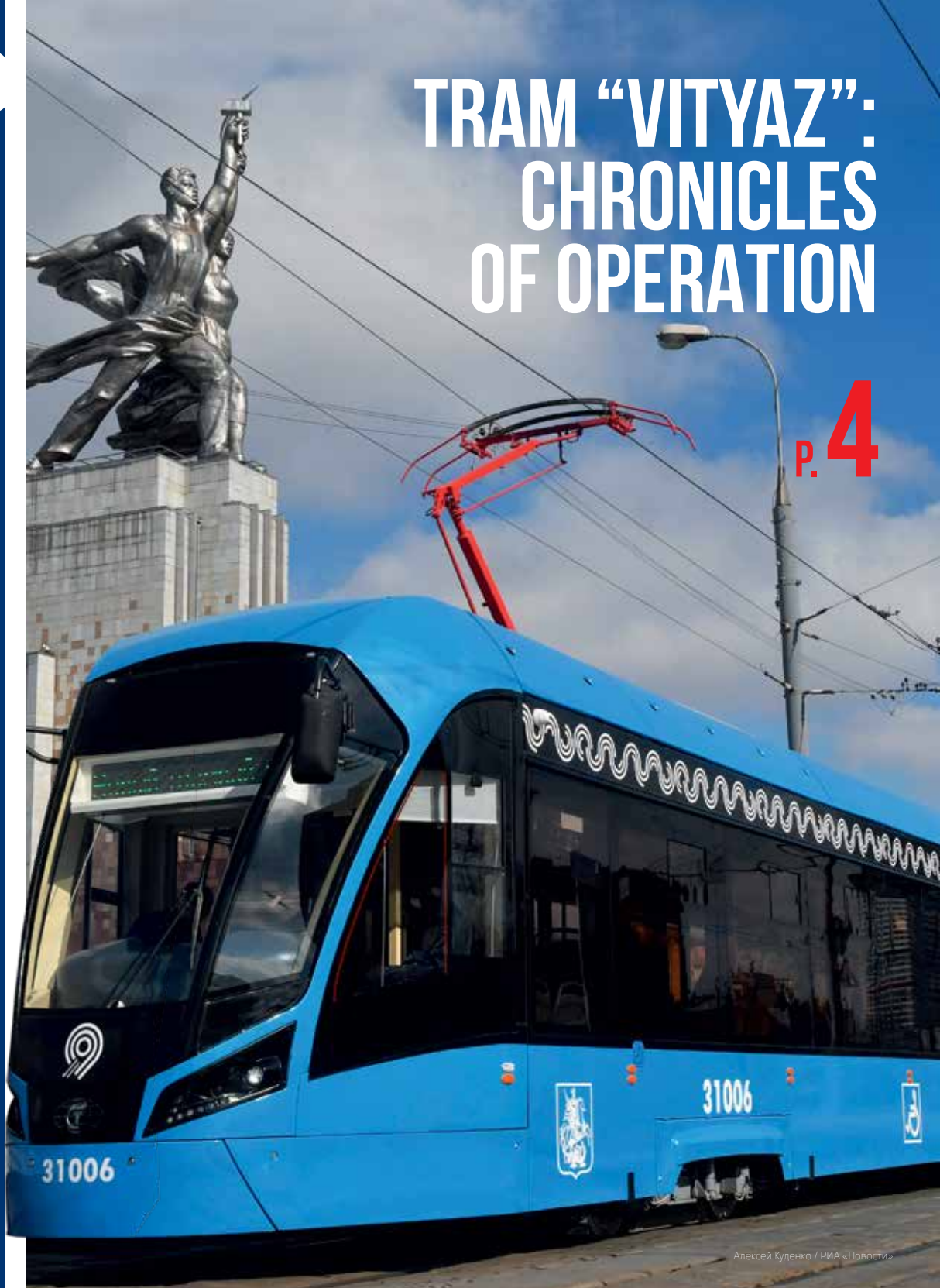


MAGAZINE FOR PARTNERS

#4 12/2017 Transmasholding



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Magazine for partners of CJSC
Transmashholding

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OUR RESPONSE TO SANCTIONS

Electric train EP2D became a laureate of the national award in the sphere of import substitution "PRIORITY-2017" in the "Transport" nomination.

EP2D is produced by Demikhovo Machine Building Plant. A technological platform for a whole range of new generation Russian electric trains has been developed based on this machine. In the design of the train, modern technical solutions are implemented that not only increase the comfort and safety of passenger transportation, but also allow to reduce operating costs. EP2D manufacturers note that this train is modern, economical and very comfortable. It has been designed taking into account the views and desires of suburban passenger companies. The carriages comply with international quality and comfort standards: they have special brackets for transporting

bicycles, folding changing table and places for low-mobility passengers.

Since about 90% of EP2D components are produced in Russia, it is not surprising that this particular train became the laureate in the field of import substitution. It should be noted that Demikhovo Machine Building Plant has received this prestigious award for the second time: in 2015 the company was awarded a diploma for winning the nomination in machine building.

How EP2D is gaining positions in the vastness of Russia (and beyond), see page 10

TREATY OF OPENNESS

The Oktyabrsky Electric Car Repair Plant (OEVZR) signed an agreement on information cooperation with the St. Petersburg Metro.

The document was signed by OEVZR Executive Director Artem Ovelyan and Deputy Head of the St. Petersburg Metro — Chief of rolling stock service Igor Shlendov. The objective of the agreement is to improve the exchange of information, customer service, transportation process

and transportation security in the underground, as well as to form the ways to improve the technical and technological support.

The document is intended to strengthen the cooperation of the manufacturer and the St. Petersburg Metro in the provision of information on modern achievements in science and technology, new technologies and technical solutions that have a real or potential opportunity to be used in the metro to improve the efficiency of transportation process and transport safety, and to train underground technicians in use of special properties of the new technology.



AROUND NIZHNY WITH COMFORT

Metrovagonmash delivered cars of model 81-717.6/714.6 in Nizhny Novgorod

All in all in Nizhny Novgorod (electro-depot Proletarskoe) 23 underground cars, 10 head and 13 intermediate, were transferred. The contract amount is 1 billion 300 million roubles.

The new rolling stock meets the most stringent requirements for the safety of passenger traffic. Car parks are equipped with a video surveillance system. Forced ceiling ventilation is used, which allows air exchange not only on the move, but also at stops. To illuminate the passenger compartments luminescent lamps of "light line" type are used. For the interior decoration of walls, molded panels of flame-resistant plastic are used. Seats in the cabin are made using fiberglass frames. Wear-resistant linoleum serves for the flooring.

There is an exit in the front part of the cab.

To ensure that the driver's conditions of work meet the modern requirements, a chair with vibration absorption and pneumatic adjustment is used.



THERE IS A CERTIFICATE!

BMZ has received a certificate of compliance for the maneuvering diesel locomotive TEM28.

The document gives the right to manufacture and sell 100 diesel locomotives of this series for five years, until October 2022.

In terms of its parameters, the machine is at the level of the world's advanced models. The maneuvering locomotive TEM28, with a capacity of 895 kW and electric transfer of

altering-direct current, is capable of driving trains whose mass is one and a half times larger than the maneuvering vehicles of the mass series produced today can drive. It is equally effective on heavy maneuvering, export, and light gravity hump works. Using the TEM28 can reduce fuel consumption by more than 25%, a noticeable reduction in maintenance costs.

An important structural feature of the BMZ innovative development is its modularity, which makes it possible to create several series of machines with a large difference in characteristics: both general and unique, inherent in a particular series.

PLUS THREE HEROES

Transmashholding delivered all the 4ES5K locomotives that were planned for this year.

Novocherkassk Electric Locomotive Plant (NEVZ) fulfilled the plan for the year 2017 to produce electric locomotives 4ES5K Ermak. The last three locomotives went to the place of service this year.

The 4Je55K electric locomotives are among the most powerful locomotives in the world. The machines of the Ermak family are manufactured in various designs, the power range ranges from 6560 to 13 120 kW and is the most numerous series of modern electric locomotives in Russia. The first electric locomotives were produced in 2007, and today about 1150 locomotives carry cargoes along the trunk lines of Russia. To ensure the production of modern electric locomotives at the Novocherkassk Electric Locomotive Plant, a high-tech production facility has been created and is operated by an engineering center. NEVZ is the only manufactur-



er in Russia having its own rolling ring with a length of 7.4 km.

In the current year, NEVZ commissioned RZD to produce five 4ES5K locomotives.

Next year, at the Novocherkassk Electric Locomotive Plant, they plan to create 10 such electric locomotives for Russian Railways.

AHEAD OF THE PLAN

The Tver Railway Car Building Plant (TVZ) built a batch of cars ahead of the schedule for the Russian Post Service.

The new railway equipment has already been sent to the customer - VTB Leasing, which, according to a trilateral agreement, will transfer it to the Russian Post Service under a financial lease.

The tripartite agreement was signed on September 1 of this year and assumed the transfer of 45 mail-baggage cars (model 61-4505) until the end of November. However, as the CEO of the Tver Railway Car Building Plant, Andrey

Solovey, noted, the production capacity of the plant and the existing experience in the construction of 60 such cars for the Russian Post Service in 2015-2016 enabled the contract to be executed earlier than the deadline.



ALEXEY SKATIN, Deputy Director General of the Russian Post Service for logistics:

- In October, the Russian Post Service's train began daily cruising along the Moscow-Vladivostok route and in the opposite direction. - The development of international rail routes is in our plans. New train cars of domestic production will help us to significantly update our railway fleet, numbering about 800 cars. This is especially timely during the New Year's peak period.

TESTING POWER

The most powerful main cargo BMZ diesel locomotive is being tested at BAM.

The locomotive is based in the depot Novaya Chara. On the highway it will travel 50 thousand km. Earlier the 2TE25K2M diesel locomotive successfully passed tests in Russia's Central Zone. The pilot run, according to the program in accordance with JSC "RZD", successfully completed the preliminary tests. The locomotive performed transport work of about 240 thousand tons of cargo, the maximum weight of the trains constituted 8230 tons.

PROUD “VITYAZ” HURTLING



The “Vityaz-M” trams first appeared on the streets of Moscow in March of this year. Passengers have already appreciated the advantages of the advanced vehicle, which the new tram has a lot of.

Routes of Moscow

The first “Vityaz-M” cars (model 71-931) appeared on the most popular route of the city - No. 17. It connects the Medvedkovo and Ostankino districts, carrying up to 63,000 passengers per day, and over a month - more than one and a half million.

Nowadays, only new cars run on this route. It can be safely asserted that, as compared to the same period in 2016, passenger traffic has increased, Muscovites use this mode of transport and give due credit to the comfort of new cars.

To date, Vityaz-M has completed six of the seven routes of the Bauman tram depot. It took 110 tram cars. The next wagons to be delivered to Moscow in 2018 will go to the depot Oktyabrskoye. And the third party (2019) is intended for the Rusakov depot. Thus, the entire north-east and east of Moscow will be equipped with new cars.

Old trams can still be seen on the streets of Moscow, but as new cars arrive, they are taken out of service.

Currently, SUE “Mosgortrans” is preparing a technical assignment for a second, similar lot of cars, which will allow to fully equip all Moscow tram depots (with the exception of the Strogino district in the west of Moscow, since 70 Polish cars of the new generation Pesa operate there). The delivery is planned in the same mode - for a period of three years, for 100 cars a year.

Reasons for popularity

- The rolling stock is low-floor, which is very convenient for transporting people of low-mobility.



In addition, it is equipped with wheelchair access ramps, and inside the cabin, special parking spaces are provided which are equipped with seat belts.

- The tram is very comfortable. Not only for passengers, but also for people living in the streets, along which trams run, it is important that the cars are quiet. This characteristic, as well as smooth running is ensured by the use of new carriages, which are three in the car.
- The new car is spacious and wide. “Vityaz” is one of the largest trams in the world in terms of cabin width.
- There are all in all six doors on the car, which will reduce time outside.

At the same time, door operation is noiseless, anti-squeeze sensors and systems are also installed, allowing the driver to open the door both from the cab and the passenger individually. If, for example, one person needs to enter or leave,



IGOR BIKMAYEV,
Director of the Tram Department
of SUE «Mosgortrans»:

— All vehicles purchased by SUE «Mosgortrans» meet the highest modern requirements of safety and reliability. All of them are adequately adapted for travel of low-mobility citizens. The requirements were set out in detail in the ToR, and Metrovagonmash, which won the tender for delivery of the Vityaz-M wagons to Moscow, met all these requirements - presented the rolling stock in full accordance with our request.



IGOR BIKMAYEV,
Director of the Tram Department
of SUE «Mosgortrans»:

— This is a new step in the development of tramways. This is a completely different car that meets the highest requirements. The predecessor of «Vityaz-M» is the model 71-623 of orange-blue color. You can see it in the city. This is also a modern car: it has a zone with a lowered floor, it is adapted to transport low-mobility citizens. But even this does not put it on the same level as the «Vityaz-M» car. In contrast, on the «Vityaz-M», the new carriages are used to ensure a smooth ride. The six doors of the car allow to reduce the time for pick-up and drop-off and thereby increasing the speed of the car on the route. At the same time, door operation is noiseless, equipped with anti-squeeze sensors and systems that allow the driver to open doors from the cabin or by the passenger individually. Thus, the cabin maintains a stable temperature regime.

then there is no need to open all doors in the car. It is enough to open one, which, by the way, will keep a comfortable temperature in the cabin.

- The car can carry up to 260 passengers at a time; 60 of them seated. This is considered high capacity.
- In the car - as well as in the cabin and the driver's cab - there is a climate control system that maintains a comfortable temperature at any time of the year.
- To comply with security measures, the car is equipped with video surveillance systems. They keep track of what is happening in the driver's cab, in the cabin, behind and in front of the car, and also how the roof equipment works. The driver's cabin is equipped with a 2-terabyte hard drive, the records on it are stored for 30 days. These videotapes are in demand when investigating episodes of vandalism, road accidents and fare jumpers.
- Thanks to the satellite navigation system, the dispatcher can see at any time where the car is and on what route.
- The car is equipped with an electronic information board that shows the route number, air temperature in the cabin and on the street, the

IN TODAY'S TIME, «VITYAZ-M» STAFFS SIX OF THE SEVEN ROUTES OF THE BAUMAN METROPOLITAN TRAM DEPOT. IT TOOK 110 CARS TO DO THIS. NEXT CARS WHICH WILL BE DELIVERED TO MOSCOW IN 2018 AND WILL GO TO THE OKTYABRSKOYE DEPOT

points of the route on which the tram is moving, and the name of the next stop.

View from the cab

Convenience and generally decent working conditions for the driver have a significant impact on traffic safety. Manufacturers of "Vityaz" took care of this.

The driver's section of the new tram is equipped with a climate control system. The driver's seat is comfortable and is equipped with a seat belt - feeling more protected, the driver is not distracted from work. The cabin as a whole has become larger in size and has an ergonomic



sliding door. It is all glazed, which gives the driver a circular view of the roadway, an opportunity to better assess the traffic situation, and at any time of the year, as all the windows are heated and do not mist over.

Thanks to the ADCS (automated dispatch control system), the driver sees the distance to the car ahead and behind him, in accordance with this, he regulates his movement.

The video surveillance system allows the driver to monitor what is happening in the cabin, because a car with a length of 27.5 m cannot be properly seen in the rear-view mirror.

Each of the six doors of the wagon installed video cameras that allow you to monitor the pick-up and drop-off, to verify that the landing is over and you can move out.

There are video cameras at each of the six doors of the car that allow you to observe the pick-up and drop-off of passengers, to make sure that the vehicle stops running and you can start moving. The pantograph (power) drive is electric, which also facilitates the work of the drivers. It is enough to press the button, and the pantograph will lower or rise.

Under the strict supervision

The contract concluded between SUE "Mosgortrans" and the wagon supplier includes maintenance of the rolling stock throughout its life cycle, which is 30 years. The contractor company



works on the basis of the Bauman tram depot. It performs planned and unscheduled inspections, daily maintenance before the launch on the line, extended maintenance - RK-1 and RK-2, which the wagons pass depending on the mileage. When the car leaves the building, the contractor performs repair work. It cleans and prepares the tram for its job.

The company-contractor also shared with Mosgortrans the preparation activity of drivers who work on new trams. According to the contract, the driver training was carried out by the wagon supplier, and by the tram management - after the training and under the supervision of driver-instructors - the drivers test-ran the line.



IGOR BIKMAYEV,
Director of the Tram Department
of SUE «Mosgortrans»:

— All the drivers are experienced, they all went through training at the training center, pass qualification exams, and are tested. Therefore, it was not necessary to retrain drivers for work on new trams, rather an adaptation to a new type of transport was what was needed. After a certain number of hours driving and having already got accustomed to a new car, the driver was allowed to work independently on this car. But the first to get the new cars, of course, are the best drivers who have no complaints.



PASSENGER COMMENTS

ALLA DMITRIEVA, housewife:

— I have a small child, I do not know how to drive a car, that's why we always move with a child and a stroller on public transport. I'm glad that we now have a new and modern tram - it's not a problem to put a stroller in it, I easily do it myself. It was impossible in the old tram, so I was forced to ask for help from other passengers both at the entrance and at the exit. I didn't always have luck with this...

ZAHAR NOVIKOV, Manager:

— The new trams is super, they're like in Europe! I can get to work by tram, and by underground. And it's a little longer on the tram, but always choose it now, at least on the way back home, because it doesn't jerk, doesn't rattle around and the seats are comfortable. I just go and gaze out the window. It's just a pleasant trip!

The editors of Transmashholding thank the employees of Mosgortrans for their help working on the material.



ANTON MEDVEDEV,
tram driver:

— «Vityaz» is comfortable for the driver. I remember the day when we got these cars. Then they chose the best drivers, that is, who would be the first to ride them, and then train others. I was one of them. And there the cabin is so spacious, there is a place for an instructor - a folding seat on the side. They didn't have this on the other trams, so the instructor had to take a stool and sit next to the student who drives the tram.

I mastered the new car quickly, there is nothing complicated in it. The buttons include a trip pointer, heating, lighting, and they're all touch. I would like to especially note that the brakes of the «Vityaz» are excellent, they are much better than all the cars I worked on earlier.



EP2D: UNIQUE TRAIN TRANSFORMER

“Modern public transport should be safe and comfortable for passengers,” President Vladimir Putin said at the September meeting of the State Council presidium dedicated to the development of passenger traffic in the regions of the Russian Federation. Being the largest manufacturer of railway equipment in Russia, Transmashholding is already ready to provide the country’s suburban passenger companies with the motor-car rolling stock of the latest models meeting the highest requirements for convenience and safety of passenger transportation.

EP2D developed on Demikhovo Machine Building Plant (DMZ). The appearance of the new electric train was made possible by combining the experience of the leading domestic manufacturer of the motor driven rolling stock and the energy of the young design team.

The engineers faced a difficult task: taking the equalization to the world trends in the field of construction and design of the rolling stock, to

create an electric train in an affordable price category. This is very important for Russian suburban passenger companies, because, despite the support from the government, there is as yet no unambiguous answer, at the expense of what means they need to update their rolling stock, obsolete physically and morally.

Demikhovo Machine Building Plant managed to reach a compromise in this issue - the wide use

CALCULATIONS DEMONSTRATE HIGH ECONOMIC EFFICIENCY OF OPERATING THE EP2D. THE COST OF OWNERSHIP OF THE ELECTRIC DRIVE ON THE LIFE CYCLE WAS 20-50% (DEPENDING ON THE MODELS OF THE COMPETITORS).



of import substitution allowed to create a modern product that meets all the requirements for rolling stock today. The designers of DMZ implemented the concept of creating a lightweight electric train, which, unlike the products of other manufacturers, can consist of two or three cars, which significantly increases its efficiency on routes with a small or pendular passenger traffic.

Most EP2D components are manufactured in Russia, which allows to avoid the sanctions risks associated with the acquisition of spare parts and consumables abroad, and make the train competitive at a price. The train's building work involved more than 50 enterprises located in different regions of Russia. At the moment the level of localization of production is about 90%.

Every opinion is taken into account

Any manufacturer will confirm that when you create a new product, there is nothing more important than to listen to the wishes of the consumer. That is why, working on EP2D, the specialists of the Demikhovo Machine Building Plant first of all turned to all those who deal with electric trains every day. The wishes of Russian suburban passenger companies were analyzed; the expectations of passengers spending in the train several hours a



The Interior cabin and the driver's cab of the EP2D



**VLADIMIR MOISEEV,
General Director of OJSC
«DMZ»:**

— *Modern rail transport should be safe and comfortable for passengers - our new electric train, no doubt, meets these conditions. The main advantage of EP2D is the ability to form suburban trains of short composition (2-3 cars), and this guarantees economic efficiency of transportation in remote areas where passenger traffic is small. I can say with confidence that the Demikhovo Machine Building Plant is ready to supply the suburban rolling stock market with a full line of modern electric trains suitable both for use in the megacities zone and for sparsely populated regions.*



Your train for any direction

Following the compact two-car model, the company began developing EP2D standard components for the largest Russian suburban operator - the Central Suburban Passenger Company (CPPK). The 11-car train, built taking into account all the wishes of JSC "CPPK", was designed for large volumes of traffic in the capital region: some of the seats in the cars were placed in a 2 + 2 scheme, which allowed increasing the capacity of the electric train during peak hours; the number of seats was reduced; in the cabins and lobby there were convenient handrails for standing passengers. Since 2016, trains manufactured under this standard have been delivered to the CPPK (currently 352 cars are in service).

Thus, an electric train appeared in the range of Transmashholding's products, suitable for both large and small suburban carriers. The profit is primarily economic - it is possible to form trains from 2 to 12 wagons for the needs of a particular customer and the volume of passenger traffic.

Calculations made by the specialists of Transmashholding demonstrate the high economic efficiency of EP2D operation. In comparison with other modern proposals presented on the Russian market, the cost of ownership of an electric train produced by DMZ throughout the life cycle was lower by 20-50% (depending on the models being compared). Also potential savings due to lower cost of compulsory periodic maintenance and routine repairs is estimated at 40%. The lifetime of the electric train EP2D is 40 years.

In addition, suburban companies with the help of short-composed EP2D can form their own fleet of electric trains and do not spend money on renting rolling stock. There is no need to send long half-empty trains on the line, and consequently, energy consumption and maintenance costs are reduced.

Internal filling of the passenger cabins will also be developed in accordance with the wishes and requests of a particular customer. After all, for the rolling stock used in the regions, the requirements are radically different than to those that serve densely populated areas. Passenger traffic in the regions is much smaller, the distance of transportation is longer. Therefore, in the electric train it is possible to install more seats, the inputs and outputs from the car can be designed for two types of platforms: high and low.

Modern, eco-friendly and economical

The EP2D embodies progressive technical solutions aimed at improving passenger comfort and safety.



ALEXEY MOGUCHEV,
technical director of the
DMZ:

— I was the chief designer while for the EP2D. It was interesting to work on this project: in a short time we put on production a new model of the electric train, in which the technical solutions were used, and also made design changes ensuring compliance with the requirements of the Technical Regulations of the Customs Union. The rolling stock was developed taking into account the opinions of passengers and the wishes of suburban companies for economic and operational indicators, the interior and exterior of the train were completely updated. The product turned out to be worthy - in 2016 the electric train EP2D became the winner of the All-Russian competition «100 best goods of Russia».



to local information and entertainment portals via Wi-Fi with the ability to access the Internet so they will not get bored on the way.

Particular attention was paid to safety issues when developing a new rolling stock. It is safe to say that EP2D meets the most stringent requirements in this field. Train wagons are equipped with passive safety systems (crash systems), which, with a possible accident, can significantly reduce the damage to the health of passengers and locomotive crews.

Thanks to the modern video surveillance system installed in the cabins of the train, the driver has the ability to control everything that happens in the salons and tambours ahead of the train, as well as to monitor the pick-up and drop-off of passengers and the position of the current collectors. The cabs of the EP2D operator are equipped with the latest diagnostic systems, which will allow timely troubleshooting and quick troubleshooting.

Within the framework of the International Railway Salon "Expo 1520" Transmashholding presented to the attention of suburban companies and passengers a sample EP2D painted in eco-style: to date, electric trains are considered one of the most environmentally friendly modes of transport due to the absence of harmful emissions into the environment. Moreover, a set of energy-saving electrical equipment installed on EP2D, allows to reduce electricity consumption by 20% or more. In the design of the train, other

The trains are equipped with a new multi-circuit conditioning system with an air disinfection function. It allows you to maintain the microclimate in the cabin for a wide range of outdoor temperatures. In addition, the system itself analyzes the workload of the car and decides on the intensity of its work.

The heat and noise insulation of the cars has improved due to the use of special materials of the hull, windows and doors of a new design and hermetic inter-car transitions. Heat and noise insulation of cars has improved due to the use of special materials of the hull, windows and doors of a new design, hermetically inter-car transitions. The color schemes are also pleasing: the seats have become bright blue, green, red.

The train is equipped with everything necessary for any category of passengers: there are bicycle carriers, folding changing tables for babies, a lift, a toilet complex and wheelchair seats for people with limited mobility.

Passengers will be able to monitor the routes of their trip on the monitors installed in the passenger cabins, and they will have wireless access



Short-composed (two-car) EP2D

Presentation of the EP2D electric train to the President of Russian Railways Oleg Belozеров at the International Railway Salon Expo 1520

**EP2D:
INTERESTING
NUMBERS**

40 YEARS
lifespan

20%
reduction in electricity
consumption

40%
savings in cost of periodic
maintenance
(compared to competitors)

4000 KM
mileage repairs

2-12
number of cars
in electric trains

UP TO 50%
savings in the cost of owning
an electric train during the life
cycle

energy-saving technologies are also widely used: LED lighting in salons and tambours, LED buffer lights and passengers' landing and disembarkation control lights.

Within the framework of the International Railway Salon "Expo 1520" the new electric train was positioned as a basic technological platform for a whole line of trains of the next generation of both direct and alternating current in the segment of accessible rolling stock. The advantageous combination of low prices, proven technical solutions implemented in EP2D, as well as the possibility of manufacturing trains consisting of only two or three cars - all this interested many Russian suburban passenger companies.

Demikhovo Machine Building Plant is ready to provide all the needs of suburban passenger companies, it is capable of producing up to 500 rail cars a year. Transmashholding is confident that the majority of the passenger companies (possibly taking into account government support) will soon begin to purchase electric trains of the new DMZ model line, since the purchase of this economical rolling stock will allow minimizing costs and preserving the regional route network. And the increased level of comfort achieved in EP2D through the use of modern technologies will be to the liking of anyone, even the most demanding passenger.

WE CONQUER SEAS AND OCEANS



EVGENY VOZHAKIN,
General Director of JSC
"Kolomensky Zavod"

The development and production of modern diesel engines for the marine and river fleet is one of the strategic directions of Transmashholding's development. Many projects in this direction are being successfully implemented today by specialists of the Kolomna plant.

History of great deeds

The production of the Kolomna plant is associated with shipbuilding from the end of the XIX century. During the period of 1878-1939, the company built more than 300 units of the fleet: towing, cargo-passenger, tow-passenger, oil tankers, tugboats, oil tankers, steam dredgers, steam and diesel refueling dredgers, dry cargo and oil barges, and chalets. The plant became the founder of heat generation - in 1908 here for the first time in the world a motor ship was built, which was named "Kolomna diesel". Since the beginning of the XX century, the company has been supplying diesel engines for ships and vessels of various types: submarines, anti-submarine cruisers, pusher tugs, rescue tugs, tankers, tunnels, fire vessels, floating bases and drilling rigs,

border ships, hunter boats for underwater boats, tugs, research vessels etc.

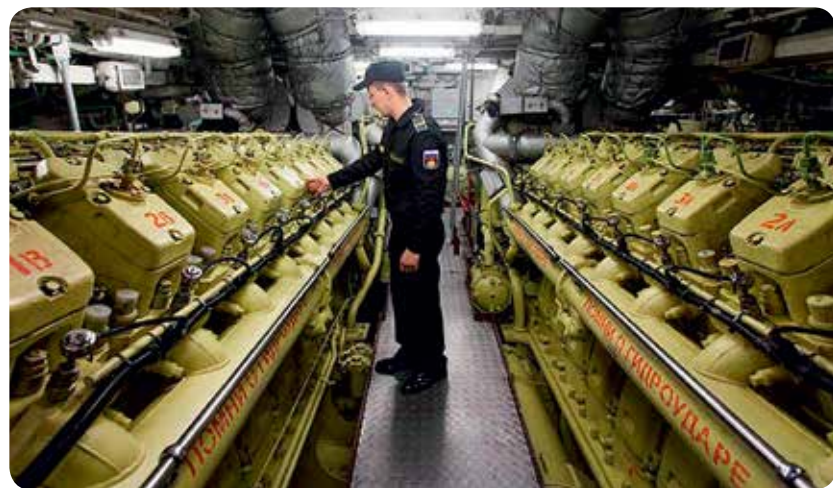
In our time, the activity of the Kolomna plant in the field of marine diesel engineering, interrupted in the 1990s, was resumed. The enterprise takes an active part in the revival of the Russian fleet - it participates in several projects of the Russian Navy for the construction of surface ships and submarines. In the latest developments of diesels for the Navy, special attention is paid to equipping them with automatic control systems, which are created on a modern element base using the latest software.

Along with special marine diesel engines of type D42 (30/38) for submarines, a number of new units are made on the basis of serial diesel engines of type D49 (26/26) of modular design. Such diesel engines were used at the diesel-electric submarine "St. Petersburg", corvettes of projects 20380 and 20385, the frigate "Admiral Gorshkov". Diesel engines pass an extended test volume directly at the factory. They simulate all possible staffing and non-standard operating modes. For this purpose, special test benches equipped with automated measurement systems have been created.

Black Sea project

In the period of 2010-2016, six submarines of Project 636.3 were built under the program of improving the diesel-electric submarines of the Russian

In the engine room
of the ship



Navy and restoring the combat readiness of the Black Sea Fleet. All of them are named in honor of cities that bear the honorary titles of "Hero City" and "city of military glory": Novorossiysk, Rostov-on-Don, Stary Oskol, Krasnodar, Veliky Novgorod and Kolpino.

The main power plant of the submarines of Project 636.3 is based on diesel generators 30DG (60CHN30 / 38) with a capacity of 1500 kW of the Kolomna plant. Diesel generators provide the life of the boat in the above-water position and when immersed up to 6 m, as well as charging the batteries. The submarines of the modified 636 project have a higher combat effectiveness (compared to previous projects). The optimal combination of acoustic concealment and target detection range, the newest inertial navigation system, modern automated information and control system, powerful high-speed torpedo-missile armament provide a world priority for ships of this class in the

field of non-nuclear submarine construction. For their secrecy the boats of this project received an unofficial name "black hole" for NATO. This project (including all modifications) is one of the largest in terms of the number of submarines built in the history of world shipbuilding. In total, more than 60 diesel-electric submarines were built for the domestic fleet and for export, currently part of the Navy of many countries. All of them are equipped with Kolomna diesel engines.

New opportunities

One of the most significant projects implemented recently was the creation of the diesel-diesel unit 1DDA12000, the main power plant for the project 20380 corvette. The power plant of the corvette has a completely unusual power scheme: four diesel engines in the form of two coupled diesel-reducer units (working name 1DDA12000) with two lines of propeller shafts. The operation of the

Corvette «Boyky»

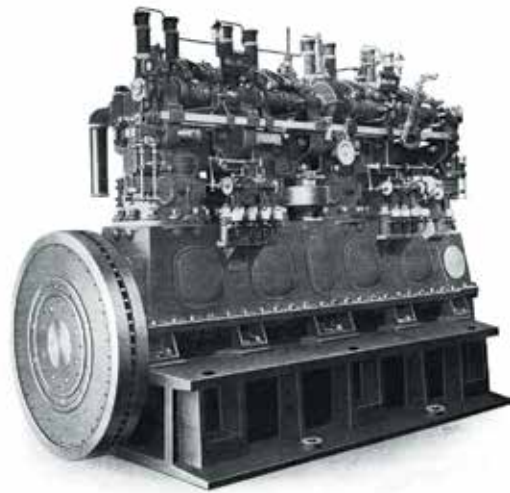


The world's first ship reverse «diesel engine»

700 engines

25 modifications of production Kolomna plant is currently operated on ships and vessels of various purposes

15% of them abroad



power plant is organized in such a way that the ship can go under one, two, three and four engines in any combination. On the basis of the 10D49 diesel, the DRRA3700 shipboard installation was manufactured for the large landing craft of Project 11711. At the present time, the first warship "Ivan Gren" is being completed. On the Frigate class ship under construction, a combined diesel-gas-turbine unit (GTU) is used as the main power plant based on the diesel engine 10D49 with a capacity of 5200 hp with automated control.. The transfer of the head frigate project 22350 to the Russian Navy is expected in the near future.. The main power plant of the "Yury Ivanov" communications ship includes two diesel-reducer units 5DRA based on the eight-cylinder 11D42 30/38 diesel engine with an

output of 1850 kW (2516 hp) produced by the Kolomna plant. Currently, the second ship "Ivan Hurs" is under construction.

As part of the import substitution program, the Kolomensky plant created the DRRA6000 diesel-reverse gear unit with a capacity of 6000 hp based on the 16D49 diesel for the main power plant of the new patrol ship. The diesel-reverse gear DRRA6000 is designed to work on a propeller of a fixed pitch. The main ship power plant of the project includes two units: DRRA6000 and DRRA6000-01 (each with a capacity of 6000 hp), which are located on the left and right side of the ship. Each unit consists of a 16D49 diesel engine built by Kolomna plant, a reverse gear drive produced by PJSC "Zvezda" and a local control system from JSC Concern "NPO "Aurora". The patrol ship "Dmitry Rogachev" - the first serial ship of this project - was unveiled at the Zelenodolsk plant in July 2014. The main ship of the project "Vasily Bykov" was equipped with a MAN power plant (Germany). A total of six 22160 ships will be built at the Zelenodolsk plant. Until 2020, all of them will supplement the composition of the Russian Navy.

The experience of operating D42 and D49 diesels on submarine and surface ships, as well as research work carried out by the team, show that they have considerable potential for expanding the scope of application for new projects.

Scientific approach

As part of the federal target program "National Technological Base", JSC "Kolomensky Zavod" per-



Diesel-electric submarine «Stary Oskol»

formed works on several ways, including the development of baseline samples of model range of the V-shaped Middle speed diesel engines and diesel-generator units of mainline freight and passenger locomotives in power 2000-4500 kW range.

A fundamentally new platform for D500 diesel engines has been created, several modifications of which have already been made and passed a set of tests. The modern four-stroke D500 internal combustion engine with a dimension of 26.5 / 31 (crankshaft speed of 1000 rpm, average effective pressure of 25.8 bar) with V-shaped arrangement of cylinders with gas turbine charging and inter-cooling is designed for a wide range of industrial products a new generation: diesel locomotives, ships, nuclear power plants. Depending on the number of cylinders (12, 16, 20), the engines cover the power range from 4412 kW (6000 hp) to 7360 kW (10,000 hp), forming a standard series, in which unified modifications are combined, differing in the number of cylinders, the level of forcing, bundling, etc. The design of the engine has reserves that can allow further improvement. At the end of 2016, the Kolomna plant became the winner in an open tender

A NEW PLATFORM FOR D500 DIESEL ENGINES, MULTIPLE MODIFICATIONS OF WHICH IS ALREADY MANUFACTURED AND TESTED AS A COMPLEX OF TESTS

"The creation of domestic ship medium-speed diesel engines with a capacity in the range of 6000-10 000 hp", which was held by the Ministry of Industry and Trade of Russia. The achievements of Kolomna engineers received the highest overall rating for the totality of evaluations, including such indicators as "Experience of the participant in the competition for the successful performance of works of comparable nature and volume" and "Business reputation of the bidder". Today the enterprise is working on the implementation of the state contract for the design, construction and testing of a prototype of a medium-speed marine diesel engine of dimension 16CHN26,5 / 31 with a capacity of 5900 kW.



The world's first motor ship "Kolomna diesel"



CONTINUOUS IMPROVEMENT PRACTICE

The interest of domestic business in improving the organization of production is growing. Large metallurgical, automotive and engineering companies are actively using the tools of modern management implementing a systematic approach, building systems based on the achievements of world leaders. Transmashholding also has its own production system.

Workshop on Bryansk Machine Building Plant

In the basis of this production system, called TPSYS (production system of Transmashholding), a Japanese philosophy of kaizen is laid, it's philosophy of continuous improvement of all processes: development, production and management. Way of Kaizen is development of standardized actions and processes. The

purpose of Kaizen is production without losses (or lean manufacturing), reducing costs, saving resources.

The results of the implementation of the system at the enterprises of TMH are very revealing. So the magazine "CEO" proposed to make on one of the plants of the holding a workshop on the theme "building an efficient production system. The results of the best projects and development of practical skills". The

HIGH-POWERED FIVE-YEAR ASSETS

Alexander Mironov, director for the development of the production system at Bryansk Machine Building Plant, called his speech at the workshop "High-powered Five Year Lean Production". In fact the results achieved by the enterprise in five years of intensive work to restructure the production system are very impressive, the use of the company's resources has become as effective as possible, and the unproductive costs have decreased.

INTRODUCTION OF THE PRODUCTION SYSTEM ON BMZ ALLOWED:

- to optimize the number of shops from 11 to 5;
- to replace 1593 machines previously involved in the production process by 333 units of high-performance equipment;
- to reduce the number of assembly positions on the line of shunting locomotives from 16 to 9;
- to reduce the number of assembly positions on the line of the main diesel locomotives (in 2015, when they began to be produced serially) from 23 to 18;
- to reduce the number of QC department remarks per unit of output by 51%;
- to reduce the number of defects in the assembly line and shunting equipment by 30%;
- reduce the incidence of injuries by almost five times.

AND ALSO:

- to introduce energy-saving technologies and equipment;
- to calculate the overall efficiency of equipment;
- to improve the technological sequence of operations;
- to build logistic flows;
- to bring warehouses closer to production sites;
- to optimize stocks;
- to introduce thousands of proposals submitted by the plant employees for improvement;
- create reference lines, a single dispatch center, supermarkets for storing, accounting and issuing details for the assembly.

EXPECTED RESULTS OF 2017 WILL GIVE (IN COMPARISON WITH 2012):

- gas saving by 7.8 times;
- energy saving by 2.8 times;
- reduction of energy costs from 599.5 to 223.6 million rubles.

event was attended by directors and Chief specialists of almost three dozen industrial enterprises of Russia.

The venue of the workshop became the Bryansk Machine Building Plant (BMZ), which is the best enterprise of the company, according to present at the event Natalia Shishlakova, Deputy CEO for Personnel Management of CJSC "Transmashholding".

It did not happen all at once

The first attempts to move to work on the principle of lean production (LP) were made at BMZ in 2010. They did not come to grips with understanding, and the leaders, specialists, and workers could not understand why they had to break the existing system. BP was skidding.

But in 2012 it was decided to create on the sites BMZ competence to produce the first freight locomotive diesel locomotives in Russia, and the time for swinging was over. It was necessary to build the production processes in such a way that at the finish, the right number of machines of the appropriate quality should be produced. This required the restructuring of the enterprise.

The unification of workshops, the re-design of logistics chains, the replacement of the combined heat and power plant with mini-boiler houses, the

The general director of JSC «UK» BMZ «Alexander Vasilenko acquaints workshop participants with the production process





alienation of unused territories gave a significant economic gain. Besides, technological labor intensity was reduced by 5%, stocks of work in progress were 30%, Russian Railways' comments per unit of output were 35%, output was rhythmic due to the output of the product in time, and the quality of products was improved.

ARSENAL OF EFFECTIVE TOOLS

Today in the arsenal of the Production System Transmashholding there are more than 20 tools:

- mapping the value stream for all major and new products;
- extension system (supermarket, complete delivery);
- double container on the assembly line TEM18DM;
- maps of sequential execution of operations;
- standard operating card;
- SWIP — initial improvement program;
- OEE (overall equipment efficiency) on critical equipment;
- TPM — universal maintenance of equipment;
- FMEA — failure analysis;
- QRQC — tool for quick response to problems;
- stand of visual management;
- risk assessment on labor protection.

Step by step

But for the management of the enterprise there was another global task - to explain to people the values of production, to teach business, to involve them in the process of continuous improvement. And in this direction, too, a tremendous work has been done:

- pilot sites were designated;
- mandatory five-minute meetings began to be conducted ;
- everywhere and consistently lean tools were implemented, primarily SC (sorting, keeping order, keeping clean, standardizing, improving). These methods of creating an effective workplace were understandable to the factory workers, and very soon it turned out that the execution of simple actions makes the workflow more convenient;
- regular audit of workplaces;
- X-matrix for cascading purposes was created - from the level of the CEO to the site master;
- universal training of personnel for LP tools under the standard program was implemented.

The material motivation also gave effect: for the implemented proposals for improvements, which, for example, only from September 2014 to October 2017 filed 11,263, the authors of the proposals began to pay remuneration.

The general director of JSC "UK" BMZ "Alexander Vasilenko emphasizes that the LP allowed to build a reference line for the production of main locomotives and modernize the production of shunting. BMZ has become an enterprise with sustainable development and keeps a focus on an important component of modern production - the introduction of a contract for the life cycle of products.

Supermarket in the area of shunting locomotives

Electronic terminal for accounting for actual labor input and monitoring of production operations

With own eyes

It turned out that the majority of participants in the workshop are familiar with the BP as an instrument of rational use of resources only in the first approximation. Therefore, access to the production site - in order to see everything with own eyes and correlate theoretical calculations with visual results - was necessary. "Practical work" caused real, sincere interest.

The stages of production of trunk and shunting locomotives at BMZ participants of the practical tour were introduced by the CEO of JSC "UK" BMZ "Alexander Vasilenko. The production system director Alexander Mironov and the head of the lean manufacturing department Mikhail Yain told and showed how the so-called supermarkets provide systematic storage, accounting and delivery of parts to production sites. This project was launched at the plant in 2016 and significantly optimized the process of supplying parts to the plots. I was interested in sightseers and why the terminals are installed and for what they are intended, which reflect the inserts of the indication of equipment operability, which is convenient for bar coding. In the role of teachers were also masters, shop managers, specialists of the Directorate of Operation. And everyone was equally enthusiastic, informed about the changes in their shops and in the plant as a whole, about the impressive results of these changes.

Alexander Vasilenko at the opening of the workshop said: "The continuous perfection of the production system is in place. And our team, whose work resulted in visible improvements, does not stop. We are moving forward." Keep it up, BMZ!



FEEDBACK FROM PARTICIPANTS OF THE PRACTICUM

ANDREY VISHNEVSKY, Chief Engineer of Kemerovo Joint-Stock Company "Azot":

- It was very interesting to see that the system works in a complex way. It can be seen that all specialists are motivated, they are interested in working and they see in what they do and have done, great benefit. And it's really valuable.

ALEXANDER SEMENOV, Director of LLC "MP" Agrotec "(Saratov):

- I took part in a similar workshop at Rosselmash and thought I saw a high level. But here I was really surprised by the fundamental and deep work experience. I really liked the practical lesson, which was conducted by factory specialists, who taught how to build a sledge of the value stream, to identify losses.

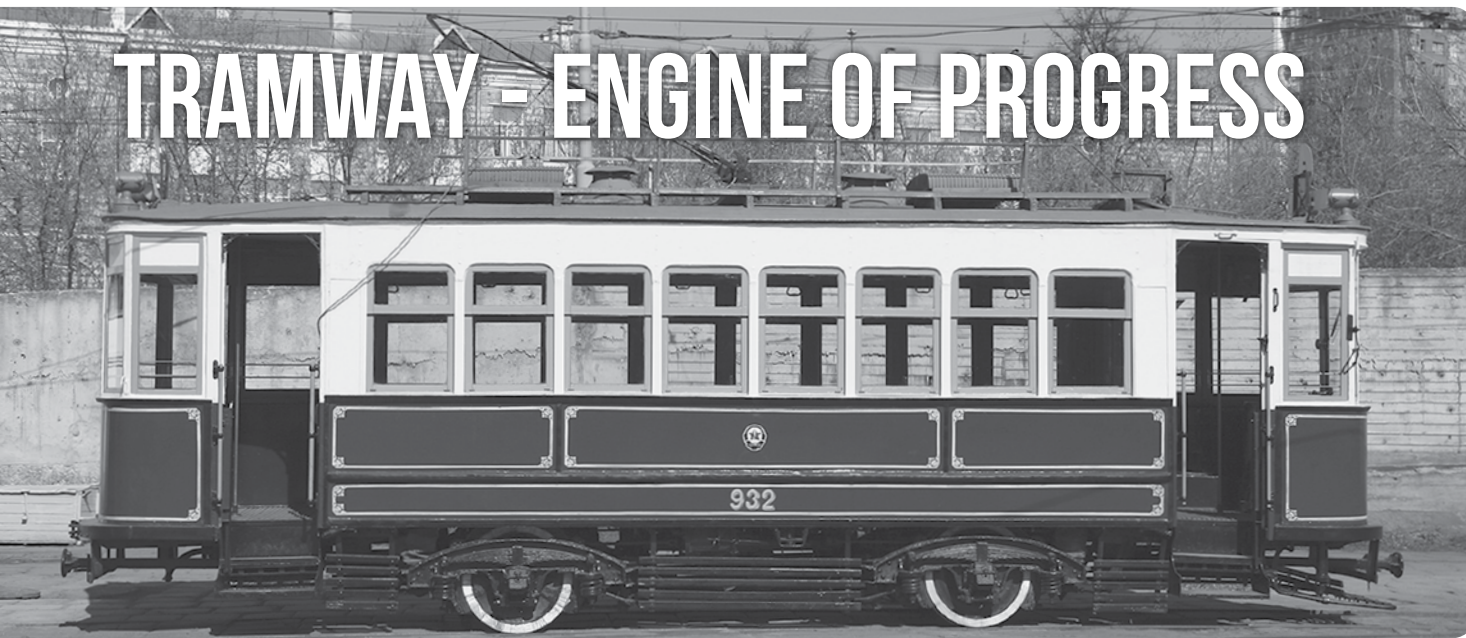
YURI ISAKOV, Director for Personnel Management, Social Affairs and Regional Policy, Novocherkassk Electric Locomotive Plant:

- The workshop is very informative, there is much to learn. The plant itself made an indelible impression. I have an idea of what it was like, and amazed at the changes, the way it became due to the titanic work of the team of like-minded people headed by the CEO. Here, in a good sense, the virus of lean production was able to spread among the work collective.

OLGA KASYANOVA, LLC "Remplazmatsentr" (Lyubertsy):

- The production is exemplary, I did not see the best. We traveled a lot around the enterprises to learn, but the impressions were mostly somewhat depressing. And here it is clearly shown, what can and how production should be, if business is built on the principles of BP. Stands of visual management will be introduced at home!

TRAMWAY - ENGINE OF PROGRESS



At the end of the XIX century, Russia became the fifth country in the world after England, Germany, the United States and France, where an electric tram began to be used as a city transport. The first domestic tram was built in Kolomna and was intended for Kiev. However, very soon similar miracle machines appeared in many cities of Russia and, of course, in Moscow.

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The founder of the Kolomna plant, Amand Struve, offered the authorities of Kiev several types of transport: horse, steam and electric trams. However, he managed to prove the economic feasibility of electric traction for urban transport. As a result, exactly 125 years ago, in July 1892, the first domestic tram left for the streets of Kiev. And several

KM and KP cars operated in the cities of Arkhangelsk, Baku, Barnaul, Voronezh, Gorlovka, Ekaterinburg (Sverdlovsk), Zaporozhye, Kazan, Krasnodar, Moscow, Nizhny Novgorod (Gorky), Novokuznetsk, Novosibirsk, Noginsk, Odessa, Orel, Orsk, Perm (Molotov), Riga, Samara (Kuibyshev), St. Petersburg (Leningrad), Kharkov, Chelyabinsk and Yaroslavl.

years later similar trams appeared in other cities of the Russian Empire.

With flashlight and without it

The first order for trams for Moscow was received by Kolomna plant in April 1907 - it was then that the serial production of trams began.

They were trams on Becker's single-axle bogies, electrical equipment was supplied and assembled by Westinghouse. In the tram park of Moscow, these cars received city numbers 213-253.

Supplies of large quantities of tram cars to St. Petersburg and Moscow did not go unnoticed. From May 18 to May 25, 1908, the XI International Shipping Congress was held in St. Petersburg. And on May 30 of the same year, 100 participants of the congress arrived in Kolomna. At the plant guests were shown ready-made vessels, locomotives and trams. They were proudly demonstrated even to the English, who were experienced in these matters.

In 1909, 90 motor carriages were produced for the Moscow tram on the Becker system bogies (No. 254-343), to which, however, the plant made significant changes. The most important of these are the reworked lever brake system and the reinforcement of the body by a reverse sprunger. The electrical

Motor car BF for Moscow.



In May 1985, San Francisco hosted the International Exhibition of Operating Retro Tramways, in which a tram built in 1912 - a car No. 106, that half a century served the Muscovites - took part.

equipment was supplied by Siemens-Galske. In addition, an order was made for 60 four-axle trailer wagons with electrical equipment from VCE (No. 1157-1216), of which 31 wagons with Becker brakes and 29 with Westinghouse brakes.

In these cars Kolomna specialists used two-axle bogies with wheel pairs of different diameters (the small-diameter wheel pair played the role of a guide).

At the end of 1910 the plant fulfilled the order for 25 tram cars for Moscow (No. 634-658). The first batch of 10 cars (No. 634-643) arrived at the Ryazan (now Kazan) railway station on December 20, 1910. All the motorcars built for Moscow were of the same design, on the Becker system trolleys; there were only minor differences in the body structure. After 1917, these trams in Moscow received a series of "F", which meant "flashlight", that is, with a light flashlight, or lantern, on the roof.

After the revolutionary events, the Civil War and the known difficulties of that time, the plant returned to making trams in the middle of 1923. The enterprise again began to manufacture trams for Moscow, it was decided to start the production of a new type of car. Changes affected mainly the body, which was raised ceiling, as well as the construction of windows. The light lantern on the roof was abolished, and as a result this type of tram got a series of "BF" — "without a flashlight". Its appearance turned out to be quite recognizable, and the BF tramway became a characteristic feature of the capital for a while. In total, the Kolomna plant in the period 1925-1928, produced 185 trams of type BF, which arrived in the park of the Moscow tram.

More space - less wood

In 1926, the wagon department of the Kolomna plant was tasked with designing a wagon of large

capacity for Moscow. As a result, a four-axle wagon with a body was developed, the rigid construction of which consisted entirely of metal parts, on trolleys with stamped sidewalls. In 1927, two four-axle motor cars (No. 2001 and 2002) were ready and they were delivered to Moscow for trial operation. Serial production of these cars began in 1928. Trams received a series of "KM" - "Kolomna motor". In the same year, a four-axle trailer car was designed at the Kolomenskoye plant, which received a series of "KP" - "Kolomensky trailed", designed to work in pairs with KM. By design, the new cars were significantly different from trams of type KM. Part of the KP cars built by the Kolomna plant had two doors only on the starboard side - they were destined for other cities of the Soviet Union. In total, the company produced 416 trams of type KP.

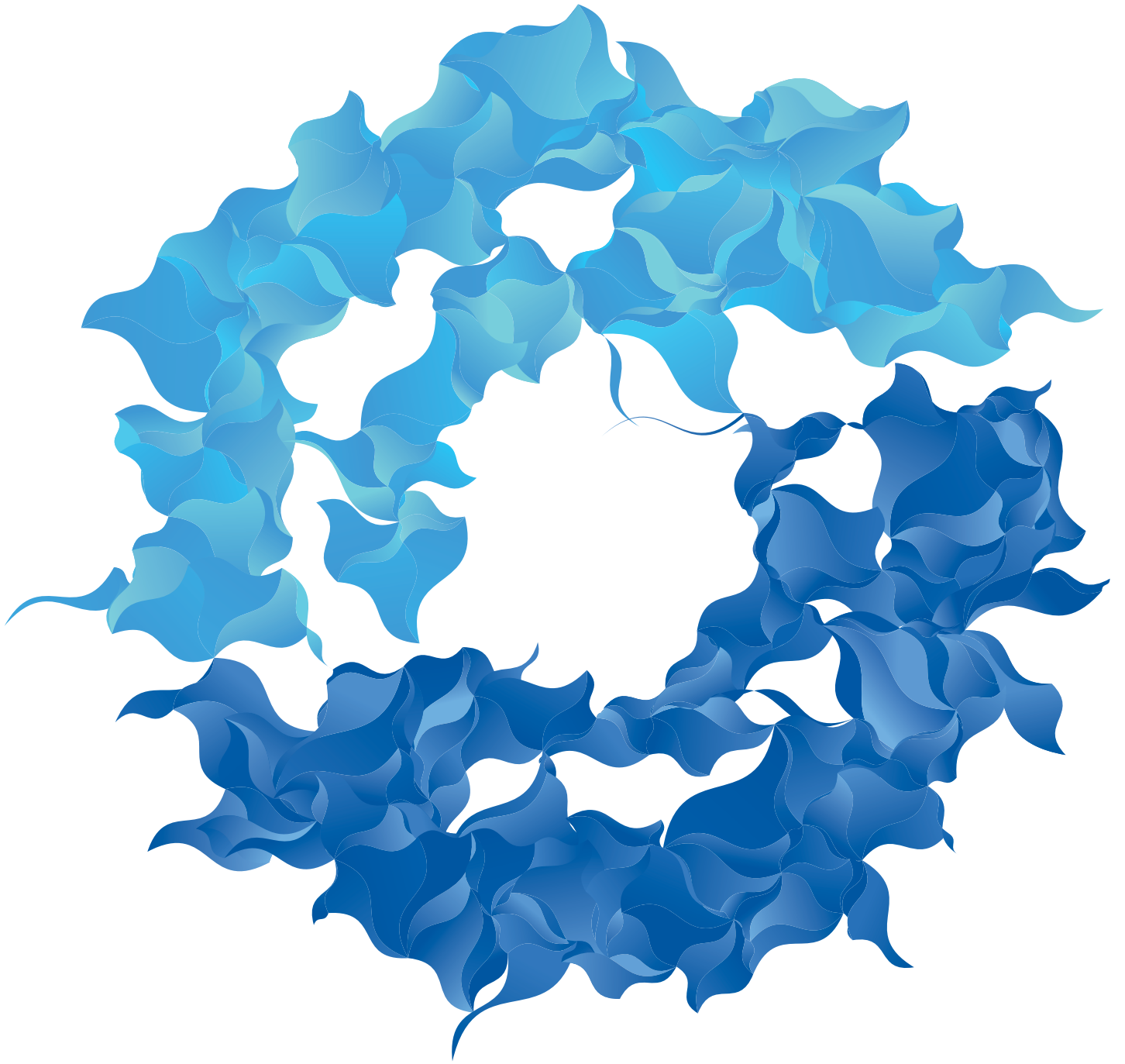
Kolomna trams like KM and KP have lived a long life. The longest time they were exploited in Gorky (now Nizhny Novgorod) - until 1970 and in Moscow - until 1974. KM-type wagons in the capital began to be written off when Moscow began to receive large quantities of cars from Czechoslovakia. The last KM cars were put off from work at the end of 1974, and they were in good order and were written off only because of the moral aging.

Today in Moscow, trams KM No. 2170 and KP No. 2556 have survived. Another such train is in Nizhny Novgorod, with KM on its original carriages.

Tram KM 2170 on the Parade of trams in Moscow. 2015



Cars KP, converted into motor, went and in Kolomna for 20 years (until 1968). Currently, one KP car (No. 204, motor) has survived in the city - now it is a special car-tower for maintenance of the contact network.



We are 15!