



MINISTRY OF TRANSPORT OF THE RUSSIAN FEDERATION

FEDERAL AGENCY OF RAILWAY TRANSPORT

Moscow State University of Railway Engineering (MIIT)

***«New approaches in the  
organization of rail freight in  
international traffic»***

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## Basic concepts of technology development of rail transport in the 21st century:

- vacuum superconducting trains;
- string transport systems;
- the tubular rail transport;
- monorail system on suspended tracks;
- high-speed traffic with the use of alternative energy sources;
- electric trains on wireless charging;
- road trains of system SARTRE and others.





## **The basic directions of modern researches in the field of railway transport :**

- the development of intellectual transport systems in railway transport;
- the increasing the carrying capacity of the rolling stock, modernization fleet of freight wagons;
- the creating a compatible digital transport control systems and a navigating equipment;
- optimization and standardization of requirements to high-speed parameters, improving the reliability, the safety of railway traffic;
- the formation of the intermodal network of logistic infrastructure;
- the increasing of the environmental safety and energy efficiency improvement.



## **The growth of the relevance of researches in the above areas is confirmed by:**

- the volume of funds invested by venture companies, which amounted to **5.7 billion dollars in 2015;**
- an increase **in 2 times** the level of innovative activity in comparison with the previous two years (2013 and 2014) in these areas of development of railway transport.



## **The role of rail freight transport in the development of the world economy and global transport support:**

- The rapid development in the world market of rail freight.  
*The annual growth of rail traffic is 5.7% in China which showed the revenue of \$ 45.4 billion in 2016.*
- Heightened attention to the development of railway networks, the infrastructure routes and corridors on the part of countries with developing economies.  
*By 2030 there will be located up to 80% of production capacity, concentrated the main trade and labor markets.*
- Active influence of transit rail freight traffic to increase the stability and integration of the world market.
- The wide diversification of services offered by the railway operators.
- The annual growth in of tax revenues obtained from the transportation of goods by railway in the national budgets of states.



## **Trends affecting on the development of international rail freight market:**

- the integration of transport systems;
- the development of logistics technologies;
- the development of international industrial cooperation;
- globalization of commodity markets;
- the formation of a single information space;
- the relative rise in prices of goods relative to the weight / volume unit, respectively the reduction of the share of transport component in the final price of products;
- the emergence of new products, new product groups for which the critical factor in competition is the speed of access to the market from the date of manufacture.

According to experts, a daily degree of depreciation of some high-value goods, such as consumer electronics, may reach 2.5%.



## The growing popularity and the volume of online trade as a factor determining the prospects for the development of international transport of goods

The volume of world online trade  
(trillion dollars)

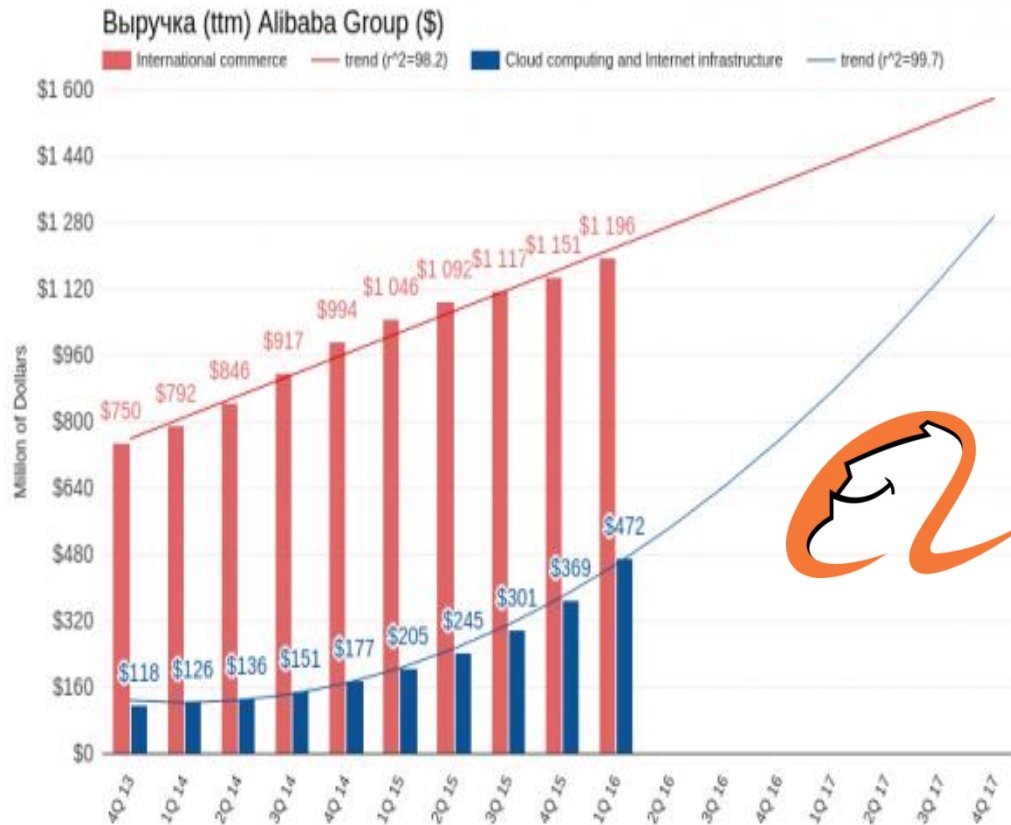
2,5 thousand tons  
of parcels per day

— the growth rate  
over the previous year





## The major players of the global e-commerce market:







## The system problems in an extension of rail freight services market:

- the relatively low speed;
- imperfection of organization and logistics of the freight traffic (downtime, inflexible graph of transportation, lack of specially designated ways, lack of regular railway traffic, inefficiency in work on loading - unloading of goods, and others);
- the lag in the development of transport and logistics infrastructure;
- the weak consolidation in the interaction of producers, distributors, transport operators (carriers) and end-users in terms of synchronization flows, nodes and networks.



## **Innovative transport solutions in the organization of railway freight traffic:**

- adaptation of aviation and other technologies and logistics principles to the organization of international rail freight transport;
- the development of high-speed freight rail traffic;
- the launch of regular freight rail connections.



## Innovative transport solutions (aviation):

- adaptation of "passenger" solutions for freight transport;
- creation of special vehicles (aircrafts);
- technology transportation, loading and unloading, storage, packaging, freight securing and others.
- means of mechanization and automation.

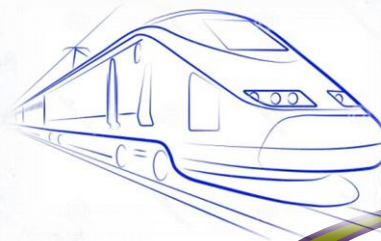




## New transport solutions:

### regular high-speed / high-speed freight rail link:

- potential cargo base;
- a promising route network;
- speed modes;
- uniform dimensional and weight restrictions;
- rolling stock with automatically variable track width;
- infrastructure;
- shipping and terminal technology (loading-unloading, storage, means of mechanization and automation of intermodal transport units, etc.);
- competitive pricing policy;
- organization of operator activity.





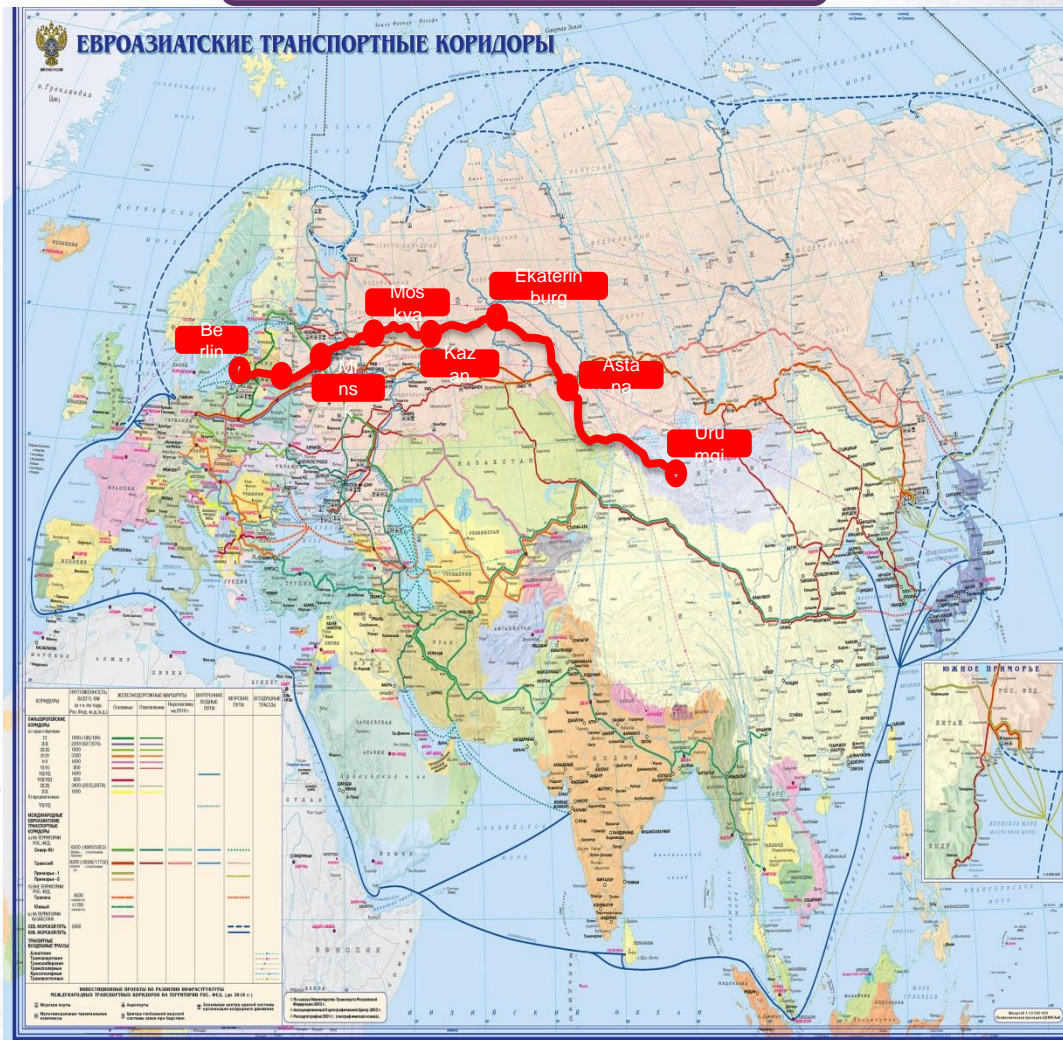
## The principles of high-speed railway tracing :

- ❑ **passenger:** the shortest distance between major cities and towns;
- ❑ **freight:** based on the topology of the international transport corridors, the location of national centers of generation and repayment of freight flows, the integration of regional projects in transport and logistics infrastructure.

## Criteria of efficiency of high-speed railway:

- ❑ **passenger:** least time-distance trains;
- ❑ **freight:** punctuality, placing on the routes of global supply chains, Post production centers to the distribution networks.

### Eurasian transport corridors





## Evaluation of competitive advantages by modes of transport in terms of implementation of schemes of regular linear motion:

### Maritime transport

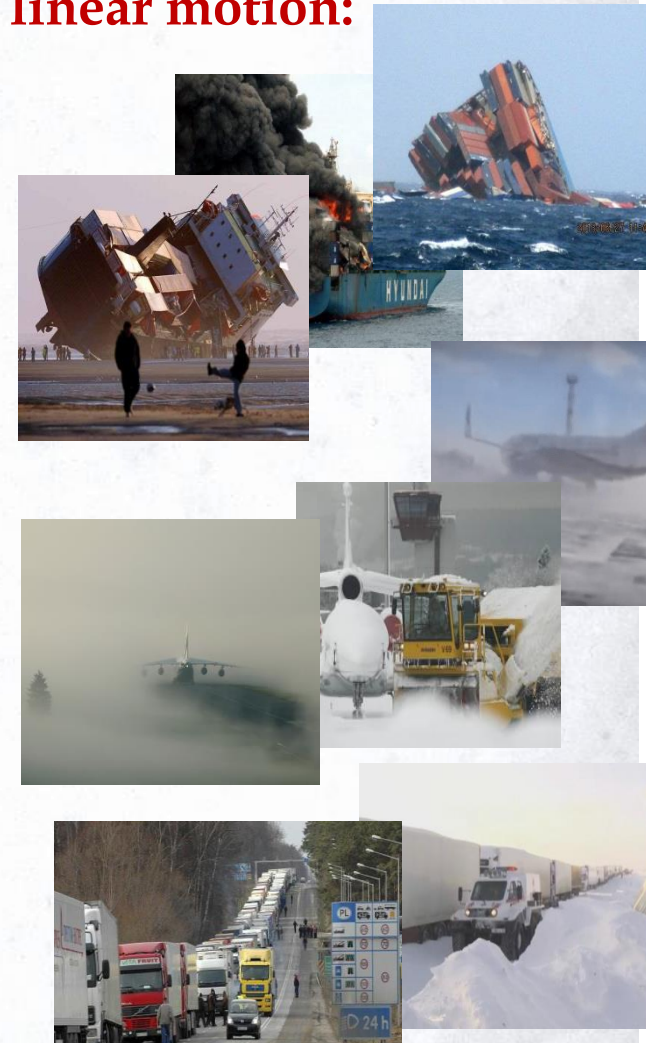
- the inability (technical, economic) of the line service (the implementation of the intermediate vessel calls, partial loading / unloading);
- low-speed cargo delivery;
- high dependence on weather conditions.

### Air transport

- inability (for economic reasons) of the line service (frequent takeoffs / landings, partial loading / unloading);
- inadequate cargo-airport infrastructure;
- high dependence on weather conditions.

### Automobile transport

- dependency on weather conditions, state of road surface, etc.;
- high accident rate, problems with traffic safety in certain regions;
- undeveloped infrastructure, border crossings, road service and others.





## The possibilities of organizing a high-speed freight rail link:

- all-weather capability, reliability and security;
- punctuality (the movement of freight trains on the "hard route schedule") - conditions for implementation of logistics principle of "just-in-time";
- possibility of the implementation of the linear cargo service to the "passenger" principle (regardless of the applications for freight): intermediate freight terminals, partial loading / unloading, storage, consolidation ;
- high speed in delivery of cargoes;
- developed infrastructure (railway, border, a customs and others);
- high concentration of scientific, investment, administrative and other potential.

### Suggestions:

1. Creating a special group or permanently functioning body for elaboration of the question of the planning and launch of high-speed rail line (Coordinating Council, a working group, etc.);
2. Development of concept (general scheme) for the organization of regular high-speed rail freight transport in the continental traffic;
3. Determination of sources and volume funding priorities: rolling stock, terminal infrastructure, hoisting and transport means, storage and information technology, facilities for mechanization and automation, etc.



**Thank you for your  
attention!**



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