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A publication for partners
of Transmashholding, CJSC

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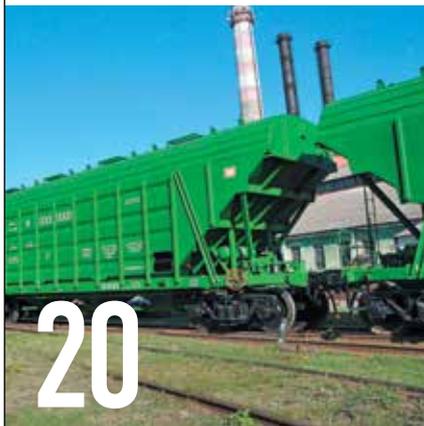
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Celebration

Anniversary Cast in Steel



Bezhitsky Steel Plant (BSZ) has turned 80. All these years BSZ has been providing high-quality steel castings to car repair plants and rolling

stock manufacturers. During its long history, the company has produced more than 6.4 million tons of casting.

Today BSZ has become one of the largest Russian enterprises for the production of steel castings. It produces more than 300 kinds of steel castings of high reliability and excellent quality for the production and repair of freight and passenger cars. The nomenclature list includes bogie frames, span bolsters, couplers, cushion units, yokes, and more. The quality and reliability of products are some of the best among similar companies in Russia. These products are in demand both in Russia and abroad.

Modernization

The Black Hole

A new submarine with the main propulsion by the Kolomna Plant has joined the Russian Navy.

Admiralty Shipyards JSC in St. Petersburg hosted a ceremony of raising St. Andrew's flag on the diesel-electric submarine «Krasnodar» (Project 636.3). The «Krasnodar» is the fourth in a series of six submarines under construction for the Russian Navy at the facilities of Admiralty Shipyards. The main propulsion units for these submarines are based on 1500 kW diesel generators

30DG (6ChN30 / 38) by Kolomna Plant JSC.

Diesel generators drive the systems of the U-boat while on the surface and when submerged up to 6 meters and charge its batteries. Diesel-electric submarines of modified Project 636.3 by the Rubin Central Design Bureau for Marine Engineering are better in comparison with the previous modifications in terms of combat effectiveness due to an optimum combination of acoustic discretion and

target detection range, the latest inertial navigation system, modern automated information and control system, and powerful high-speed torpedoes and missiles.

The NATO has nicknamed the submarines of this type the «Black Hole» for their stealth properties.



Prospects



You've Got Mail

Tver Carriage Works (TVZ) has built 50 new railway cars for Russian Post.

TVZ recently hosted a special car delivery ceremony. The contract for the supply of 50 cars of models 61-4504 (with baggage compartment only) and 61-4505 (equipped with facilities for the staff) was signed late October this year. Russian Post received funds for the renovation of their rolling stock from the Government of the Russian Federation as part of the state support program for the railway car-building industry.

«Orders for railway cars for Russian Post and the Interior Ministry, which the plant received thanks to the measures of state support, have enabled us to keep the production workshops busy, — says Andrey Solovey, CEO of TVZ. — This in turn has allowed us to retain the workers as well as an important nationwide competence — that of building passenger railway cars.»

Baggage and mail cars are a new type of products for the Tver Carriage Works. Their designers had in mind the wishes of potential clients who are interested in carrying more cargo, while reducing operating costs.

Collaboration

Metro Upgrade in Nizhny Novgorod

Metrovagonmash is to repair 20 subway cars for the Nizhny Novgorod Metro.

According to the contract, by December 2017 Metrovagonmash is to deliver to Nizhny Novgorod Metro five four-car trains (10 control cars 81-717 and 10 middle cars 81-714). In accordance with the terms of reference, all bodies and bogies will be repaired within the overhaul activities. Bodies

shall be checked for defects such as cracks in the metal and welds, scores, deformations, dents, corrosion damage to metal, problems with suspension brackets. Detected defects will be eliminated as part of the upgrade program. The body will be coated with a special anti-corrosion enamel. Thresholds of sliding doors will be replaced with new ones with slits. Braking and pneumatic equipment will

be upgraded; pneumatic doors will be completely replaced. The cars will get a new electrical system as well as an automatic fire detection and suppression system. The car interior will be upgraded too: vandal-proof cushions with frames made of nonflammable fiberglass will be installed. The backs and seats of benches will be upholstered with fire-proof imitation leather.

Production



Special Order for RZD

Tver Carriage Works (TVZ) executed a contract to supply special escort cars.

All together from May to September 2015 47 cars were produced and

handed over to Roszheldorsnab (a branch of Russian Railways, JSC).

These escort cars built by TVZ are a unique type of rolling stock for Russia. Until 2011 such railway cars

had not been developed and produced in Russia and the CIS countries, one had to adapt old passenger cars. The first prototype of a specialized car for track crews was developed in 2011 by TVZ designers in close cooperation with the concerned departments of RZD. This has allowed the company to design cars that are fully adapted to the needs of railway workers. Russian Railways bought 139 such carriages between 2011 and 2015. They have shown excellent performance.

These cars are added to the freight or repair trains and are used for the accommodation of track crews. Workers get comfortable conditions for work and recreation: there is a workshop, a storage room, a shower with a water heating system, clothes dryer, a toilet, living compartments, and a kitchen equipped with modern appliances. There is a diesel generator on board providing power for the autonomous operation of the car's technical systems; air conditioner and an autonomous diesel burner of a boiler allow the car to operate in all climatic conditions of our country.

NEVZ: focus on Im



VLADIMIR PUTIN, PRESIDENT OF RUSSIA, EMPHASIZED THE IMPORANCE OF IMPORT SUBSTITUTION OF MAIN PRODUCTS AT THE PLENARY SESSION OF SAINT PETERSBURG INTERNATIONAL ECONOMIC FORUM IN JUNE 2014. TRANSMASHHOLDING HAD MADE A DECISION ABOUT FOCUSING ON IMPORT SUBSTITUTION EVEN EARLIER: ON DIESEL LOCOMOTIVE ENGINES — AT THE END OF 2013, ON GENERATORS — IN Q2 OF 2014. NOVOCHERKASSK ELECTRIC LOCOMOTIVE BUILDING PLANT ALSO MAKES ITS OWN CONTRIBUTION TO THIS PROCESS.

The Electrotyazhmash plant (Kharkov) used to be the main producer of electric traction engines for the Transmashholding locomotives until recently. Now the holding is actively working on the replacement of this supplier.

Motors and generators for diesel locomotives are manufactured as part of the Russian program of import substitution and are included in the list of priority investment projects of the Russian Ministry of Industry and Trade. It helped NEVZ receive some budget support in the form of an interest rate subsidy on loans. RosEvoBank grants loans for the project. The payback period is three years.

port Substitution

NEW EQUIPMENT

The Novocherkassk Electric Locomotive Plant is setting up a single competence center for engines and generators for diesel locomotives, which will act in the interests of all diesel locomotive companies of Transmashholding — the Kolomna Plant, Bryansk Machine-Building Plant, and Lugansk Locomotive Plant.

New equipment has been purchased to organize the production

process. For example, the welding and body shop received a chamber furnace for heat treatment of motor housings. The machine tool fleet of Electrical Machine Shop #2 got two new machining centers. Electrical Machine Shop #1 received three new machines — an automatic banding machine, automatic collector slotting machine, and a CNC lathe for groove milling of collector plates. In December, six more units of equipment were commissioned.



**IGOR SHCHEDROV,
NEVZ CEO:**



— Our task is to ensure smooth production of a key component for the production of diesel locomotives with higher reliability and competitive cost. In addition, motors and generators for diesel locomotives are a hefty addition to our planned volume of production and the creation of new jobs.

Main characteristic of traction engines of DTK-417 type

| Parameter Name | Parameter Value for Nominal Engine Mode | Parameter Value for Locomotive Operation Modes | |
|---|---|--|---------|
| | | TEM18 (DM) | TEP70BS |
| Operating Mode according to GOST R 52776-2007 | | S1 (continuous) | |
| Rated power, kW | 417 | 105 | 417 |
| Voltage, V, in operating mode: | | | |
| continuous | 511 | 203 | 555 |
| max rotation speed | 780 | 290 | 780 |
| Armature current, A: | | | |
| continuous | 890 | 605 | 820 |
| max rotation speed | 577 | 424 | 577 |
| Rotation Speed, revs/min: | | | |
| continuous | 600 | 247 | 675 |
| max | 2320 | 1300 | 2320 |
| Efficiency factor, % | 92 | 85 | 92 |
| Shaft torque, kg-m | 672 | 415 | 602 |
| Max starting current for two minutes, A | 1130 | 1000 | 1250 |
| Braking Mode rating, kW | — | 183 | 530 |
| Cooling air flow, at least, m ³ /min | 78 | 36 | 70 |
| Static pressure of cooling air in collector chamber, Pa | 1600 | 350 | 1215 |
| Full pressure, Pa | | | 1620 |
| Maximum weight, kg | | 3350 | 2700 |



EUGENE LOSEV,
Project Manager for traction
motors and diesel locomotive
generators:

— New engines already passed the tests and were certified. A pilot batch of DTK-417P is to be made at the end of 2015; the design of all types of engines of DTK-417 series will be finalized by the beginning of 2017. The plan is to reach the production capacity of 2.5-3 thousand engines a year.

Features of DTK-417:

- Bolted collector plates. Analogues feature ring nuts and spring washers;
- straightforward extension of mica sleeves in comparison with analogues was increased by almost 1.5 times, which improves the reliability of the insulating gap between plates relative to the housing;
- the use of the collector profile made of an environmentally friendly alloy;
- there is a swiveling frame for easier maintenance of the brush assembly and installation of brushes on the normal neutral plane;
- coil springs are used in the brush holder assembly for applying pressure of tooth supports on the brushes; in contrast to the flat spiral springs, they are more reliable, easy to manufacture and maintain;
- armature coils are made of insulated winding wire;
- Engine frames and end shields are welded.



Kirill Lipa, CEO of Transmashholding (first from the left), tours the generator production shop



Motor frames together with pole systems, in the foreground — DTK-800, in the background — DTK-417TS

NEW ENGINES

The plant mastered the production of traction motors for passenger and freight locomotives — DTK-417R for Kolomna diesel locomotives TEP-70BS and DTK-417TS for Bryansk locomotives 2TE25km.

When developing own electric motors of DTK-417 type, NEVZ specialists of the serial products division have applied proven design and technological solutions, which are supported by positive experience of operating collector traction motors for electric locomotives. Design features of the

new engines setting them apart from their prototypes — ED-133, ED-150 (Kharkov) and ETL-133 (city of Lysva) — will further improve their performance and operational reliability.

Application of new design solutions allowed the company to unify some parts required for the manufacture of DTK-417 frames with different types of suspension and lubricants for motor-axial bearings. The innovation has also helped to eliminate the technological waste casting, improve durability and reliability of the collector assembly, and provide greater insula-



Another DTK-417R engine is ready for shipment

Engine design features

| Parameter Name | DTK-417C, Novocherkassk | Analog | |
|---|----------------------------|-----------------|----------------|
| | | ED-133, Kharkov | EDU-133, Lysva |
| Rated rotation speed, rot/min | 600 | 600 | 600 |
| Nameplate rating, kW | 420,2 | 417,7 | 417,7 |
| Rated voltage, V | 511 | 511 | 511 |
| Rated current, A | 890 | 890 | 890 |
| Maximum current, A | 1130 | 1130 | 1130 |
| Efficiency, % | 92,4 | 92 | 92 |
| Insulation thermal resistance class, frame/armature | N/N | N/N | N/N |

tion efficiency for engine components to ensure their increased operational reliability.

NEW GENERATORS

NEVZ is developing the production of three types of generators for mainline freight and passenger locomotives — GTSN-2800, AT2S-2800/600, AT2S-2800/400 designed for locomotives 2TE25KM, 2TE116U, TEP70BS and 2TE25A.

The generator section received high quality equipment. For example, two units for soldering current-carrying elements of the stator were acquired from SEIT Elettronica (Italy), as well as a swing jib crane produced by VVmZ (city of Kirov). A vacuum pressure impregnation set by Meier, Germany, was put into operation. This will greatly improve the quality of electrical insulation work and accordingly the quality of the generators.

The prototype generator GTSN 2800 was produced and provided for electrical and acceptance tests that

THE GENERATOR SECTION RECEIVED HIGH QUALITY EQUIPMENT. THIS WILL GREATLY IMPROVE THE QUALITY OF THE GENERATORS

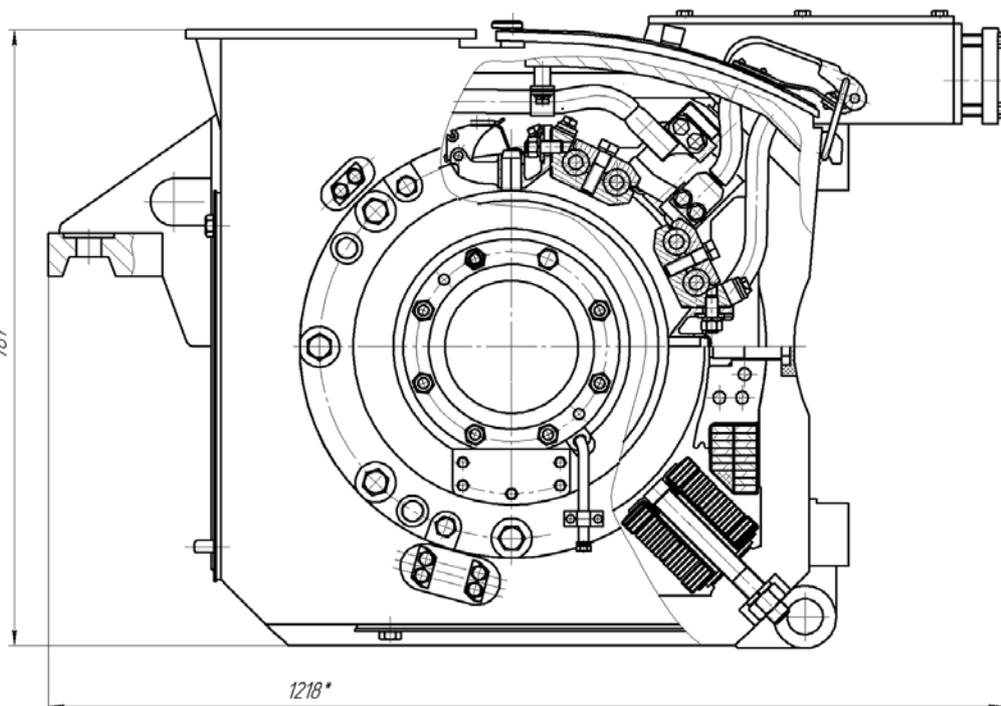
should confirm its compliance with the design documentation. Specially trained personnel who will have studied the design and production of generators will make the generators. Housing parts for generators are made by Tsentrosvarmash JSC under the intercompany cooperation program. Cast rotor parts are made by Mashstal (city of Penza). With the exception of a few minor components produced by partners, everything else is homemade.

100% of materials and components are made in Russia.

This project is being implemented for the needs of Transmashholding enterprises building diesel locomotives. However, the Locomotive Repair Plant Lokotekh LLC and locomotive depots of Russian Railways are among other potential clients for this new product. 

Written by Anna Semenyuk
Photography by Dmitry Ibraimov

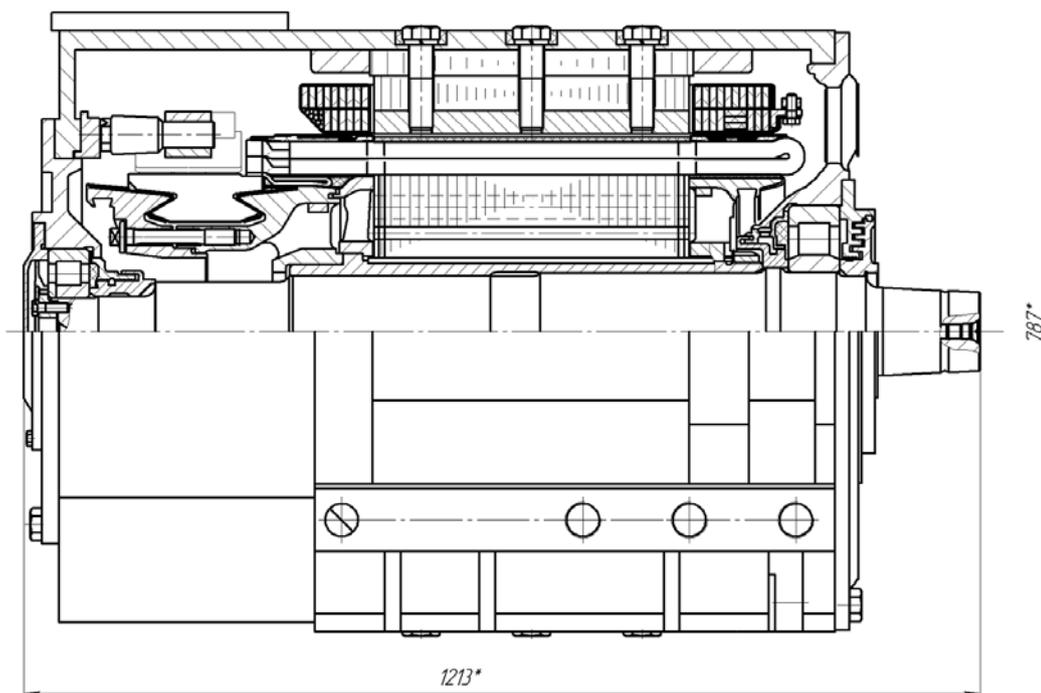
WHEN DEVELOPING IN-HOUSE ELECTRIC MOTORS OF DTK-417 TYPE, NEVZ SPECIALISTS OF THE SERIAL PRODUCTS DIVISION HAVE APPLIED PROVEN DESIGN AND TECHNOLOGICAL SOLUTIONS



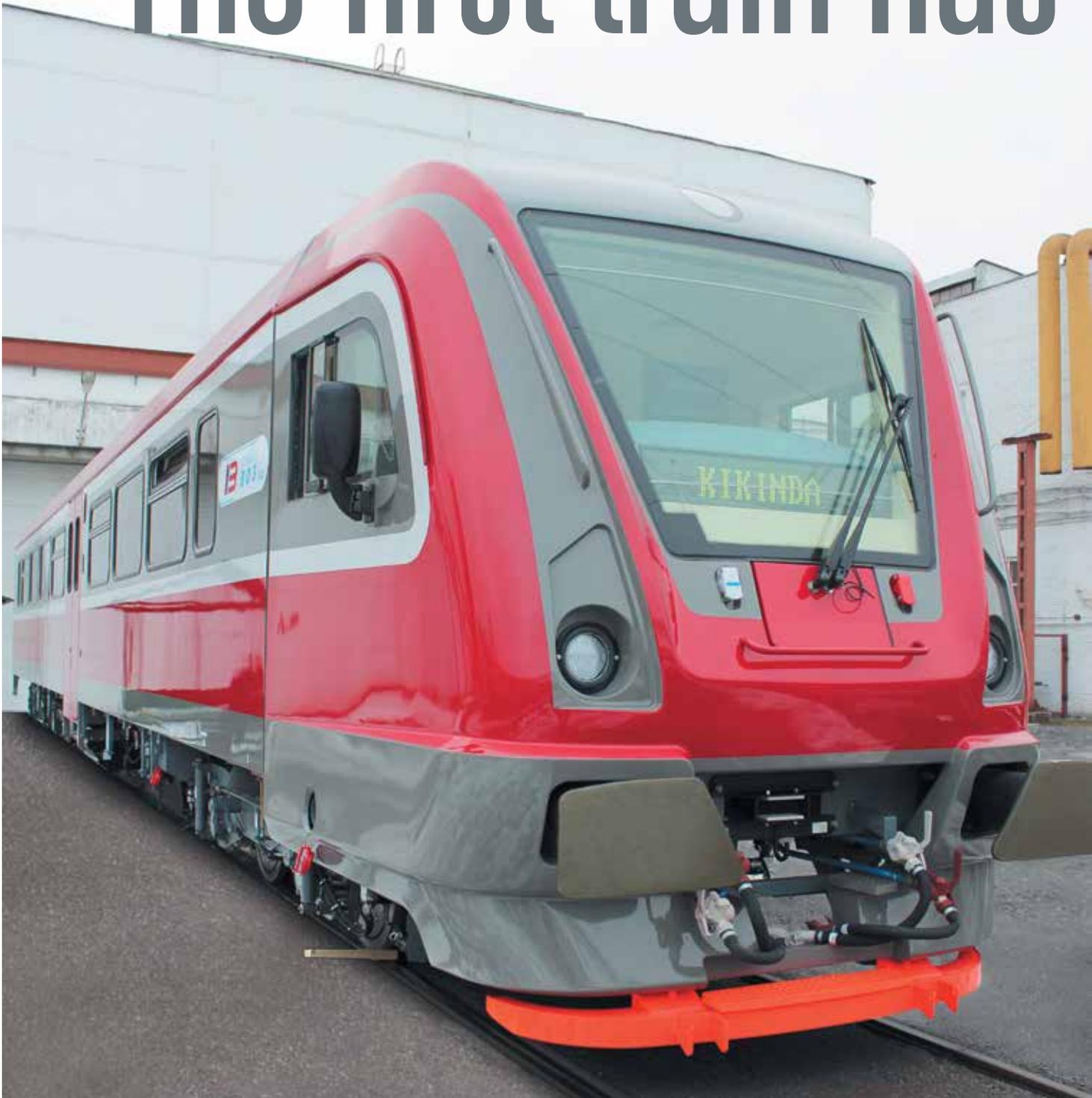


Assembling a generator rotor core

Engine
DTK-417P



The first train has



departed for Serbia

IN DECEMBER, METROVAGONMASH DELIVERED A DPS TWO-CAR DIESEL TRAIN TO SERBIAN RAILWAYS. THE AGREEMENT PROVIDES FOR THE DELIVERY OF 27 SUCH TRAINS TO SERBIA.

The cooperation between Metrovagonmash and Serbian Railways has a solid foundation.

The contract for the supply of diesel trains, signed in the autumn of 2014, was the third one in a row for the parties. Today, 12 diesel trains delivered in 2010-2012 are successfully operated in the Republic of Serbia.

The diesel train is designed for railways with a track gauge of 1435 mm, common in most European countries.

The diesel train is used on non-electrified railways, with part of the route passing through the electrified section of 25 kV 50 Hz. The average distance between stops is about 5 km, and the standard maximum speed is from 60 to 100 km / h.

doors manually if the train speed does not exceed 5 km / h. The doors are controlled by the train driver via the remote control or by passengers using the buttons located next to each door.

The passenger cabin has 120 second-class seats with armrests, including 10 hinged ones.

COMFORT AN SAFETY

The diesel train cars are designed in such a way that the trip is most

convenient for all passengers. Intercar walkways allow passengers to move safely and comfortably through the train. The driver's cab and the passenger cabin are equipped with a modern system of heating and ventilation. The temperature in the passenger compartment is maintained automatically. At the same time, the driver can remotely enable / disable the heating, ventilation, and air conditioning systems from his cabin. The train has a

BOARDING ANYWHERE

The train uses modern two-axle motor and trailer bogies produced by Metrovagonmash. Passengers can board and leave the train from high and low platforms, as well as from the ground level.

Each car has a double-wing passenger door 1300 mm wide. Under the door there are steps consisting of two fixed and two sliding footrests. The door is electrically driven. It is equipped with an anti-gripping system. The doors are locked remotely after closing. At the same time, it is possible to unlock the



Service signs and instructions are made in Serbo-Croatian at the request of the customer



Modern interior with open walkways

special area for strollers and wheelchairs, bicycles, and bulky luggage.

Each cabin is equipped with ventilation, heating, and cooling systems, protection and control panels, and cabinets for additional equipment.

The dashboard includes systems to control motion and basic operational characteristics.

The walls, ceiling and floor of the body are heat and soundproofed to prevent freezing and condensation. All insulation materials are heat resistant and made of natural raw materials.

The train is equipped with modern fire-extinguishing systems that are installed in all areas where there is a risk of fire. Information from the sensors gets

to the control cabs in the form of light and sound signals.

CONTROL CAB

Cabs are designed so that the driver can work in the best possible conditions. Each cabin is equipped with ventilation, heating, and cooling systems, protection and control panels, and cabinets for additional equipment.

The dashboard includes diesel train and basic operational characteristics control systems that are used to control the movement. They also warn the driver of emergencies, provide communication with passengers, control opening / closing of doors and signal lights. In the driver's cab, there is a button to control closing of doors, as well as additional indicators of their position.

There are control monitors, including equipment for receiving images from fixed camera, in each cab. Built-in displays have good contrast characteristics and do not dazzle the driver under any lighting conditions. There is a video surveillance system to monitor the passenger compartment.

There are automatically driven, electrically heated rear view mirrors outside. Sunshades protect side windows of the cab, and the windshield is equipped with wipers.

Air-conditioning in the driver's cab is compact and located on the roof of the car. Depending on the season, the system uses air channels to work only in the recirculation, heating or cooling mode. The heating system of the driver's cab consists of the «liquid — air» heat



Comfortable and stylish seats

THE DIESEL TRAIN CARS ARE DESIGNED
IN SUCH A WAY THAT THE TRIP IS MOST CONVENIENT
FOR ALL PASSENGERS



Toilet Module

delivery device and the electric heater. The air temperature in the cab is automatically controlled when working in the heating and cooling mode. The ventilation system is equipped with filters that clean the air of at least 95% impurities.

The sound system consists of the two-tone warning siren that is located on the roof of the cabin. The acoustic signals are electrically-pneumatically controlled. The train is equipped with modern passenger information systems.

RELIABLE BRAKES

The brakes of the diesel train are produced by KNORR-BREMSE and meet all European standards. In the cab and the passenger compartment there are emergency braking devices. In the

passenger compartment, they are installed near each door, and the driver may delay their action.

In case of rapid emergency brake application for the fully loaded train



moving in a straight line at a speed of 100 km / h, the stopping distance is 700 m.

The brake system allows one to:

- automatically switch from the hydraulic to friction brakes at a speed below 25 km / h;
- gradually brake and put off the electro-pneumatic brake from the driver's cab;
- force-brake using automatic braking when the train's pneumatic ducts are disconnected or the dead-man's vigilance device is triggered.

The train is equipped with an anti-skid system. It prevents the wheelsets from blocking while braking, as well as from sliding, which can lead to defects.



THE CABS ARE DESIGNED
IN SUCH A WAY THAT THE DRIVER
CAN WORK IN COMFORT

The driver's dashboard has pressure gauges that display the pressure in the brake and main reservoir lines, as well as in the brake cylinders of both bogies of a car. The accumulating spring brake of the train is controlled automatically from both cabs.

INFORMATION SYSTEM

The information system of the diesel train includes a route indicator, information displays, speakers in the passenger cabin, «passenger-to-driver» communication, the control panel with display for the system itself, and the onboard video surveillance and data storage units.

Audible and visual messages are communicated to the passenger compartment in the automatic mode or by the train staff.

Information displays showing the route are located on both ends and on the sides of the diesel train. They are clearly visible day and night. The information displays for the passenger compartment are located on the partitions inside the compartment. The interior display uses light-emitting diodes, and the outer one uses flip-dot black and yellow elements. The displays have built-in internal surveillance cameras.

The passenger information system is controlled from the driver's control panel. Prior to departure, the driver puts in



Assembling of the diesel train in the Metrovagonmash shop

information about route stops. It is displayed automatically, and the driver can stop the flow of information into the passenger compartment at any moment.

There are holders for railway maps and text information on partitions and in the standing area.

LIGHTS AND SIGNALING EQUIPMENT

The passenger compartment is illuminated by two rows of fluorescent lights. There are also fire sensors and speakers there.

The lighting in the passenger compartment is designed to operate in full, economical, and emergency modes. It consists of two lines of fluorescent lamps.

There are incandescent lamps in the vestibule and driver's cabin.

At the end of the diesel train, there are white and red lights, and in the middle of the top part there is a powerful white spotlight. The lights use LEDs, and the spotlights have halogen lamps. Depending on the direction of the train, white or red lights are put on. The spotlight has two operating modes: a «dimmed» and «bright» one.

CLIENT'S WISHES ARE ALWAYS A PRIORITY

Metrovagonmash JSC made a number of modifications to the DPS diesel train design according to customer requirements. The Serbian side expressed them given the experience of operating first 12 trains.

In particular:

- The guiding rail of the sanitary unit radial door was modified;
- LEDs in the spotlights have been replaced by halogen bulbs;
- lights located above the passenger entrance door and the intercar walkway got LEDs;
- design of the direct vision window in the cab was changed;
- the lock on the cab door was modernized.

With these adjustments, the train became more resistant to vandalism; now it uses consumables that are easily available in Serbia. 



Specifications

| | |
|--|--|
| Operating life | 30 years |
| Gauge | 1435 mm, -5 +30 mm |
| Axel configuration | Bo'2'-2'Bo' |
| Braking distance | under 700 m (at 100 km/h) |
| Number and area of installation of diesel engines | 2 under the car body, vibration-absorbing fastening |
| Group operation | Every car has its own drive (diesel engine – hydraulic transmission – driving axle) |
| Diesel engine power | 2 x 360 kW |
| Traction power | 2 x 250 kW |
| Transmission | hydrodynamic |
| Torque | through a cardan |
| Cooling of diesel engines | liquid |
| Number of doors | In each car – one two-winged door on each side |
| Body width | 2900 mm |
| Height of cars from roof to rail level | 3750 mm |
| Buffer height from rail level | 1050 mm |
| Car floor height from rail level | 1290 mm |
| Length of train buffer to buffer | 44 650 mm |
| Number of seats | 110 + 10 hinged ones |
| Standing room (4 people/m²) | 126 |
| Maximum number of passengers | 246 |
| Main seat arrangement | 2 + 2 |
| Width of aisle between seats | 0,65 m |
| Maximum load on axle | 15 t |
| Maximum weight of the train | 115 t |
| Maximum design speed | 120 km/h |
| Maximum operational speed | 100 km/h |
| Initial acceleration to v = 20 km/h | 0,7 m/s² |
| Number of motor cars | |
| Motor bogies | 2 |
| Trailer bogies | 2 |
| Cabs | 2 |
| Sanitary unit | 1 (vacuum toilet – universal for people with special needs) |

We Have Built New Generation Diesel Engines



TRANSMASHHOLDING IS ACTIVELY INVOLVED IN THE FEDERAL TARGET SUBPROGRAM TO BUILD DIESEL ENGINES. THE HOLDING DEVELOPED THREE FAMILIES OF NEW ENGINES AS PART OF THAT PROGRAM. VLADIMIR KISELEV, HEAD OF TRANSMASHHOLDING DIESEL BUILDING DIVISION, SPEAKS ON THEIR FEATURES.

STATE INTEREST

— Why the development of new diesel engines became possible only with the state support?

— Diesel engine industry requires large amounts of investments and long time to develop new designs. Basic modifications of high power diesel engine families, as a rule, are designed to be produced for 30-40 years, followed by multiple upgrades.

Investment costs only to develop new designs and prepare for their production can amount to 100-300 million euros, and for some projects up to 1 billion euros. At the same time, there are significant

technical and technological risk. No manufacturer of diesel engines in Russia is able to finance the development and adoption of new engines alone.

In October 2011 the modified concept of the subprogram «Development and organization of production of new generation diesel engines and their components in the Russian Federation in 2011-2015» was approved. It is logical that we, as a leading diesel building company in Russia, gladly accepted government support. We joined the project and decided to develop a completely new engine.

— In what tenders did Transmashholding participate?

— According to the results of the tender, we signed five government contracts. The first one is to develop an inline medium-speed engine and diesel power plants on its basis. The second one is about medium-speed V-engines. They are designed for power units to be installed on the mainline freight and passenger locomotives.

The third project is about backup diesel generators for nuclear power plants. The fourth one is the development of a set of test benches for the new engines. These are single-cylinder experimental units required for the research and testing of new engine workflow and full-size test benches for diesel engines.

The last project is to do some research work on improving the design of turbochargers.

— How are the costs of developing new engines split between the state and the holding?

— Financial details of the subprogram provide for the use of the federal budget and extra-budgetary funds invested by the contractor. About 49% of the funds for the implementation of the sub-program come from the federal budget; remaining 51% are the money of the holding.

— Why did you decide to develop three new families of engines instead of just one?

— We developed several motors of different dimensions — D200, D300 and D500. In this we relied on the projects from the subprogram. It is important to emphasize that we are not talking about just one family

HAVING PROVEN BASIC DESIGNS, WE CAN QUICKLY DEVELOP MODIFICATIONS ACCORDING TO CUSTOMER'S REQUIREMENTS FOR SPECIFIC APPLICATIONS

or type of engine, when in one set of dimensions you change the number of cylinders or the level of boost.

We have developed three full-scale lines of engines, open for the development of any modification.

Penza engine D 200 and Kolomna engines type D 300 and D500 cover the range from 500 kW to 7.5 MW. Of course, no other diesel building company in Russia was able to do anything like that. Now as we have the basic design, we can quickly develop modifications according to customer's requirements for the specific applications.

— What are the advantages of new engines compared with D49 and D50?

— Diesels D50 (dimensions 31.8 / 33) for shunting locomotives have been in production since 1957. They were repeatedly upgraded during that time, and there is no potential in the way they are designed to meet existing and future international environmental requirements.

The same situation is in Kolomna. Engine D49 is quite a competitive machine at the moment. This power unit is well established, mass produced, almost all the components are manufactured in Russia. However, the opportunities for further improvement of its design are limited. Looking into the future, complying with environmental standards with such a design would be impossible. Opportunities to improving the working process of this diesel engine are limited.

The main objectives of the subprogram «Development and organization of production of new generation diesel engines and their components in the Russian Federation in 2011-2015»:

- «Development of basic models of medium-speed inline and V-shaped diesel engines and diesel generator sets in the power range of 500-7500 kW (450-1500 / min) for mainline freight and passenger locomotives, shunters, clean-up switchers, and hump locomotives, diesel geared aggregates of Navy vessels and ships, small-scale power plants, stationary technological tools, special projects of backup power installations of the nuclear energy industry.
- Development of basic models of high-speed diesel engines in the power range 400-3000 kW (1500-3000 rev / min) for self-propelled rolling stock, small capacity shunting locomotives, propulsion systems of vessels for inland and coastal navigation, Navy boats, transport and technological equipment, container-type small power plants, etc.
- Creation of structures and organization of industrial production of diesel engine components.
- Development of research and experimental base for the development of new design solutions in the field of industrial diesel engine building.
- Implementation of development and basic research projects.

IN TERMS OF THEIR FEATURES D200, D300 AND D500 WILL BE QUITE COMPETITIVE AGAINST THEIR EUROPEAN AND AMERICAN ANALOGUES

— What will be the scope of use of the new inline engines?

— The engine was developed primarily for locomotive type TEM18. At the same time, we wanted to create a new family of engines with energy and marine applications in mind.

— At what stage are you in your work on engine D200?

— At the moment, the prototype has been made, and a set of tests has been run to the extent specified in the state contract. Work is underway to optimize parameters of the working process.

— Let's talk about engines D300 and D500. Why are they divided into two families?

— The original task was challenging — to create a family of engines in a broad power range from 2,000 kW to 7.5 MW. Where are such powerful diesels used? For example, as a backup power supply system of a nuclear power plant. In the case of emergency (external power outage), these systems must provide electricity to all main process equipment for switching the nuclear reactor to a safe condition.

It is very difficult to select the dimensions to cover such a range, so we decided to develop two types of the engine. The first one is type D300 (dimensions 260 x 280). This engine is for the installation on locomotives up to 3.5 thousand kW. We are discussing the delivery of three diesel generators with D300 engines for freight three-unit locomotives type 3TE25KM to Bryansk Engineering Plant. The second one is D500. This diesel of large dimensions (265 x 310) in its 20-cylinder version easily gives us 6.3 MW required by Rosatom and the power industry. The use of D500 on civil and military ships is also being discussed.

IMPORT SUBSTITUTION IN ACTION

— Were spare parts for engines purchased abroad? Or are these the products of domestic manufacturers?

— Transmashholding companies were among the few who had worked seriously on the selection of the suppliers.

We have attracted many domestic manufacturers, although foreign vendors also took part in our work. If there is a need to refine the design for specific customer requirements, our designers will already have all the necessary foundation. This is due to the enormous amount of experience that has been obtained because of our R & D work and the efforts of our technical and commercial departments to select suppliers.

The transition to mass production of diesel engines of new design will enable us to give work not only to our diesel building enterprises, but to dozens of factories — manufacturers of components across the country.

— Will the new engines make it possible to ease dependence on supplies from abroad?

— Of course. First, it is true about D500 that will be supplied to nuclear power plants. We did not have engines for 6.3 MW diesel generator sets previously. Nuclear power plants had to install imported engines.

— What will happen to engines D49, D50?

— They will be gradually replaced with new ones. It is hard to stop producing them now, because a large number of these engines are in active use. In the next 20-30 years they will still need spare parts, so the new engines will move ahead slowly.

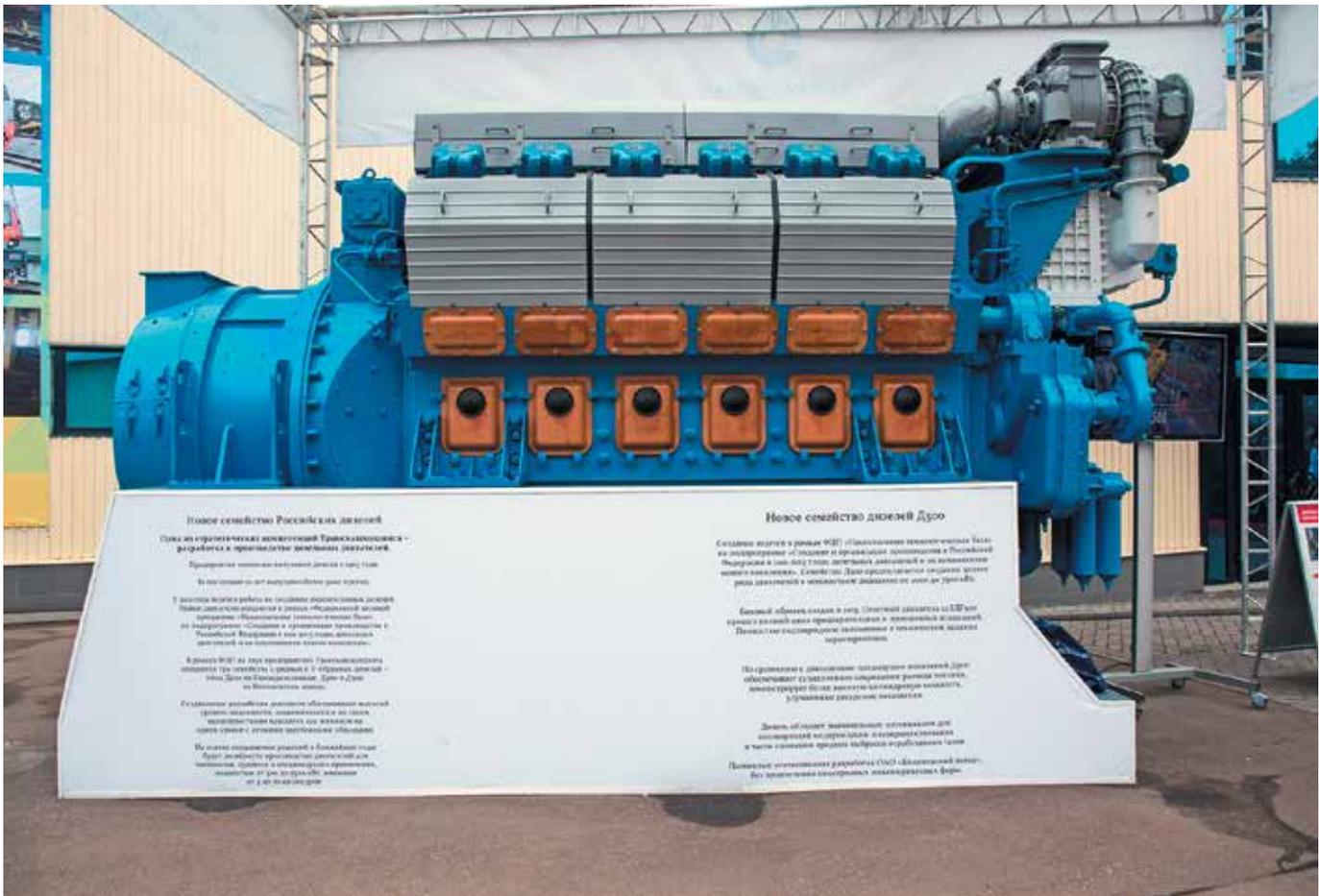
— Who was involved in the development of new engines?

— Kolomna plant design bureau headed by Valery Aleksandrovich Ryzhov, the State Prize winner and honored designer of Russia. He passed on to his team his extensive experience, inspired them and led them in the right direction. The results speak for themselves. We should also mention the design bureau headed by Victor Alexeyevich Mironov, chief designer at Penzadieselmash.

We can say already that the engines are a success.

Government contracts signed by Transmashholding within the framework of the federal subprogram:

- «Development of basic models of medium-speed inline diesel engines and diesel generator sets for the propulsion systems of vessels, shunters, clean-up switchers, and hump locomotives, small-scale power plants, and stationary technology in the 500-1500 kW power range».
- «Development of basic models of medium-speed V-diesel engines and diesel generator sets of the mainline freight and passenger locomotives in the 2000-4500 kW power range».
- «Development of basic models of medium-speed V-diesel engines for special projects of backup stationary power units at nuclear power plants in the power range of not less than 3000 kW».
- «Creating designs of specialized experimental test benches for medium-speed diesel engines from 450 to 1,500 min for diesel building plants».
- «Undertaking exploratory and experimental research to improve the design of turbochargers, develop the flow parts of compressors and turbines for the upgrade of the basic models of medium — and high-speed diesel engines and the development of advanced diesel engines».



Diesel D 500 became one of the main exhibits of «EXPO-1520»

— What are the prospects for the new engines in the foreign markets? Are there plans to export them?

— The prospects of new engines are very good. In terms of their design, use of a number of technical solutions, technical and economic characteristics that we get and continue to improve during the development testing, D200, D300, and D500 will be quite competitive against their European and American analogues.

The technical level of medium-speed diesel engines will be determined primarily by their ability to comply with required current and future standards for specific harmful emissions stipulated by international environmental requirements. Their energy, economy, weight and dimensional characteristics will be considered only as indicators of competitiveness, for the most part directly or indirectly affecting the levels of harmful emissions.

On January 1st, 2016 we should get the first official information on the implementation of the new requirements to toxicity levels in Europe. We now plan to work to meet these requirements. Our diesel D500 was first shown at «EXPO-1520» that was hosted in September 2015 in Shcherbinka. The engine aroused great interest among visitors.

— To what regions can these engines be supplied?

— As I said, the only limitation regarding the possible supply of our diesels to any region has to do with the requirements to the level of toxicity of exhaust gases which is set by the supervisory authorities. You also need to understand that we as suppliers are dependent on the customer making the final product (this can be a locomotive, a ship, or a power plant) to be delivered to customers in Russia and abroad.

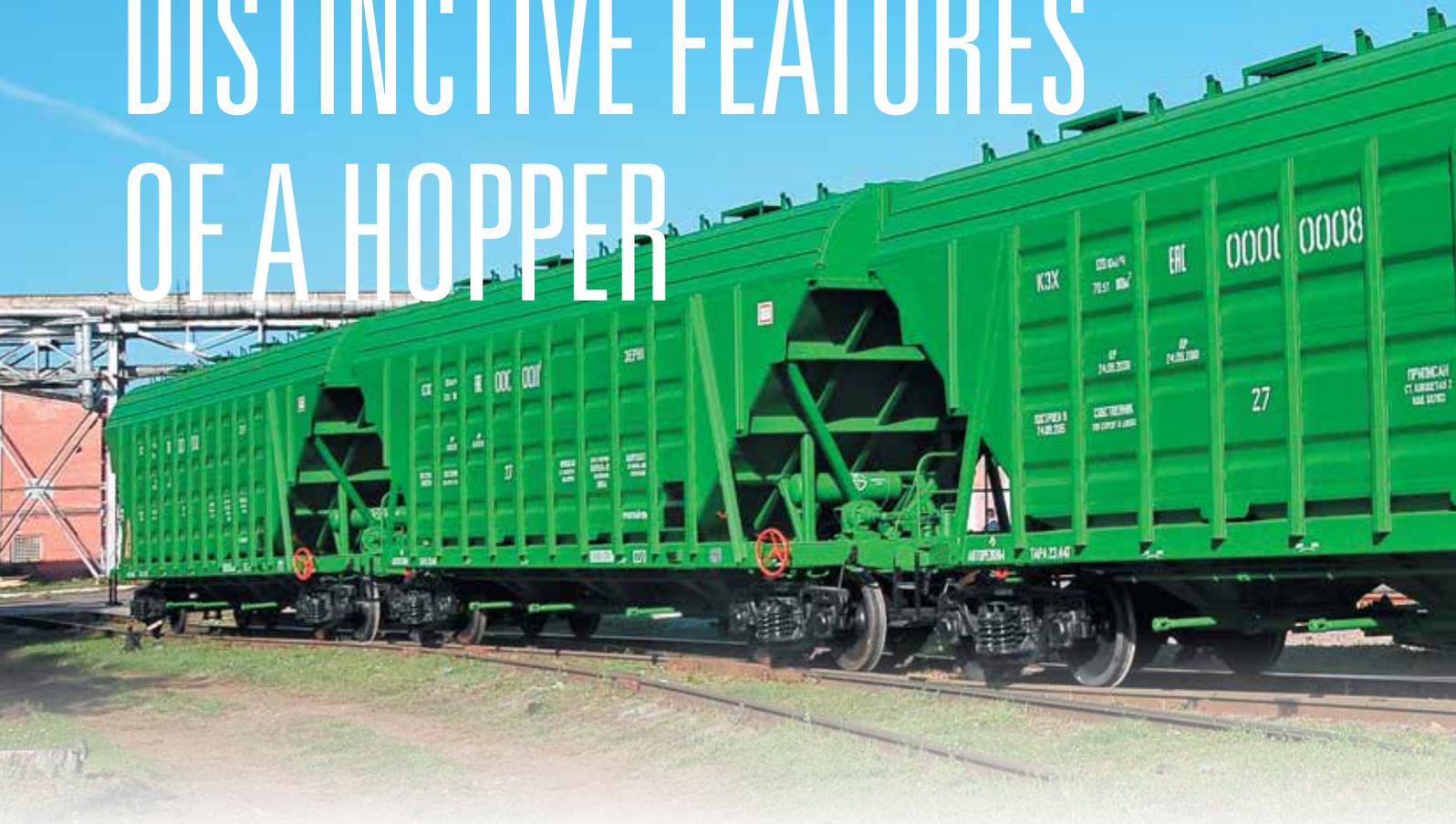
Today it is also important to understand that in order to be competitive in the market, one needs to have a developed system of service to maintain and repair the equipment the customer buys. At the same time, it is important to stay within a reasonable price range for the Russian market.

— Is the holding ready to provide new engines to domestic producers?

— The implementation of the project will allow Transmashholding to set up production of base modifications of multi-purpose diesel engines and to occupy a dominant position in the Russian market for diesel engines for railway equipment, civil shipbuilding, shipbuilding, and stationary diesel generator sets.

Then we will be able to prepare competitive offers of medium-speed diesels for foreign tenders. 

RELIABILITY AND VOLUME — DISTINCTIVE FEATURES OF A HOPPER



Vladimir Sudarev,
chief railway
car designer

ANOTHER NEW PRODUCT BY TRANSMASHHOLDING IS A HOPPER CAR MODEL 19-3058 FOR THE FREIGHT OF GRAIN AND OTHER FOOD CARGOS. THE HOPPER WAS PRESENTED AT THE 5TH INTERNATIONAL RAILWAY SHOW «EXPO-1520».

A hopper prototype was manufactured at the Bryansk machine building plant at the end of 2014. The hopper car is different from its counterparts that are now used on the railways of Russia, CIS and the Baltic countries because of its high capacity body.

READY FOR ACTION

During the exhibition at Shcherbinka, a suburb of Moscow, professionals were able to appreciate the advantages of the hopper model 19-3058. «The hopper has passed all kinds of necessary tests, — says Vladimir Sudarev, chief car designer at the Bryansk machine building plant. —



It includes static and dynamic strength tests, assessment of road performance of the car and its impact on the track, the reliability of the rolling stock design and its components».

At the end of September 2015 the new hopper car received a certificate of compliance from the Register of certification at the Federal Railway Transport (RS FZhT).

FOCUS ON VOLUME

The designers increased the working volume of the body by eliminating the center sill. The hopper model 19-3058 can carry up to 118 m³ cargo, while the

volume of the serial rolling stock is 112 m³. The cargo carrying capacity of the new car is similar to that of the base rolling stock — 70.5 tons. As a result, the hopper model 19-3058 with a larger body volume allows clients to optimize costs for shipping products with a relatively low bulk density: barley, oats, buckwheat, sunflower seeds.

The new model is lower than the standard one — only 4.8 meters. Thus it can be loaded at all existing terminals. In addition to that, the car has a sliding gate type discharging device protecting the cargo from theft and making it possible to freeze or stop unloading altogether.





Specifications

- Cargo Capacity — 70.5 t
- Design speed — 120 km / h
- Dimension type — 1-T
- Body volume — 118 м³
- Car base — 10 500 mm
- Length along coupler axis — 14 720 mm
- Height from rail level — 4800 mm
- Number of hatches: for loading — 5, for unloading — 3
- Gauge — 1520 mm

HOPPER MODEL 19-3058 WITH A LARGER BODY VOLUME ALLOWS CLIENTS TO OPTIMIZE COSTS FOR SHIPPING PRODUCTS WITH A RELATIVELY LOW BULK DENSITY



Hopper model 19-3058 is equipped with a separate braking drive for each bogie, which provides the same degree of braking effect regardless of load. Despite the implementation of many technical solutions, the company continues to work on further improvement of the car. Now serial bogies 18-9896 are used for manufacturing the hopper.

HIGH RATING

The new hopper quickly attracted attention of potential customers. The first contract for the supply of model 19-3058 was signed with the «Logistics Expert», a company from Kazakhstan. «We have carefully examined the cars — said the general director of «Logistics Expert»

Denis Dolmatov. — We thoroughly tested wheelsets, side frames, bogies, bolsters for faults, defects, and cracks. In short, we focused on quality and found the excellent performance of this rolling stock. No claims for manufacturers. We are quite satisfied by the hopper colors: it is beautiful and bright».

By early November, the first 50 cars were handed over to the customer. According to Denis Dolmatov, despite the extreme volatility of railway car building market, «Logistics Expert» intends to continue its partnership with BMZ. By the way, this is not the first time when BMZ and «Logistics Expert» cooperate. In March, 150 hoppers model 19-3054-04 went to Kazakhstan. The cars are successfully used for the transport of grain crops and are showing great performance. According to «Logistics Expert» estimates, a bigger car (19-3058) will allow the company to increase the volume of cargo traffic.

By the end of 2015, the Bryansk machine building plant plans to produce 150 cars of model 19-3058. «We hope that hopper model 19-3058 will find its place in the market of freight rolling stock», — says Vladimir Sudarev. 🌐



WARTIME LIFE

NOVOCHERKASSK STEAM-ENGINE PLANT (NPZ — FUTURE NEVZ) WAS FOUNDED IN 1932. AT FIRST THE PLANT SPECIALIZED IN NARROW-GAUGE LOCOMOTIVES, BUT THE GREAT PATRIOTIC WAR RADICALLY CHANGED ITS PRODUCT RANGE.

Initially Novocherkassk Budenny Plant was conceived as a socialist paradise. In the immediate vicinity of the plant a model city was constructed (albeit only partially) for up to 20 thousand people. It was assumed that the employees of the company will get all the benefits of a socialist system and will be able to create a new society of labor. But life made its own adjustments to these plans.

A SCENT OF TROUBLE

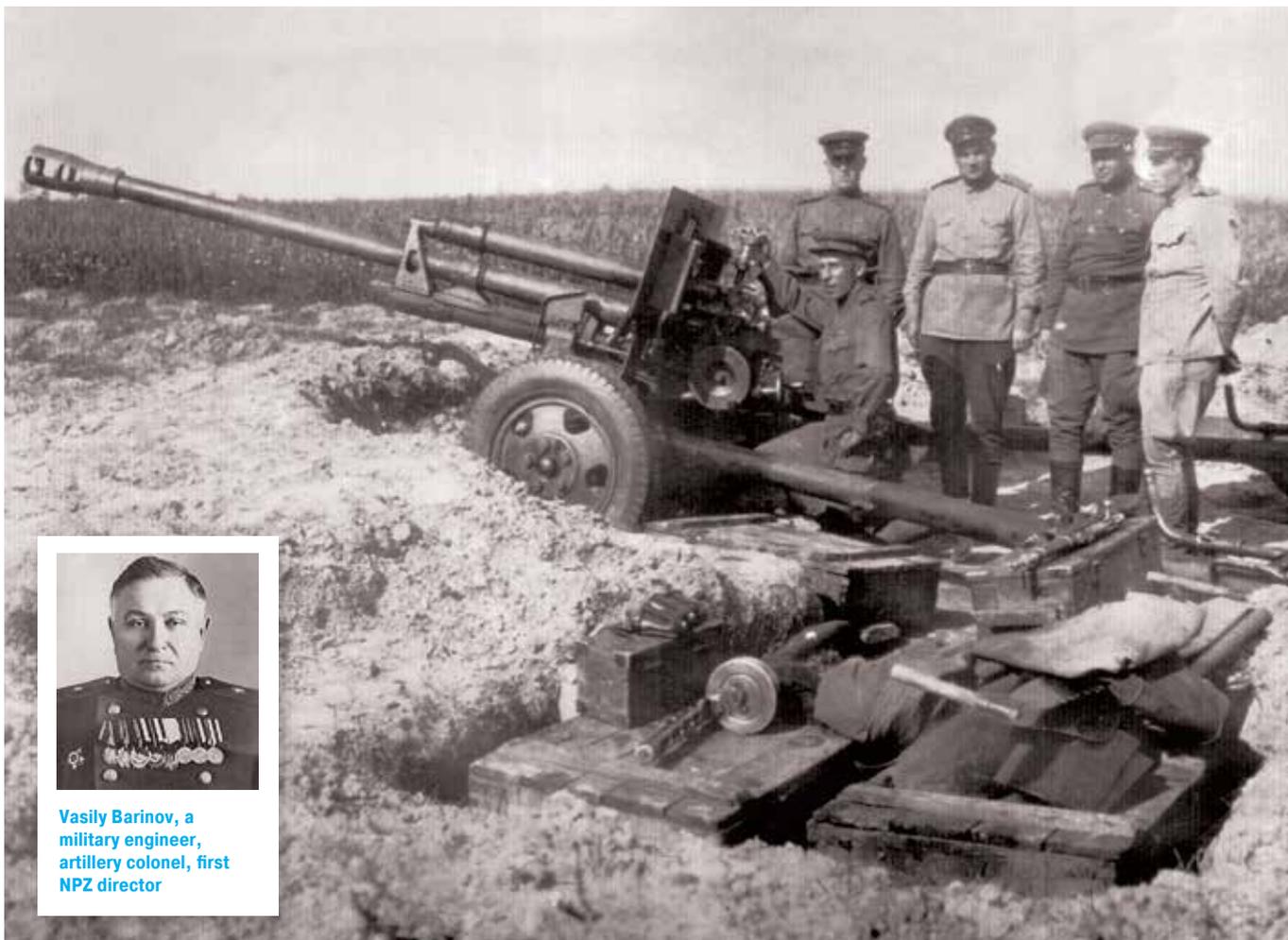
In the late 1930s, Novocherkassk steam-engine builders felt the fiery breath of the approaching war among the first. In 1938 due to the deteriorating international situation, the largest plant in Novocherkassk, Budenny Plant, was transferred to the People's Commissariat of Arms from the People's Commissariat of Heavy Machine Building. Yesterday's steam engine builders had to finish their steam engines and together with military specialists arrange conversion of the plant to defense needs.

New machines and equipment were delivered to the workshops from the Molotov (Perm) military factory. More than a thousand artillery professionals also arrived, and by the end of 1938 the plant mastered the production of anti-aircraft guns ZU-4 and 122-mm field guns ML-19 and ML-22 (Molotov guns with a range of 19 and 22 km). Instead of building locomotives the workers cast and grooved the barrels, manufactured locks and gun carriages. The tests were carried out at the testing grounds right outside the factory gates.

Novocherkassk guns were first used in 1939 in combat against the Japanese during the Nomonhan Incident.



76 mm «Annushka» gun of 1942



Gun testing



Vasily Barinov, a
military engineer,
artillery colonel, first
NPZ director

WARTIME SAMOVARS

In the early days of World War II Factory #352 (a number assigned to it in the People's Commissariat of Arms) moved to a military operations mode: 10-hour day and the strictest discipline. The factory workers were trained in rules of anti-aircraft and anti-chemical defense. Workers came to the shop floor long before their shift, prepared the tools and, without waiting for the signal, started working. During the war, the factory workers tried to learn several professions at once. It included women who replaced men who had gone to war.

In addition, the staff of the company took care of the families of soldiers: the workers delivered coal and firewood to their flats using factory transport, transferred money earned during

FROM NOVEMBER 1941 TO JULY
1942 NPZ DELIVERED TO THE
FRONT-LINE MORE THAN 2,000
«SAMOVARS»

week-end extra work to the country wide Defense Fund.

During the war the plant had to produce new products. Thus, it was decided to start the production of 82-gauge mortars modeled on the

captured German samples. NPZ did not have any banks for the mortars. The workers had to use tools and machines from the mining equipment plant to do boring. The machine tools did not have their own engines and were driven by a single motor for the whole plant through transfer belts. Such mortars were called «samovars». From November 1941 to July 1942 NPZ delivered to the front-line more than 2,000 «samovars».

When the war ended, the factory gradually began to abandon the military production and returned to building locomotives. Ⓞ

Galina Zakharova, a museum specialist of Cultural and Sports Center, NEVZ
Photos are from the collection of the NEVZ history museum.



TRANSMASHHOLDING

HOLDING'S PRODUCTS AND SERVICES:

- mainline and industrial electric locomotives;
- mainline and shunting diesel locomotives;
- freight and passenger cars;
- electric train and metro cars;
- road-rail buses and diesel trains;
- car casting;
- diesel locomotive and marine diesel engines;
- diesel generators and turbine-driven compressors;
- components for transport;
- spare parts;
- repairs and maintenance.

IN THE PAST FIVE YEARS, THE COMPANY HAS MANUFACTURED

over
3000
locomotives

more than
4000
passenger cars

more than
3000
electric train cars

over
230
cars of
road-rail
buses

more than
1500
metro cars

over
2700
diesels

EG2Tv electric train
TVER

- Transmashholding – No. 1 IN CIS COUNTRIES in rolling stock output and sales
- Transmashholding is ranked among THE WORLD'S TOP TEN MANUFACTURERS of railroad machinery
- Transmashholding – RUSSIA'S ONLY COMPANY, with experience in developing and manufacturing technical equipment for arctic conditions
- The technical equipment of Transmashholding is operated IN ALL CLIMATIC ZONES ON EARTH

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