity cargo containers, including 13-40 feet containers. With the establishment of international transport corridors, the Trans-Siberian main railway is considered a priority route in the communications between Europe and Asia.

Rail transport Eurasia has a number of the unquestionable advantages over sea transport:

- First of all, rail transport has a higher level of ecological reliability, since railroad electrical thrust is much safer than any even most reliable working media of seagoing vessels;

- Second, speed gain of delivery is completely obvious: 2-3 times. There is no need for accumulating 20-50 thousand piece containers waiting for ship parties that takes 10-15 days. The distance of transportation is shorter in comparison with the sea, and the main advantage is that the speed of railroad transport is considerably higher;
- Third, the sea and intermodal cargo transportation usually include 6-10 loading-and-unloading operations. For each of them working media and labor resources expenditures are required, load-lifting mechanisms are necessary, and each operation of this kind possesses great probability of damage or loss of load.
- Fourth, the “Europe - Asian-Pacific Ocean Region – Europe” connection concerns mostly container loads; this means that container itself more than comprises 50 % of the cargo weight. The sea vessel weighs from 20 to 50 thousand tons. Therefore the weight of transportable payload by sea should take approximately 30 %, while on the railroad it is about 60 %.

The cargo transit through the Russian Federation will allow customers to decrease the time of container delivery from Japan to Europe by 2,5 - 3 times in comparison with the sea delivery, even the cost of delivery will be considerably more cheap. In this case numerous boundary and customs barriers will be excluded, the trans-shipment of loads from one mode of transportation to another can also be avoided.

The first basic factor that makes railroad attractive for countries of the Pacific Rim Region is the access to East Siberian and Far Eastern natural resources.

The second basic factor is the active participation in construction of the road to full extent and in the guaranteed development of the most extensive region of Russia.

The development of commercial and economic relations with European and Pacific Rim countries proves the potential possibility of the cargo transit volume increase through Trans-Siberian main railway. For instance, the year 2000 the total volume of cargo containers transported along the Eurasian sea route westwards composed 3,330 thousand containers. Beginning in October 2000, the new movement schedule for express container trains has been introduced which states running time through Trans-Siberian main railway, equal to 9,5 days. With the use of special express container trains along the Trans-Siberian main, the average running speed increased to 950 km in a 24-hour period.

The government of Russian Federation, business people, and scientists hope that the development of the road will make international standard container transit through the Trans-Siberian Main Railway more active.

At present, accordance with the intergovernmental program the Republic of Korea and People's Democratic Republic of Korea concerning the creation of united national railroad network, railroad construction and main line modernization are supposed to take up to 5 years. The railroad begins in the port of Pusan, which in the case of connection with the railroad system of North Korea, will be directed along the Eastern coast of the People's Democratic Republic of Korea ending up at the Russian Trans-

Siberian main railway (Pusan - Seoul - Vonsan - Radzhin - Khasan). Therefore, the problem of competitiveness increase of the Trans-Siberian main railway in Northern-Eastern Asia still remains tangible for the economy of the region as well as for Russia as a whole. In the year 2001, the Minister of Railroad Communications of Russia N. Aksenenko and the Minister of Railroads of People's Democratic Republic of Korea, Kim Yen Sam both signed "The agreement on mutual collaboration between the two railroad departments". This document, which gives way to concrete actions on reunification of north and south of Korean railroads with the Trans-Siberian main, became the consequence of the important political agreement adopted in the beginning of August in Moscow by President Vladimir Putin and Chairman of the State Defense Committee Kim Chen Eer. At the same time, taking into account the great international significance of this project, the leader of North Korea made a daring step, changing the route of future road and directing it not along the West coast of peninsula, but through the eastern section of trans-Korean railroad (Pkhongan - Vonsan - Tumangan).

The Far-Eastern railroad comprises a major portion of external economic interactions of Russian Federation with the countries of the Pacific Rim Region and occupies one of the leading places in the transport of the export-import cargo that takes up more than 40% of the total cargo volume. Large-capacity (multi ton) export and import containers within the road limits receive a 30 % off discount.

The existing transport infrastructure of Trans-Siberian main makes it possible to ensure high competitive power from the countries of the Pacific Rim Region to central Europe.

According to recent expert estimations the cost advantages of shortening the delivery period to 17 days for one 20-foot container with the load value of US \$50 thousand from the countries of the Pacific Rim Region to Europe can be \$300. Furthermore, shortening the period of container lease of due to the decrease of load delivery time to 17 days will make it possible to save additional US \$100 - \$150. Much attention is now paid to acceleration of large-capacity container trains. During April 1998, there has been conducted a project on demon express container trains to run along the routes Nakhodka-Eastern – Bekasovo and Nakhodka-Eastern – Brest with running speeds of more than 1150 km/day. The admission technology for express cargo trains determined some regulations on technological and commercial inspections of railroad cars, inspections of locomotive replacement stations and locomotive brigades, cargo safety regulations, transportation cost for transit containers, improvement of customs procedures, correcting information division of the automated container transportation control system. In the course of running along the railroads of Russia, the demonstration train proved the state of railway and the tractive possibilities of locomotives allows to deliver transit containers from Nakhodka-Eastern to Brest in 9 days and 6 hours as stated in the new schedule can be made on the. Simultaneously, on the Krasnoyarsk railroad the demo container train experimented with the use of satellite control system for establishing train location (accuracy up to 100 m in real time).

The Trans-Siberian main railroad is practically entirely electrified. The eastern part of Trans-Siberian road uses the alternating current electrification with frequency of 50 Hz and the voltage of 25 kV. Traction stations receive feeding from external power supply lines, as a rule, these 220 kV lines bear the functions of basic intersystem communication in the United Energy System of the East of Russia.

The 220 kV electric network of the system nature is completed and developed. Electric power lines are built along “BAM” (northern transit) and along Trans-Siberian main (southern transit).

The Far Eastern power system is sufficient enough. However, after launching of Bureia Hydro Electric Station a number of external power supply and electrical rod problems on the Trans-Siberian road will be removed. The expected introduction of the first aggregates of Bureia Hydro Electric Station is planned in the year 2002. The introduction of Bureia Hydro Electric Station at full power, in the years 2004 - 2005. In the year 2002, it is planned to complete works on the electrification of the main section of Bikin – Spassk and, thus, to complete the electrification of the Trans-Siberian main. The digital communication network will be simultaneously introduced into a constant operation to satisfy the technological needs of road; also, the telecommunication services segment extended to a wider variety of users.

It is intended to conduct a number of projects on modernization of railroad automation to further increase the safety trains; it's planned to equip container terminals with load-lifting mechanisms and special forklift trucks for 40-foot containers. New information-control systems are being implemented for the advance control of the technological routes (railroad car flows) of basic cargo industries. For improvement of customer service quality, the modernized united transport center has been created, including, the building of the fiber-optic of the lines of communication, and now the satellite navigation systems are being prepared for putting into operation. Also intensive information technologies for the effective traffic control along entire road are being introduced.

As a result, the maximum permissible speeds for the freight trains will be 90 km/h; for the passenger and intermodal container transportation, over 120 km/h, which will make it possible to considerably accelerate the delivery time and will lead to reduction transportation cost. The mentioned above facts make it possible to assert that the Trans-Korean and Trans-Siberian railroad main lines will ensure market international transit from the countries of Northern-Eastern Asia into the western part of Russia and Europe.

