Development of the railway infrastructure in Russia and abroad

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Deputy Chief Executive Officer
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Integrated reconstruction of the Mga – Gatchina – Veimarn – Ivangorod section and railway access roads to seaports on the southern shore of the Gulf of Finland.

Traffic capacity in 2020: 80.3 mln tonnes
Traffic capacity in 2017: 47.0 mln tonnes
Traffic capacity in 2007: 6.8 mln tonnes

Project progress: 76%

Cost of work completed since the start of the project: RUB 120.2 bln
The program for the modernization of the Trans-Siberian Railway and the Baikal–Amur Mainline is the core project of the transport development component of the Eastern Polygon.

**Impact:**
- Increase in the annual capacity of the Baikal-Amur Mainline and the Trans-Siberian Railway from 58.1 mln tonnes to 124.9 mln tonnes;
- Improved transport efficiency;
- Establishment of a framework to attract international freight transit;
- Promotion of manufacturing companies, creation of an economic environment to facilitate the effective development of Siberia and the Far East.

The Far East of Russia is in for integrated renovation of its entire transport infrastructure, along with the development of an integrated transport and logistics system capable of providing freight and passenger traffic services in compliance with best international practices and standards.
Program for the implementation of the integrated project to develop the rail infrastructure of the Moscow transport hub in 2012–2020

1. Reconstruction and development of the Moscow Central Circle

Development of the radial lines of the Moscow railway hub

Integration of the radial lines and the MCC

Construction of new stations

20. Integrated reconstruction of the 81 km – Dmitrov – Iksha – Povarov section of the Greater Ring of the Moscow Railway
Reconstruction and construction of the railway infrastructure for the XXII Winter Olympic Games in Sochi

1. Adler Station
2. Mys Vidny Resort
3. Olympic Park Station
4. Airport Station
5. Estosadok Station
6. Krasnaya Polyana Station

Reconstruction and construction of two-track inserts
Construction of the combined Adler – Alpika-Service alpine climatic resort motorway and railway
Reconstruction and construction of the railway infrastructure for the XXII Winter Olympic Games in Sochi

“Now I see the entire power of the Russian state”
Chair of the IOC Coordination Commission
Jean-Claude Killy
Combined Adler – Alpika-Service alpine climatic resort motorway and railway with the construction of the continuous second line on the Sochi – Adler – Vesyoloe section

48 kilometers of electrified single-track line, 46 kilometers of motorway, 27.3 kilometers of tunnels, 4 new stations with passenger terminals: Adler, Olympic Park, Alpika-Service and Estosadok terminal.
The Moscow Central Circle is a sophisticated engineering structure, with no peers on other steel trunks anywhere in the world. The MCC length is 54 kilometers. It connects 10 radial lines and includes about 200 industrial buildings and structures.
The upgrade of the railway infrastructure made it possible to connect residential areas, parks and sports facilities, shopping centers and offices, and ensure the promotion of underdeveloped areas of the city that were previously inaccessible to citizens. The surrounding urban areas were given a new impetus to facilitate development.
Reconstruction and Development of the Moscow Central Circle

**Moscow Central Circle**

- More than 150.3 mln passengers transported since launch;
- **431,000 passengers per day** – record high 14.12.2017;
- 42 passenger five-car trains;
- **177 couples** of trains on weekdays and **150 couples** on weekends;
- **1 hour 30 minutes** — MCC travel time;
- 5 minutes — peak traffic intervals, **10 minutes** — non-peak hours
As part of the MCC reconstruction, the following operations have been completed:
734,000 cubic meters of roadbed filled; 183 kilometers of track and 379 track switches laid; reconstruction and construction of 29 artificial structures; 4,945 of piers and 419 kilometers of overhead system installed; 1,814 kilometers of SCB cables laid; 637 kilometers of communication cables laid; more than 300 engineering facilities reorganized.
A new train separation system has been put in place.
The project was implemented in conditions of dense urban development, a large number of engineering communications and properties controlled by various owners, as well as in close interaction and consistent with interests of the city planning and transport units of the Moscow government, the Department of Cultural Heritage, rolling stock operators, logistics companies, Metro and private investors.
Integration of the radial lines of the Moscow railway hub into the transport system of the Moscow Central Circle

9 lines of the Moscow railway hub will be integrated into the transport system of the Little Ring of the Moscow Railway by the end of 2018.*

- Organization of 2 pedestrian connections (Moscow Government)
  - in Oktyabrskoe and Smolenskoe Lines
- Transfer of three stations (JSC Russian Railways)
  - in Savyolovskoe, Yaroslavskoe and Rizhskoe Lines
- Organization of three new stations (JSC Russian Railways)
  - in Gorkovskoe, Kurskoe and Paveletske Lines
- Construction of a pedestrian tunnel (JSC Russian Railways)
  - in Kazanskoe Line (work completed)

*Integration of the Kievskoe Line with the Delovoi Tsentr station of the MCC will be additionally addressed as part of the project to construct a connection with the Smolenskoe Line.
<table>
<thead>
<tr>
<th>Month</th>
<th>Event</th>
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<tbody>
<tr>
<td>FEBRUARY</td>
<td>Completion of the project to reconstruct the Belgrade - Pančevo line</td>
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<tr>
<td>MAY</td>
<td>Completion of operations on the Vinarci–Djordjevo line, last of the six sections of Pan-European Corridor X</td>
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<tr>
<td>AUGUST</td>
<td>Commencement of the construction of an overpass in the floodland of the Danube and Čortanovci tunnel on the Stara Pazova – Novi Sad section of the Belgrade – Budapest line</td>
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<tr>
<td>NOVEMBER</td>
<td>Completion of operations and commencement of service on the Resnik - Valevo section of the Belgrade – Bar line</td>
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Main parameters of the construction of the new Kosice – Bratislava – Vienna broad-gauge line, 1520 mm

- **€ 6.49 mln euro**
- **22.9 mln tonnes by 2050**
- **IRR from 2.1% to 7%**
RZD HOLDING’S FOREIGN INFRASTRUCTURE PROJECTS

**Construction projects**

**Serbia**
Integrated project, including the construction and reconstruction of railway sections and supply of Russian-made diesel trains for suburban service. All operations are carried out according to the schedule.

**Cuba**
Promotion of the project for integrated development of railway infrastructure, including the reconstruction of 1,078 km of main lines, supply of construction and maintenance vehicles, equipment and materials, training of specialists of Cuban railways.

**Vietnam, Indonesia, Brazil**
Work is underway to discuss the implementation of joint projects. Several agreements have been signed.

**Austria, Slovakia, Ukraine, Russia**

**India**
Promotion of the project to build a new European transport corridor

**Armenia**
Concession of the Armenian railway

**North Korea**
Rajin-Khasan Railway project. Work is underway to develop transport and logistics services.

**Mongolia**
Development of JSC Ulaanbaatar Railway

**Iran**
Garmsar – Ince Burun line electrification project

**India**
Project to upgrade the current Nagpur - Secunderabad section line

**STRATEGIC PARTNERSHIP 1520: CENTRAL EUROPE**
Introduction of the innovative split method for the laying of permanent way

Underlying the split technology for the laying of the permanent way is the concept for the performance of the main operations within a single processing procedure:

- preparation of areas under sleepers;
- laying of sleepers;
- laying of rail strings;
- transfer of clamps to the operating position;
- setup and placement of the track in the design position;
- use of a single track-laying train.

Main technology impacts of B66 UC:

- Automatic setting of the track in the design position (axis positioning, preparation of substructure geometry, including site slope and cant angle elevation, ensuring substructure strength balance);
- Strict compliance with the diagram for laying sleepers;
- Possibility of working in narrow curves (>250 m);
- Possibility of commencing service with higher speed rates;
- Machinery availability: 98% (service experience in the UK – 11 years);
- The specific features of the split method for the laying of permanent way enable effective use of the new track unit on high-speed lines.
Application of BIM-solutions in capital construction projects

- Up-to-date information about operational and cost parameters of materials
- Improved quality of project documentation
- Access to allow simultaneous work of specialists in various fields and possibility to streamline technical solutions within single space
- Availability of relevant data for reconstruction, technical upgrade, and demolition of buildings and structures upon conclusion of their life cycle
- Interconnection and consistency of all infrastructure elements
- Pegging to real time and place
Main characteristics of the global market for railway projects in 2016 (exclusive of transport and logistics operations):

- 163.6 bln euro

The following major sectors included:

- “infrastructure” – production of all components of the railway track, as well as operations to build tracks (exclusive of major artificial structures);
- “rolling stock” (diesel locomotives and electric locomotives, cars, multiple unit trains, freight cars, Metro cars, monorail cars, etc.);
- “services” – maintenance of tracks and electrification systems, repair and maintenance of rolling stock;
- “control systems” – signaling systems, communication systems;
- “technology integrators” – market for technical and software integration services.

According to expert estimates, the combined size of the international market for railway projects is expected to reach approximately 4.5 trln euro from 2016 to 2030.
Thank you for your attention!