Transmashholding
MAGAZINE FOR PARTNERS
#4 12/2016

MODULAR SHUNTING

P. 12

CONTENTS

4 12/2016 MAGAZINE FOR PARTNERS
Transmashholding

Magazine for partners
of ZAO Transmassholding

Editor-in-Chief
Konstantin Nikolayevich Dorokhin
k.dorokhin@tmholding.ru

Editorial office:
127055, Moscow
ul. Butyrsky Val, d. 26, str. 1
Telephone: (495) 660-89-50

The magazine has been issued with participation of Media Line PH
www.medialine-pressa.ru

General Director
Larisa Rudakova

Design Layout
Ilya Malov

Managing Editor
Dmitry Dorofeyev

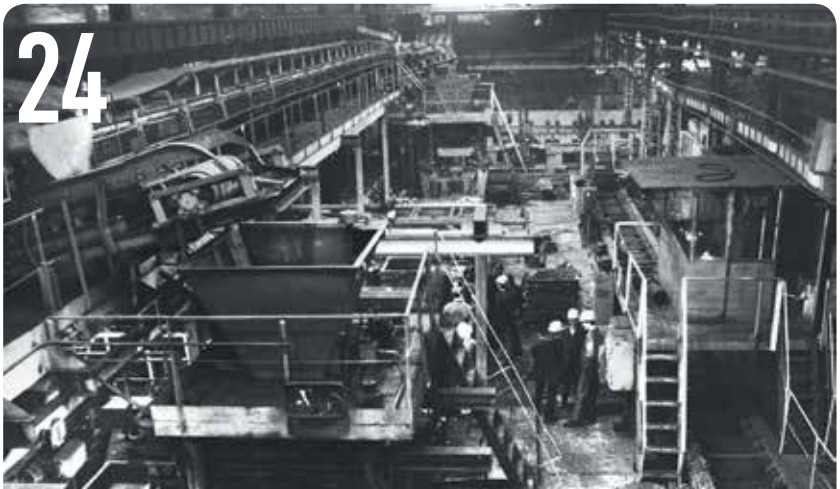
Copy Editor
Irina Demina

Design & Makeup
Lyubov Wolf,
Sergey Kukoba,
Alexey Sukonkin

Proofreaders
Alina Babich
Liliya Alieva
Margarita Trushnikova

Prepress
Sergey Karnyukhin,
Maxim Kuperman

Approved for printing on December 15, 2016
Printed in Mediacolor printing office,
Moscow, ul. Volnaya, 28
Circulation — 999 copies
Not for sale



12+

WE HAVE NOT HAD CARS LIKE THIS BEFORE

Transmashholding is consistently implementing the program for the design of new comfortable passenger rolling stock. As part of this program, Tver Carriage Works (TVZ) has designed a new staff double-deck car with seats. It is intended for passenger service at a speed of 160 km/h and features high passenger capacity: 54 seats, including two seats for a disabled person and his/her attendant.

The innovative car has been designed with the focus on the solutions implemented in the design of staff double-deck long-distance cars and cars with seats that are well-reputed in operation and appreciated by passengers. New technical solutions intended, in particular, to enhance passenger comfort, including the disabled, have been applied.

Apart from passenger compartments, the new staff car features a leisure area with cushioned furniture and TV set, compartment for a disabled passenger and his/her attendant, shower room for staff, three bathrooms, one of them fitted with a changing table, utility compartment, and radio equipment compartment. For the first time in the history of the Russian rail car-building industry, the compartment for wheelchair users has a circular door and other innovative solutions.

Wheelchair users embark and disembark from high and low platforms using a special-purpose hoisting device located in the vestibule of the non-braking end of the car.

To ensure passenger comfort and meet all customer requirements, the car is fitted with luggage racks and a special-purpose display for tea and promotional items; there is a designated area for two vending machines. The new staff car is fitted with climate control units, windows with blackout and sun-screening flaps, armchairs with folding tables and footboards, and personal 220 V sockets. The car offers Internet connection for mobile devices (Wi-Fi). All signs, including seat numbers, are also displayed in Braille. All latest updates, reference or commercial information are displayed as a ticker on information displays in passenger compartments. For the purpose of security monitoring, passenger compartments, stairs, vestibules and aisles are fitted with video surveillance cameras. All non-metallic materials used in the car's finishing have fire safety certificates and sanitary and epidemiological inspection reports issued according to the established procedure.

The specified lifetime of the new car is 40 years. In November, the first two staff cars with seats were delivered to Federal Passenger Company.

TRAINING TOGETHER

Transmashholding signs a staff training cooperation agreement with M.I. Platov's South-Russian State Polytechnic University (YURGPU).

The agreement is intended to extend the cooperation on vocational specialist training, development of the scientific potential and active involvement of the university in achievement of those tasks that Transmashholding faces with regard to the scientific and staff support of its enterprises.

YURGPU will provide opportunities for the vocational guidance and pre-university activities, target students' training, further and conversion training of the managers and specialists of Transmashholding, provision of additional educational services to students, preparation of graduation qualifying papers, and arrangement of students' practical training required by the holding. Transmashholding will, in its turn, arrange students' selection for the target training in on-demand areas of expertise, monetary incentives for university students (state grant supplements for good academic performance), and procurement of grants for the preparation of graduation qualifying papers. Our company arranges training, production and pre-graduation practice for YURGPU students.

The agreement is valid until December 31, 2020.

IMPORT SUBSTITUTION AT WORK

"Olimp" EP20 electric locomotive to be manufactured with home-produced cabins.

Novocherkassk Electric Locomotive Plant (NEVZ) has successfully completed tests of the EP20 electric locomotive with the cabin prototypes manufactured as part of the import substitution program. The new cabin of the EP20 electric locomotive has been co-designed by the specialists of Transmashholding, TRTrans Engineering Center (EP20 designer), and Polet Research and Development Enterprise (RDE).

Technical documents have been devised and a developmental prototype has been manufactured on a tight schedule. The electric locomotive's cabin has passed climatic chamber tests in the entire range of operating temperatures from –50 to +40 °C and routine tests in a high-speed range in Belorechensk. All the tests have yielded positive results. "Olimp" EP20 is

Russia's first two-system electric locomotive capable of operating passenger trains at the speeds of up to 200 km/h via the AC and DC railway lines. The locomotive features an asynchronous drive. The implemented engineering solutions enable multifold reduction in maintenance operations, increased time between repairs, and significant energy savings.

Three additional EP20 electric locomotives with Russian cabins will be manufactured before the end of 2016.

RUNNING BOTH GAGES

TVZ to build postal-baggage cars for the Beijing — Moscow — Berlin international route.

The relevant memorandum of understanding was signed at Sochi-2016 XV International Investment Forum. The document stipulates the design of a postal-baggage car for the service between the People's Republic of China and Europe with a transit route via Russia.

The memorandum signed provides for the design of postal-baggage cars with a set of bogies for the Russian and European gages (which are standard in China, too). Tver Carriage Works (TVZ) has experience in cooperation both with Siemens Group on the manufacture of RIC passenger cars and Russian Post in the design of postal-baggage cars. Currently, RIC passenger cars are operated along Moscow — Helsinki; Moscow — Berlin; Moscow — Paris and other routes. TVZ has produced postal-baggage cars since 2015; they have larger capacity compared to their competitors and an integrated monitoring system. Russian Post has purchased 50 cars of the 61-4504 and 61-4505 modification from TVZ; today, they transport mail along Russian railways as part of postal-baggage and passenger trains.

The first trains comprising new RIC postal-baggage cars are to be operated along the Beijing — Moscow — Berlin route. Project milestones will be determined during 2016–2017. Customers from Russia and other countries that operate the 1,520 mm gage railway have already expressed their interest in this new product.


Михаил Киреев / РИА Новости

KOLOMNA ENTERPRISE TO BUILD UP THE UNDERSEA FLEET

Power plant of the new Russian submarine is based on the diesel generating sets made by the designers of Kolomna Plant JSC.

In late October, Admiralty Shipyards JSC delivered "Veliky Novgorod," the latest diesel-electric submarine, to the Russian Navy. This submarine has become the fifth diesel-electric submarine out of six submarines under the 636.3 project intended to reinforce the combat readiness of the Black Sea Fleet.

These are third-generation submarines that are considered to be among the quietest in the world. This attribute is secured, among other things, by 30DG diesel generating sets (6CHN30/38) with a power of 1,500 kW made by the designers of Kolomna Plant JSC.

The 30DGs form the basis of the main propulsion of 636.3 diesel-electric submarines and ensure their operation in up-top, submersion, independent cruise and recharge of accumulators. The 636.3 submarine's speed is 20 knots, its maximum diving depth — 300 meters, cruising capacity — 45 days.

It should be noted that "Kolpino," another latest submarine, is also fitted with the 30DG diesel generating set.

FROM MOSCOW TO ST. PETERSBURG FOR MAINTENANCE

More than 130 Moscow subway cars of the 81-717/714 series will be repaired at Oktyabrsky Electric Car Repair Plant in St. Petersburg. The work will be completed by June of 2017.

Oktyabrsky Electric Car Repair Plant (OEVRZ) has won a tender for the overhaul of 131 cars of the 81-717/714 series owned by Moscow Metropolitan SUE. Apart from OEVRZ, Demikhovsky Engineering Plant took part in the tender. The tender committee awarded the same qualification score to both bidders; OEVRZ was selected due to lower costs. According to the contract, the plant has to replace the driver's controller drive, cardan sleeves, center bearers and interior of the cars by June of 2017. All the cars are at least 19 years old.

ALSTOM TO EXTEND THE POOL OF VENDORS

By the first quarter of 2017, the French company Alstom will engage some 40 new vendors in its affiliate program Alstom Alliance.

In 2015, Alstom launched its strategic partnership program Alstom Alliance for its key vendors. They include Schneider Electric, Nexans, Soreel, Sanmina, Knorr Bremse, Faiveley, and Midas. The French company maintains partnership in three key areas: business development, industry, and innovations.

"At Alstom, we are confident that the establishment of strategic partnership relations with vendors that ensure the availability, sustainability and quality of our solutions is one of the ways to secure good relations with clients and passengers. With Alstom Alliance, we have built a platform to make this cooperation more efficient. We will invite some 40 vendors to cooperation by the first quarter of 2017," said Alstom Chief Purchasing Officer Olivier Baril.

BMZ TO CONSOLIDATE TALENT POOL

Freshmen of the railway rolling stock department of Bryansk State Technical University organized with the assistance of BMZ have been introduced to the enterprise.

The department has been organized this year. Bryansk Machine-Building Plant has financed the studies of 20 students who successfully passed the USE and were enrolled in the University. Currently, they have a full specialization course to take. Each student's tuition will cost some 75 thousand rubles a year.

This target training calls for engagement of future mechanical engineers in the plant's activities. According to BMZ Director General Aleksander Vasilenko, this is necessary in order to bridge the gap between theory and practice. Additionally, this will help eliminate potential staff shortages. Students are trained in blue-collar jobs with subsequent practical training arranged. Their term papers will be closely related to their areas of expertise. This will help future engineers familiarize themselves with the diesel unit assembly and scrutinize its design.

VITYAZ TO CONQUER MOSCOW

Transmashholding took part in the ExpoCityTrans exhibition held in late November at VDNKh in Moscow. This year, we have showcased the product that Moscow residents will be able to see on city streets as early as next February. The Vityaz-M 71-931M three-section 100% low-floor tram was demonstrated to exhibition visitors.

THE SECOND BIRTH OF HUNGARIAN SUBWAY CARS

In July of 2015, Transmashholding won a tender for the overhaul of 222 cars (37 train sets, with 6 cars each) for the Budapest subway system. Under the contract, Metrovagonmash undertakes to perform modernization of train sets. The plant delivered the first upgraded train comprising 6 cars to Budapest this past May.

VLADIMIR DZYUBAN,
Director of the Project and Design Center

Upgraded 81-717/714 subway cars

As part of the tender, Metrovagonmash competed with Alstom Transport, Skoda Transportation, CAF, Estonian Skinest Rail, and a few companies from Romania and Hungary. According to the signed contract, 185 cars of the 81-717/714 modification, 10 cars of the 81-717/714-2M modification, and 27 cars of the Ezh3 modification must undergo modernization in 2016 2018. These cars were built in 1960-1970 at Mytishchi Machine Building Plant, one of the world's largest subway car manufacturers and the basis for Metrovagonmash JSC established in 1992. Cars have been delivered to Budapest starting from the 1970s. Due to the expiration of the car life and its high wear rate, BKV, the company that manages the Budapest subway system, decided to perform the overhaul of the cars, which will enable their further operation for another 25 years.

Subway car before and after modernization

Key modernization aspects

The first train of the 81-717/714 modification delivered to Metrovagonmash was in operation from 1986 until this past July. Its condition is nearly unsatisfactory; it is defaced with graffiti, flaking paint, and rust.

Metrovagonmash specialists have put a lot of effort into ensuring the modernization that covered nearly all car parts.

Body and passenger compartment

The body was stripped and painted with high-quality polyurethane enamel made by leading foreign manufacturers. The roof of the upgraded body was made without protruding air inlets (trains of the 81-717/714 modification operated by the Budapest subway system had protruding elements on the body roof) using forced ceiling-mounted ventilation gratings. This will ensure passenger comfort in the passenger compartments both in operation and during stops.

Backframes and center bearers were reinforced in the car frame. The main elements of the body under repair were replaced, which extended its life by 30 years.

Passenger compartments required much effort. During the modernization, the cars were fitted with an electric windscreen wiper and an electronic route display with the indicators visible at any illumination level. The car ventilation system comprises 7 ventilation sets on the head car and 8 on the middle car. The system's overall capacity with air supplied to the passenger compartment is 7,000–8,000 m3/h, which ensures air supply of no less than 20 m3/h per passenger even at the car's peak load. If the train stops in a tunnel and high voltage is removed, the system will be battery-powered for one hour.

The car's finishing with fiberglass panels meets DIN 5510, a railway rolling stock fire safety standard. The passenger compartment is fitted with vandal-proof semi-rigid couches that meet modern ergonomic requirements. The design of couches enables automated cleaning of the passenger compartment.

Lighting in the passenger compartment is designed as a light line using luminescent lamps. Handrails in the passenger compartment are made of stainless steel with satin finish, which guarantees their durability and aesthetic performance.

The folding doors of the passenger compartment are fitted with an electric drive. Unlike the old design based on constant-pressure pneumatic cylinders, the upgraded doors feature advanced anti-clamping and deceleration systems, which helps keep the risk of passenger injuries at a minimum and reduces the noise level when the doors are opened or closed.

BACKGROUND INFORMATION

Metrovagonmash has been certified by the Federal Technical Regulation and Metrology Agency of the European Standard Voluntary Certification System for its compliance with ISO 14001:2004, which is acknowledged by certificate No. РОСС RU.С.04ФБШ. СЭМ.0139. It certifies that the organization's environmental management system applies to the design, production, delivery and aftersale service of products for subway cars. This is the evidence of the measures taken to reduce the environmental load of production. The enterprise develops and implements the documents intended to improve the environmental management system pursuant to ISO 14001.

Before After

Mask and driver's cabin

The 30 cm frame of head cars was fitted with a modern mask made of incombustible fiberglass with a tilting emergency exit ramp. The materials and technology used in the manufacture of the new mask enabled reduced heat conductivity and increased acoustic insulation: the noise level when the car is hauled in a reference open portion of the line along polished rails at a speed of 60 km/h does not exceed 75 dBA. The front is fitted with four LED spot lamps with improved light-transfer characteristics.

The capacity of the cabin was increased by 30%. The cabin was fitted with the driver's primary

THE FIRST TRAIN OF THE 81-717/714 MODIFICATION DELIVERED TO METROVAGONMASH WAS IN OPERATION FROM 1986 UNTIL THIS JULY

Upgraded driver's cabin

console (DPC); structurally, the console comprised the body (frame) and side plates that house control boards and display units with controls and information display devices as well as other devices and equipment that require the driver's prompt response in the course of train operation. All the master controllers and information display devices located on the console's boards are grouped by their functional purpose. The main master controllers and controls that require the driver's constant participation and attention are located in the central part of the console.

Video surveillance and sound

All the cars are fitted with the video surveillance system. Video is transmitted from two cameras located in the front areas of the passenger compartment and two safety communication units near the doors, which enables the driver's control of the situation in the passenger compartment.

Trains have a radio channel used to transmit real-time information to the subway's situation center. Cars are also equipped with the wireless Internet access system.

Power equipment

In the bogies of upgraded cars, direct current motors with graphite brush assemblies that release graphite dust (one of the most hazardous substances in terms of respiratory system exposure) have been replaced with asynchronous motors that enable at least 35% of power recuperation.

Rib lubricators using liquid lubricants have been replaced with core-type rib lubricators with a solid lubricating element. The mechanical brake uses advanced asbestos-free checkblocks that feature a long service life, high wear resistance, environmental friendliness, and improved frictional behavior.

The equipment installed allows 9% decrease in the actual current consumed by traction (without regard to recuperation), decrease in sustained and critical current of a traction substation, across-the-line control of traction motors, smooth acceleration and change in the speed mode, and prevention of skidding and slipping. The stock list of traction drive devices has also been decreased with 25% reduction in the equipment system weight. Equipment troubleshooting and reprogramming have been enabled. The across-the-line start and recuperation enable a dramatic decrease in the heat load from the car and concurrent traction energy saving of up to 50% across the entire range of speeds.

Operational performance benchmarking

The overall period of modernization of the first rolling stock at Metrovagonmash sites was four and a half months (arrived in January and dispatched

THE FIRST UPGRADED ROLLING STOCK WILL UNDERGO TESTS ON THE HUNGARIAN SUBWAY, WITH SUBSEQUENT OBTAINMENT OF A CERTIFICATE BY EARLY JANUARY CONFIRMING THE PERMIT TO OPERATE TRAINS

in early May). As a result of the modernization, operational maintenance and repair costs are expected to decrease at least by 20%, and recuperation will result in decreased energy consumption.

Outlooks

In the nearest future, the first upgraded rolling stock will undergo tests on the Hungarian subway, with subsequent obtainment of a certificate by early January of 2017 confirming the permit to operate trains. After that, Metrovagonmash plans to monthly deliver two trains, with six subway cars each. The last upgraded train is to arrive in Budapest in August of 2018.

The warranty period for upgraded trains will be three years. During this period, Metrovagonmash will be fully liable for failure of the trains through the manufacturer's fault. The enterprise will also be fully responsible for all spare part deliveries under the contract.

MODERNIZATION HAS RESULTED IN

30%

INCREASE IN SERVICE LIFE OF CARS

DECREASE IN POWER CONSUMPTION

INCREASE IN THE DRIVER'S CABIN

The train is fitted with an air conditioning system in the driver's cabin and forced ventilation in passenger compartments

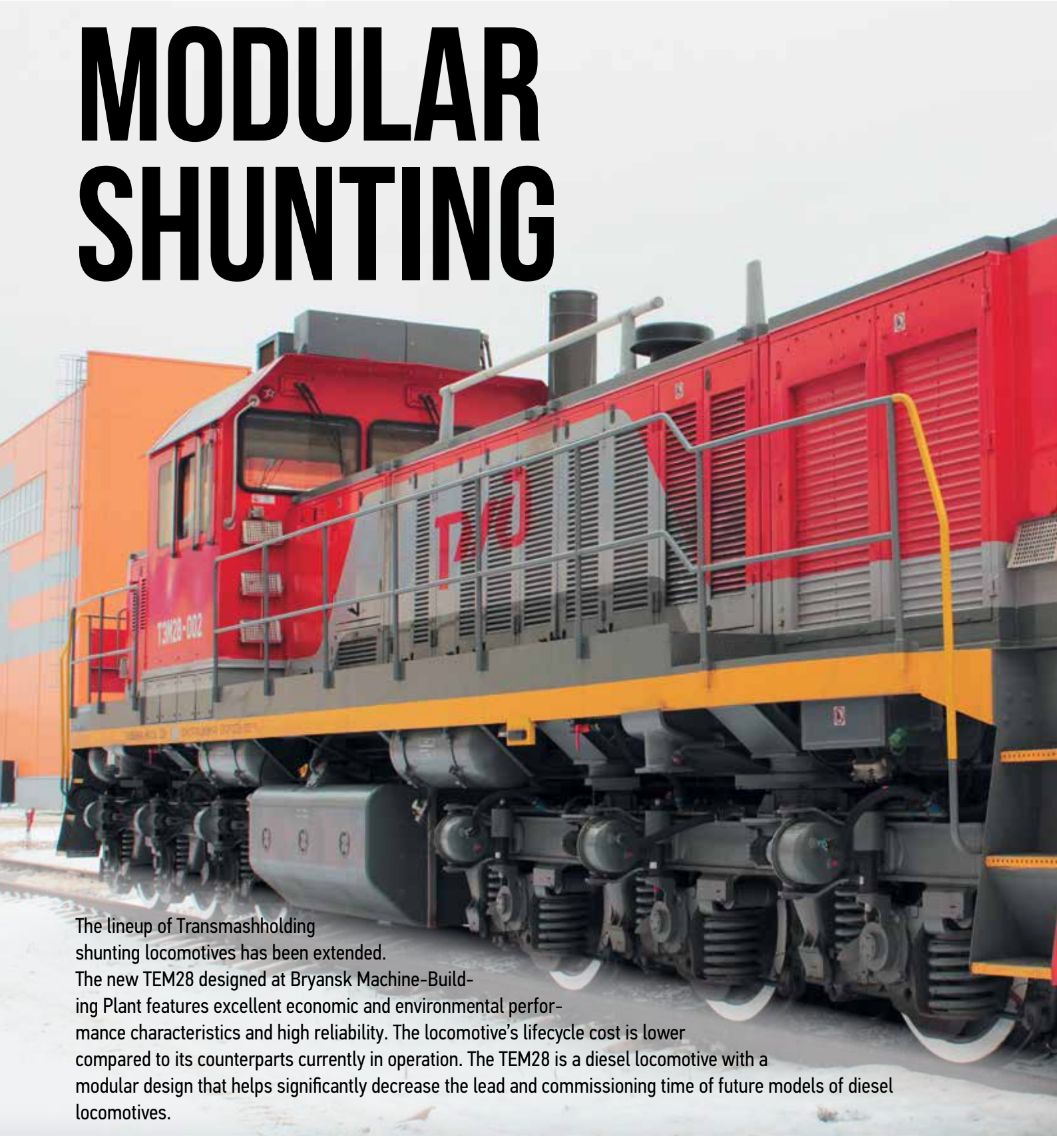
Comfortable conditions for low-mobility passengers have been created

Reduced noise level in cars

Handrails and seats are more comfortable and durable

Doors are fitted with the anticlamping system

MODULAR SHUNTING



The lineup of Transmashholding shunting locomotives has been extended. The new TEM28 designed at Bryansk Machine-Building Plant features excellent economic and environmental performance characteristics and high reliability. The locomotive's lifecycle cost is lower compared to its counterparts currently in operation. The TEM28 is a diesel locomotive with a modular design that helps significantly decrease the lead and commissioning time of future models of diesel locomotives.

Forging ahead

More than half a century ago, BMZ embarked on mastering the shunting locomotive production. The very first locomotive was the TEM1. Within 10 years (from 1958 to 1968), the plant built nearly 2 thousand machines of the series. Later, more energy efficient locomotives with improved traction performance came into being. Since 2007, the plant has been producing one of the large-scale models, the TEM18DM.

Manufacturing of the traction rolling stock based on the common platform and unified modules is a current trend in modern locomotive engineering. The next step undertaken by BMZ specialists was designing of a shunting locomotive following this principle. The modular approach enables construction of multiple diesel locomotive models at the same time and meets the needs of Russian Railways, industrial enterprises, and overseas customers for this type of the rolling stock. One of these diesel locomotives is the TEM28, a new model launched in 2016.

Savings and standardization

The new six-axis bonneted diesel locomotive with the alternating-direct current electrical transmission comprises five main modules: cooling chamber, diesel power plant, instrument room, driver's cabin, and braking equipment module. The modular design principle makes it possible to apply new maintenance approaches that enable transfer of most production and repair activities from depot to shop conditions. The modular principle of the design allows reducing equipment standby time, significantly decreasing the lead and commissioning time and the cost of future models of diesel locomotives. Additionally, the essence of the modular principle is such that diesel locomotives with different characteristics have common elements — modules. This is directly related to the unification, standardization, and typification.

Modern components used in the design and manufacture of the new diesel locomotive ensure

DECREASE IN THE EQUIPMENT STANDBY TIME, SIGNIFICANT REDUCTION IN THE LEAD AND COMMISSIONING TIME AND COST OF FUTURE MODELS OF DIESEL LOCOMOTIVES

its safe and reliable operation throughout its service life. Utilization of wheel-motor units with motor axle roller bearings allows reducing field maintenance time and, as a result, decreasing the lifecycle cost. The bogie of a diesel locomotive features a jawless design, one-stage spring suspension, and supporting axial suspension of traction electric motors. Traction electric motors face the same side, which enables even load distribution between the axes when the diesel locomotive is in motion.

The TEM28 is fitted with a diesel generating set with a power of 895 kW (1,217 HP). This device enables the locomotive's faster power ramp-up compared to the diesel locomotive series which is in large-scale operation. The high traction performance of the TEM28 allows handling of a weight of some 3,000 tonnes on the 9% ruling gradient and more than 6,000 tonnes on the 4% ruling gradient. This ensures not only effective gravity operations, but also (combined with operability in line with multiple unit systems) light line hauls. Diesel fuel savings for the TEM28 diesel locomotive compared to the locomotives currently in operation may reach 30% in the average work cycle and up to 50% in the gravity work cycle.

Comfort and safety

The design of the new locomotive focuses on comfortable work conditions for the locomotive crew; the cabin has an all-round view.

The cabin is a frame made of rigid horizontal and vertical metal sections, steel-plated from the outside and coated with fiberglass panels from the inside.

The roof, side, rear and front walls and floor of the cabin have good heat insulation. The cabin has been designed so as to ensure the ease of control and safety of the diesel locomotive's systems. Designers have also paid attention to amenities. The cabin is fitted with a refrigerator, microwave

WHEN DESIGNING THE NEW DIESEL LOCOMOTIVE, DESIGNERS FOCUSED ON COMFORTABLE WORK CONDITIONS FOR THE LOCOMOTIVE CREW AND HAVE DESIGNED A CABIN WITH AN ALL-ROUND VIEW

and instructing driver's jump seat; the lower surface of each may be used as a dining table, when folded. There are under-the-ceiling storage bins for the first-aid kit, personal protective equipment and personal belongings of the operating staff along the front and rear walls located above front windows. On the side of the assistant driver, there is a heater used to heat the driver's cabin if the diesel generating set is out of operation.

Additionally, the machine is fitted with a radio set, traffic safety systems and fire extinguishing unit. The design of the diesel locomotive incorporates an electronic control and automatic fuel consumption recording system.

The driver's console features a transport panel computer (TPC) to display current information

OLEG KRAVCHENKO,
Director of the Engineering Center at BMZ MC JSC:

— The TEM28 is a brand new example of a shunting locomotive. We have succeeded in creating a design that secures not only excellent specifications comparable to the best foreign counterparts, but also a significant decrease in the lifecycle cost. Additionally, what makes the TEM28 unique is the fact that this machine is universal and can perform the broadest range of operations with consistently high efficiency — from light housekeeping to heavy clean-up and gravity operations. The solutions embedded in the diesel locomotive design (including the modular principle) make the TEM28 a perfect platform for the design of a lineup of shunting locomotives.

about the diesel locomotive's systems. The TPC displays parameters of various assemblies and subsystems of the diesel locomotive (operating mode of the diesel locomotive, parameters of the main and auxiliary equipment) on diagnostic screens (as symbolic circuits, tables and virtual devices) in real-time mode. The TPC also displays warning and alert messages in case of equipment failures or messages on deviation from normal parameters.

The new TEM28 diesel locomotive features good cost/performance and environmental characteristics, improved reliability and reduced lifecycle cost compared to the shunting locomotives currently in operation. It has the potential to become a new large-scale locomotive for Russian railways.

MAIN SPECIFICATIONS OF TEM28 DIESEL LOCOMOTIVE

Nominal power of diesel, kW (HP)	895 (1,217)
Service weight of diesel locomotive (with fuel and sand load of 2/3 of the total load), t	126±3 %
Axle configuration	3_0–3_0
Continuous rating rail tractive effort, kN (tf)	323.6 (33)
Tractive effort at starting, kN (tf)	367 (37.42)
Design speed, m/s (km/h)	27.8 (100)

Servicing fuel load, NLT, kg	
Fuel	5,400
Sand	1,800
Service life of diesel locomotive, NLT, years	36
Clearance as per GOST 9328	1-T

Overall dimensions of diesel locomotive	
Along automatic coupling axes, mm	16,900
Width (by frame)	3,100
Automatic coupling axe length, mm	1060±20
Transmission	Individual, via traction gear box from traction motor
Body type	Bonneted, with a carriage and a turret-type driving compartment

SINGLE-PURPOSE TRAINING CENTER

Production development and launch of latest technologies and new equipment require ongoing personnel training and adoption of new competences. At Transmashholding's nine enterprises, these tasks have been entrusted to corporate training centers. One of the largest of them has been operated at NEVZ for ten years. Training facilities feature simulators of latest locomotives.

Instruct the instructor

Many enterprises in various branches of our economy experience an increasing shortage of regular labor force and training needs. This also stands true for Transmashholding enterprises. Given that specialists had to be trained within very tight deadlines and sent to plants promptly in order to support production, a decision was made to develop an on-site staff training system. As a result of this decision, in 2006, the Corporate Training Center (CTC) was established at Novocherkassk Electric Locomotive Plant (NEVZ).

According to its founders, the center has to promptly respond to the need for a given specialist, introduce a continuous vocational training system, and maintain efficient cooperation between the enterprise and industry-specific educational institutions. During the past few years, NEVZ has managed to create a unique educational system that offers efficient specialized training. In 2016, the training center obtained a license for educational activities in order to offer training in 300 trades and areas of expertise (blue- and white-collar workers, economic, financial experts, etc.). They include 224 blue-collar jobs with training of all types offered: training of new workers, sidelining, and advanced training. Currently, workers, manufacturing technicians and developers from NEVZ, employees of Russian Railways, staff from the enterprises of Rostov Region and entire South Federal District are undergoing training and taking advanced and conversion training courses at the center.

The center occupies an area of more than 500 m3. It comprises special-purpose classrooms, laboratories and training ranges fitted with the most advanced training devices. Lecture halls are fitted with interactive equipment. Training classrooms feature hardware and software systems of the latest locomotive models. Training is organized at the workplaces of the training and production site and directly at the plant's shops.

Each student has to visit NEVZ

NEVZ has strict requirements to vocational specialist training. The enterprise continuously improves the staff training level and its advanced and conversion training system that the managers of the plant and holding as a whole consider to be the key factor that determines the efficient use of all other resources. Personnel investments and promotion of conditions for the staff professional


НЭВЗ
ДВИЖЕНИЕ ВПЕРЕД БЕЗ ОСТАНОВКИ -
НАШ ИДЕАЛ ПРОФЕССИОНАЛЬНОЙ ПОДГОТОВКИ!

Technical training of Russian Railways drivers

development yield good economic and production results.

Training simulator and 3D models

Training of the staff of the enterprises and organizations that operate, maintain and repair the locomotives manufactured by the plant holds a prominent place in the center's activities. First of all, this applies to the drivers of traction directorates of Russian Railways. Two of the NEVZ simulators are particularly popular among them. One of them replicates the control system interface of the largest-scale modern electric freight locomotives manufactured in Novocherkassk — "Ermak" and "Donchak". The other replicates the driving compartment of the EP20 electric passenger locomotive. The interactive equipment of training simulators enables simulation of adverse weather conditions, failure of individual equipment, overhead line failure, obstacles on the rail track, and much more. The simulator that imitates an electric freight locomotive has been used at the plant since 2013; passenger — since 2014. A total of some 700 people have already worked on the simulators. Additionally, drivers are in direct contact with electric locomotive designers, which facilitates efficient use of NEVZ machinery during train operation.

Specialists of service motive-power depots receive training under the 40-hour program "Design Features and Maintenance Techniques."

This program will help acquire in-depth knowledge of the specifications of electric locomotives,

EP20 simulator

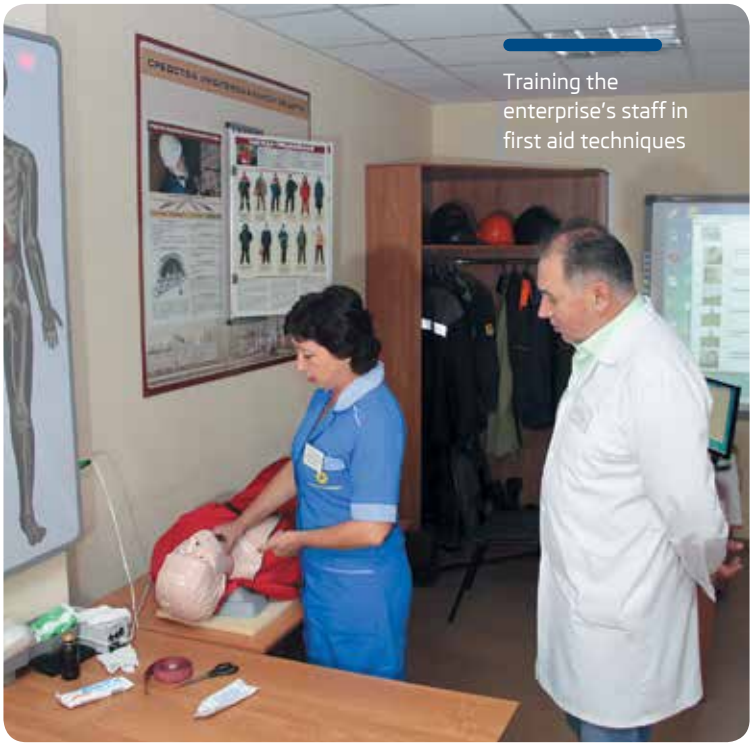
TRAINING, LABORATORY AND PRODUCTION BASE OF THE NEVZ CORPORATE TRAINING CENTER

- Pneumatics laboratory; mechatronics laboratory
- Classrooms: computer; mechanical operation; gas supply; boiler inspection facilities; load lifting structures and devices; electrotechnical personnel training; general technical subjects; health and electrical safety; welders' training; metallurgy and chemistry; lean manufacturing; production establishment and management; JSCo "RZD" staff training; IT training
- Olimp EP20 and Ermak 3ES5K locomotive simulators
- Classroom and range for the training of crane operators and strappers with special-purpose visual aids
- Classrooms and laboratories of educational institutions that act as strategic partners
- Forge-and-press, casting and welding laboratories
- Practical training site

SERGEY PODUST, Director of the NEVZ Corporate Training Center:

— Summing up the results of the 2015–2016 academic year, it is important to note that our center has served as the basis for the training of 6,717 of the plant's workers and 2,139 members of the white-collar staff. As usual, the plant is willing to share its knowledge with railway employees. During the last academic year, we trained more than 400 specialists engaged in the operation and maintenance of our electric locomotives.

Currently, we are actively extending our physical infrastructure and developing latest guidance and educational materials and training aids and fitting special-purpose classrooms and laboratories of our center. We have many plans that we will surely implement.



Training the enterprise's staff in first aid techniques

and scrutinize their main circuits and undercarriage. Classes are taught by experienced instructors in a special-purpose classroom fitted with interactive equipment, guidance materials and 3D models of the assemblies and units of electric locomotives. Upon completion of their training, manufacturing technicians, foremen and repair mechanics will be able to train their depot colleagues.

Achievements and outlooks

The center makes use of new educational techniques. The practical course entitled "Production system as the basis for the enterprise's dynamic development" is very popular among the managers and specialists of leading regional enterprises. It helps managers learn how to effectively develop a production system at their enterprises and integrate it into the corporate structure. Trainees learn the main principles of production system structures and study the global experience of Toyota, Bosch, Mercedes-Benz and other companies that have advanced experience and know-how in the NEVZ production system.

The training center holds annual workmanship contests among industrial engineers, turners, millers, welders, and electric overhead type crane operators. NEVZ has twice (in 2015 and 2016) held the "Best in Trade" workmanship contest among young employees and specialists of Transmashholding enterprises. NEVZ knowledgeable specialists won in four out of five categories.

The Corporate Training Center is not going to rest on its laurels and is committed to enhancing its achievements. All the current programs and training courses will continue over the mid-term. New best practices in guidance and ever-improving physical infrastructure will ensure even more efficient training of top experts.

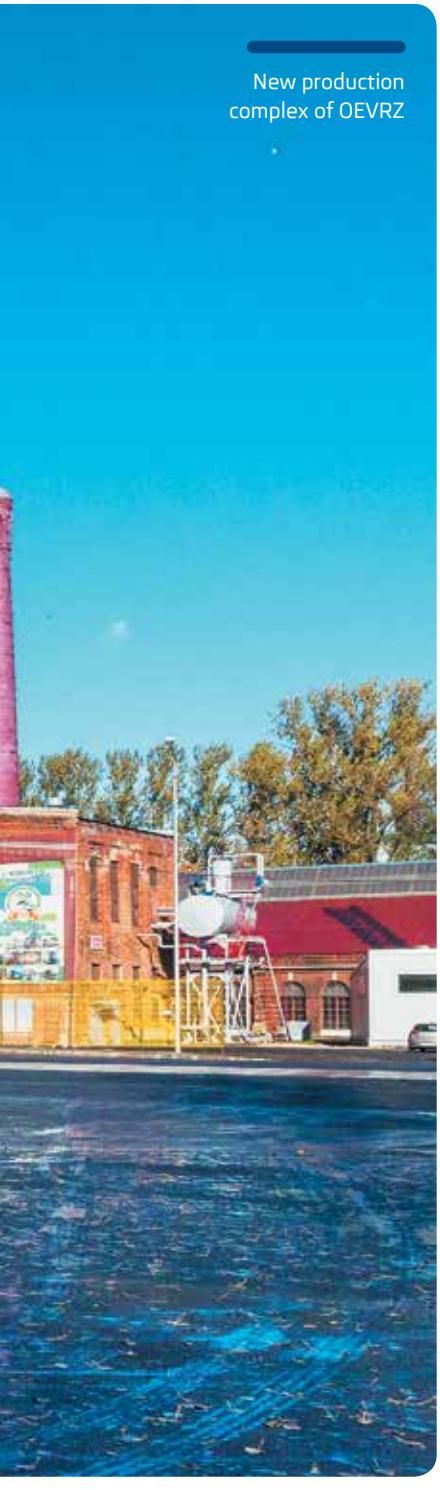
TRAINING AT NEVZ CTC IN THE 2015–2016 ACADEMIC YEAR, TRAINING WAS RECEIVED BY:

- 6,717 PLANT'S WORKERS
- 2,139 WHITE-COLLAR EMPLOYEES
- 80 ACQUIRED HIGHER EDUCATION
- 700 STUDENTS (PRACTICAL TRAINING)
- 400 SPECIALISTS ENGAGED IN OPERATION AND MAINTENANCE OF ELECTRIC LOCOMOTIVES

Text: **Anna Semenyuk**
Photo: **Dmitry Ibraimov**

NEW TECHNOLOGY FOR THE PLANT AND CITY

Transmashholding has launched a new flexible process cycle complex at Oktyabrsky Electric Car Repair Plant. The complex is intended for the manufacture of modern high-technology products — subway cars and trams.



New production complex of OEVRZ

Visitors of the enterprise inspecting the new complex

The opening ceremony of the new production complex was held on the 190th anniversary of the foundation date of Oktyabrsky Electric Car Repair (OEVRZ), one of the oldest enterprises of St. Petersburg. This is not by accident, as the plant has always occupied a special place in the city on the Neva River and performed top-priority tasks. It has always been recognized as one of the most technically advanced production sites of St. Petersburg. This is why the launch of the flexible process cycle complex is a logical new page in the history of the enterprise.

Close connection to the city

Until recently, the plant has only repaired railway machinery. Today, it focuses on the manufacture of the new passenger rolling stock. In the past few years, the cooperation between the St. Petersburg authorities and OEVRZ has strengthened. As part of an agreement signed by the city authorities and Transmashholding management at St. Petersburg International Economic Forum in June of 2015, OEVRZ has served as the basis for the implementation of an investment project involving establishment of the production of urban electric transport (passenger rolling stock). As a result, during the last two years, the main volume of the rolling stock produced by the plant was supplied to meet the transport needs of St. Petersburg.

Flexible approach

The new complex occupies an area of 15,000 m3. It will make use of flexible technology and, as required, will be able to promptly transition to new activities. The production complex comprises several buildings. One of them is used for the rolling stock manufacture. The other one will house assembly testing of the machinery produced. The testing facility is fitted with advanced equipment intended for a broad range of testing and commissioning operations. Additionally, modern administration facilities have been built to ensure comfortable conditions for employees. A special track spanning 1,200 meters enables dynamic tests of rolling stock with various voltages.

Launching of the new production site has become possible thanks to the plant's reengineering that has helped utilize the areas that were not used efficiently and consolidate production. The complex has been built since 2012. The new shop will offer employment opportunities to more than 300 people. The production capacity of the new complex is some 200 subway cars and at least 70 trams a year.

Preparations for the World Cup

The new flexible process cycle complex will focus on the manufacture of subway cars with asynchronous traction drive 81–722.1/723.1./724.1. A contract with Petersburg Metropolitan SUE provides for the delivery of 27 new six-car train sets with an asynchronous traction drive that OEVRZ will deliver to the company by April of 2018. The first train is planned to be delivered to the customer before June 30, 2017. The 3rd underground line will be fitted with the most advanced rolling stock made by OEVRZ by the time of the Football World Cup in 2018.

SERGEY MOVCHAN,
Vice-Governor of St. Petersburg:

— Transport machine building remains the leading urban industry. Currently, the plant is performing work under the contract with Petersburg Metropolitan SUE for the delivery of modern cars until 2020.

Plant's products in the new car assembly shop

Team of the new complex

BACKGROUND INFORMATION

Site area within development boundaries — 7.3 ha

Production complex comprises the buildings made of light-gage constructions:

Vh1 — assembly factory;

Vh2 — building for static tests of assembled cars.

Comprises the advanced equipment complex:

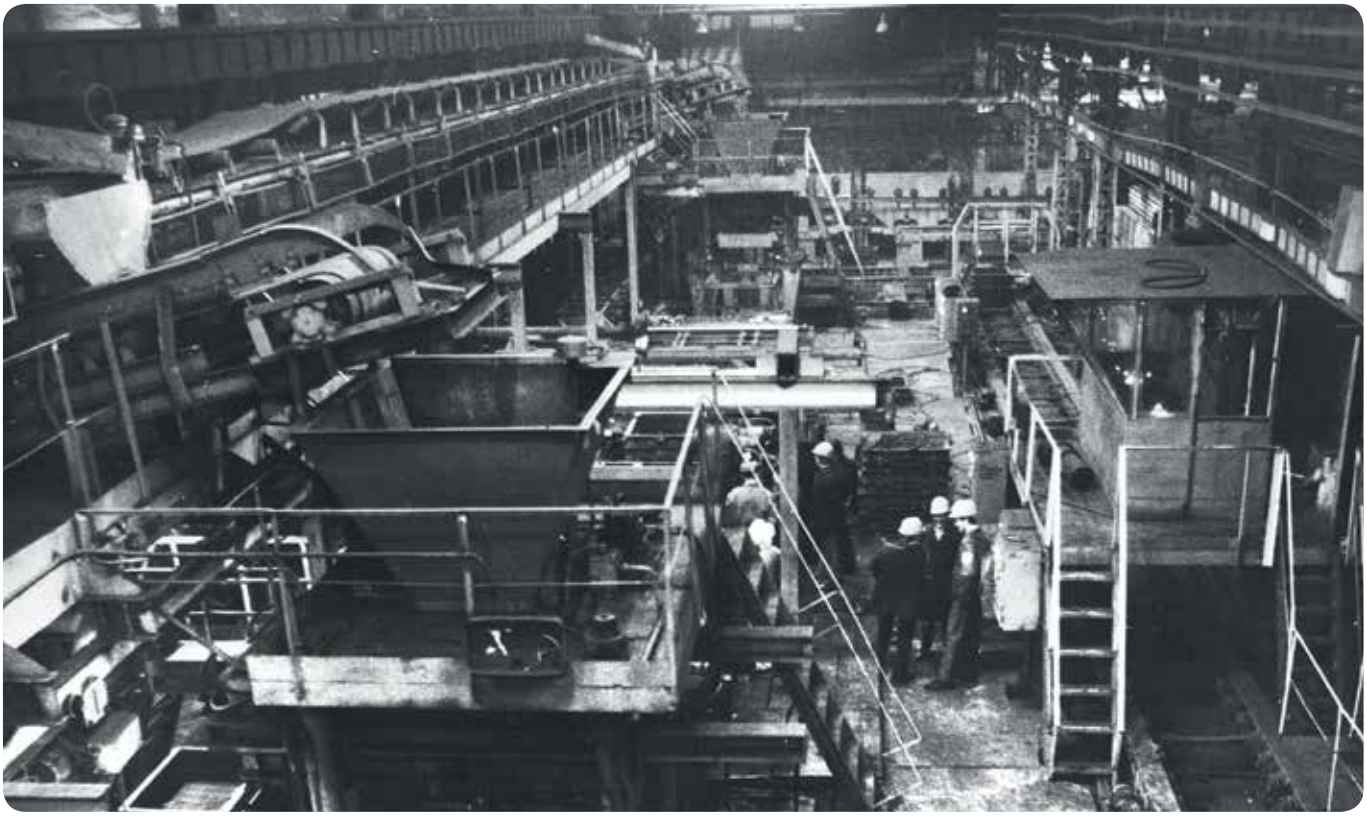
- **3 inspection pits for commissioning;**
- **equipment for car leak tests;**
- **car weighing unit;**
- **car spray irrigation unit;**
- **processing equipment to procure 550/750/3000 V test pressure for cars;**
- **modern administration premises.**

Dynamic test path — a special track spanning 1,200 meters that enables tests of rolling stock with various voltages.

Total area of Vh1 building (assembly site), including the transborder area exceeds 9,600 m2

Total area of Vh2 building (static test site) exceeds 4,500 m2

Number of staff — 312 employees



A PLANT OF STEEL TEMPER

After the Great Patriotic War, this country was in desperate need of castings for freight railway cars. The fast-growing industry required from Bezhitsa Steel Works something that seemed impossible — increase in the output. The only appropriate measure was the plant's technical retooling. Former trench fighters and guerillas who worked at the plant knew no fatigue. They built their peacetime life as selflessly as they had fought for the victory in the war.

The first-born of Soviet five-year plans — Bezhitsa Steel Works (BSZ) — was established in 1935. Shortly before the war, it yielded 100,000 tonnes of hot metal and 14,700 automatic coupling sets and bogie parts for high-capacity rail cars.

However, the fierce onslaught of fascists in 1941 affected the fate of the enterprise: it had to be urgently evacuated. BSZ joined Uralvagonzavod and took an active part in the manufacture of T-34 tanks. After Bryansk was liberated from the Nazis, the plant's workers returning after the evacuation started to reconstruct the plant that had been destroyed. It was a challenging task, since the fascists had left behind smouldering ruins. No wonder that Bryansk was one of the 15 cities that Stalin ordered to restore in the first place. Thanks to the workers' dedicated efforts, BSZ made its first steel in 1946.

Plant manager Afanasiy Fedorovich Averin is one of the heroes of the post-war era. He ran the enterprise from 1948 to 1965. Old-timers describe him as a man of an unbending will. He was an engineer of the old school; there was nothing he couldn't do for the sake of his country and its people. Afanasiy Fedorovich's resolve was combined with the ability to care for the plant's workers. It was under his management that the active construction of housing for the workers was launched. In particular, Averin initiated the development of the Novy Gorodok residential district.

Children's summer camp, five kindergartens, and sand-lime brick shop, whose products could be provided to employees for housing development, — these are the main social projects that were implemented at that time.

The plant's technical retooling was absolutely necessary. However, at that time, it was almost impossible. Even Averin's coworkers did not believe that this goal could be achieved. "If we don't start it out, we'll have no funds and no new houses for plant workers," these were Afanasiy Fedorovich's thoughts. They achieved it despite all odds! First, they upgraded Martin furnaces, increased their capacity from 25 to 60 tonnes and built a few new aisles of shop No. 2; in CH No. 1, they replaced "German" low-production molders with home-produced 235S.

In 1954, manufacturing of new journal boxes for passenger and freight cars was mastered, which helped increase the speed, weight and length of trains.

In 1956, plant workers began implementing the large tractor manufacturing technology. However, pursuant to the resolution of the Government of the USSR, the newly-built shop was transferred to the Bryansk Automobile Factory that later started manufacturing T-180 tractors. They were successfully operated in the Crimea, in the Extreme North, and during the construction of Aswan Dam in Egypt, and earned a good reputation.

In 1958, BSZ specialists successfully mastered the unique (at that time) Goldobin's inclined continuous steel casting machine. British metal makers who came to see it in operation were impressed with its characteristics.

All these measures secured a significant increase in output. However, the management believed that this was not enough. 1960-1961 saw reorganization of the plant's services: such divisions as engineering design department, main welder's service, capital building department and special office were organized.

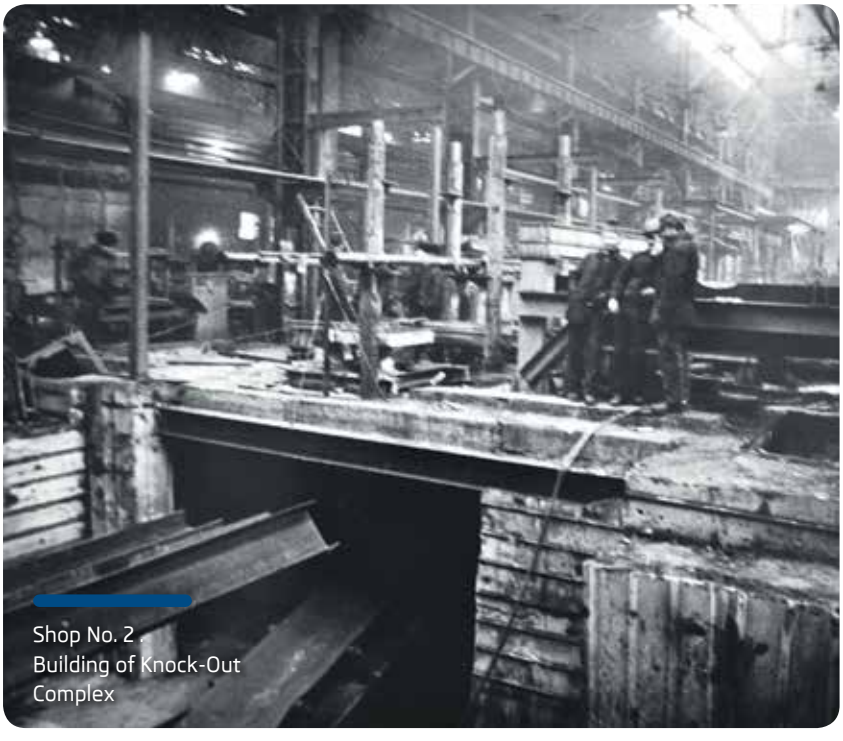
In 1962, the government issued an order for the development of the oil and gas industry; the plant initiated construction of a reinforcement shop. This played an important role in the plant's export activities — its products were delivered to 15 countries.

"At that time, the sand-conditioning unit at CH No. 1 remained a bottleneck," veteran Vladimir Lyubezny recalls. "The project was entrusted to me; the new department of the casting shop was built using the resources of the second and third shops within just one month. Besides, a four-way core-drying stove was built; 254 core machines were implemented. These measures helped increase manufacturing until the end of the 1960s."

Next to be built were the site of CH No. 3, casting factory, administrative building, rail depot, oxygen shop, drop-hammer plant with a slag processing system, turbo compressor and "Stal-2" high-voltage substation with a power line, circulation supply system, green and dry sand yards. Additionally, complete reconstruction of CH No. 1 was in the works; and a new fourth shop was built to replace CH No. 2. On the aggregate, this secured sufficient capacity to produce 217,000 tonnes of castings. Construction costs amounted to 159M rubles, which was twice the amount of the plant's available assets. Interestingly, at the first stage, CH No. 1 was modernized at the expense of the production development fund. All this became possible thanks to the unbending will of the plant's workers who believed in the success of peacetime solutions just as much as they did in the victory in the sacred war against fascism.

Plant Manager Afanasiy Averin

Vladimir Lyubezny with designing department engineers



Shop No. 2. Building of Knock-Out Complex

- 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

POSTAL ADDRESS:
Russia, 127055, Moscow,
Butyrsky Val 26, bldg. 1
TELEPHONE: +7 (495) 744-70-93;
FAX: +7 (495) 744-70-94;
E-MAIL: info@tmholding.ru
www.tmholding.ru

TRANSMASHHOLDING

HAPPY NEW YEAR!

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