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MAGAZINE FOR PARTNERS OF

Transmashholding

Report from Expo-1520
Railway Exhibition

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Valeriy Melkumov:
“People are the main value
in our holding”

p. 4



**Magazine for partners of CJSC
"Transmashholding"**

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Double-deck electric multiple units

Senior Vice-President of JSC “Russian Railways” Valentin Gapanovich has approved the terms of reference for an inter-regional electric multiple unit with double-deck cars to be developed by the designers of CJSC “Transmashholding”.

The electric multiple unit (EMU) will include two traction sections (at the head and tail of the train) and from 6 to 12 double-deck passenger cars. The traction sections of the EMU will be manufactured at Novochoerkassk Electric Locomotive Plant, and the passenger cars – at Tver Car-Building Works. Placement of traction and auxiliary equipment in traction sections at both ends of the train will ensure maximum passenger capacity because, unlike in conventional EMUs, there is no room for such equipment under double-deck carriages or on their roofs.

Passenger cars will have three classes of salons. The first (business) class cars will have 2+1 seat arrangement. A monitor for viewing video programs will be installed into each seat back. In the second (standard) class, the seating arrangement will be 2+2. Each seat will be equipped with an individual lamp. In the third (economy) class, passenger benches will be installed based on 3+2 arrangement. Adjoining benches will face each other. In addition, the cars will have separate VIP compartments for 2 passengers with ‘grand-deluxe’ class seats, a compartment for a disabled passenger in a wheelchair and their companion, a buffet bar, and a luggage room for large-sized luggage.

The maximum speed of an EMU will be 160 km/h, which will allow increasing the volumes of passenger traffic on inter-regional routes. Double-deck express trains are to be operated on the routes connecting Moscow and the nearest regional centers – Tver, Yaroslavl, Vladimir, Ryazan, Tula and Kaluga.

Alstom Transport, the holding’s strategic partner, as well as other Russian and foreign companies are expected to take part in the project. The production of double-deck EMUs is scheduled to start in 2014.

The government of St. Petersburg, CJSC “Transmashholding” and Alstom Transport have signed a memorandum on the project aimed at modernization and improvement of the street car infrastructure and upgrading of the city’s street car depot.

Street Car Named Desire

The document was signed by the city’s Governor Georgiy Poltavchenko, Chairman of Transmashholding’s Board of Directors Andrey Bokarev, and the President of Alstom Transport Henrie Poupart-Lafarge on November 16, 2011 at the St. Petersburg enterprise of Transmashholding – Oktyabrsky Electric Railway Car Repair Plant (OEVZ). The partners’ main objective is to provide the city residents with comfortable and safe municipal transport conforming to modern requirements. A competences center is to be formed at OEVZ facilities, and the development and production of low-floor high-speed street cars is to start. The project submitted to the Governor stipulates provision of a comprehensive transport product, including technical maintenance, repairs and modernization of equipment. In addition, Transmashholding and Alstom Transport are ready to advise the government of the Northern capital on issues related to the organization of the municipal transportation system, including power supply, creation of other auxiliary infrastructure facilities, and passenger flow optimization.



30 000 000 km
The total kilometers run by EP2K electric locomotives

At the end of November, the shops of Tver Car-Building Works delivered the first batch of maintenance cars for special-purpose rolling stock, models 61-4483 and 61-4484.

Comfortable Service



The cars are designed for JSC "Russian Railways." They will be operated as part of freight trains on 1520 mm gauge railways, irrespective of the availability of electrified sections. The cars are used for accommodating the train guards or repair crew of up to eight people, ensuring comfortable conditions for their work and rest. The cars are equipped with operating and emergency lighting, firefighting, water supply, heating and air conditioning systems. They offer compartments for two or four people, a workshop, a utility room with a shower and hot water supply, a toilet, a storeroom serving as a clothes drier, and a kitchen-dining room equipped with modern appliances, such as a fridge, an electric stove, and a microwave oven. Power can be supplied to cars from an onboard diesel generator set, which enables to ensure their independent functioning and operation in various climatic conditions.

According to the contracts signed, TVZ will deliver to the customer a total of 43 maintenance cars for special-purpose rolling stock by the year end.



Diesel Train for Serbia

Metrowagonmash, a plant of CJSC "Transmashholding" located in the Moscow region, began delivering diesel trains for Serbian Railways (Zeleznice Srbije).

The contract stipulates the manufacture of 12 two-car diesel trains which will be delivered to the customer within two years.

The cars are equipped with wide vestibule platforms made by HUBNER, which enables the train to freely pass curves and inclined areas, and allows the passengers to move safely and conveniently along the salon.

The heating and ventilation system in the cab and passenger compartments is made by Webasto, Germany. One of the cars has a multifunctional room located by the entrance door and designated for storage of prams, bikes, wheelchairs and large-sized luggage. The diesel train conforms to the requirements of the applicable international standards and European norms. The Mytishche train can become a worthy competitor for the products of major EU manufacturers.



The first EP2K specimen by Kolomensky Zavod (CJSC "Transmashholding") was presented in 2006. Nowadays, more than 120 of such electric locomotives are

running along the Russian railways. Based on the order of JSC "Russian Railways", Kolomensky Zavod is to manufacture 40 locomotives of this model in 2011.

Personal

SUCCESSFUL OPERATION OF EVERY ENTERPRISE DEPENDS, FIRST OF ALL, ON ITS PERSONNEL, WHILE THE LATTER DEPENDS UPON THE EMPLOYEES OF THE HR DEPARTMENT. Head of Personnel Management Department of CJSC Transmashholding Valeriy Melkumov spoke about the formation and training of the human resources and the role of the HR service in the process.

- Valeriy Dmitriyevich, what is your opinion on the importance of strengthening the role and prestige of the HR Service in corporate governance?

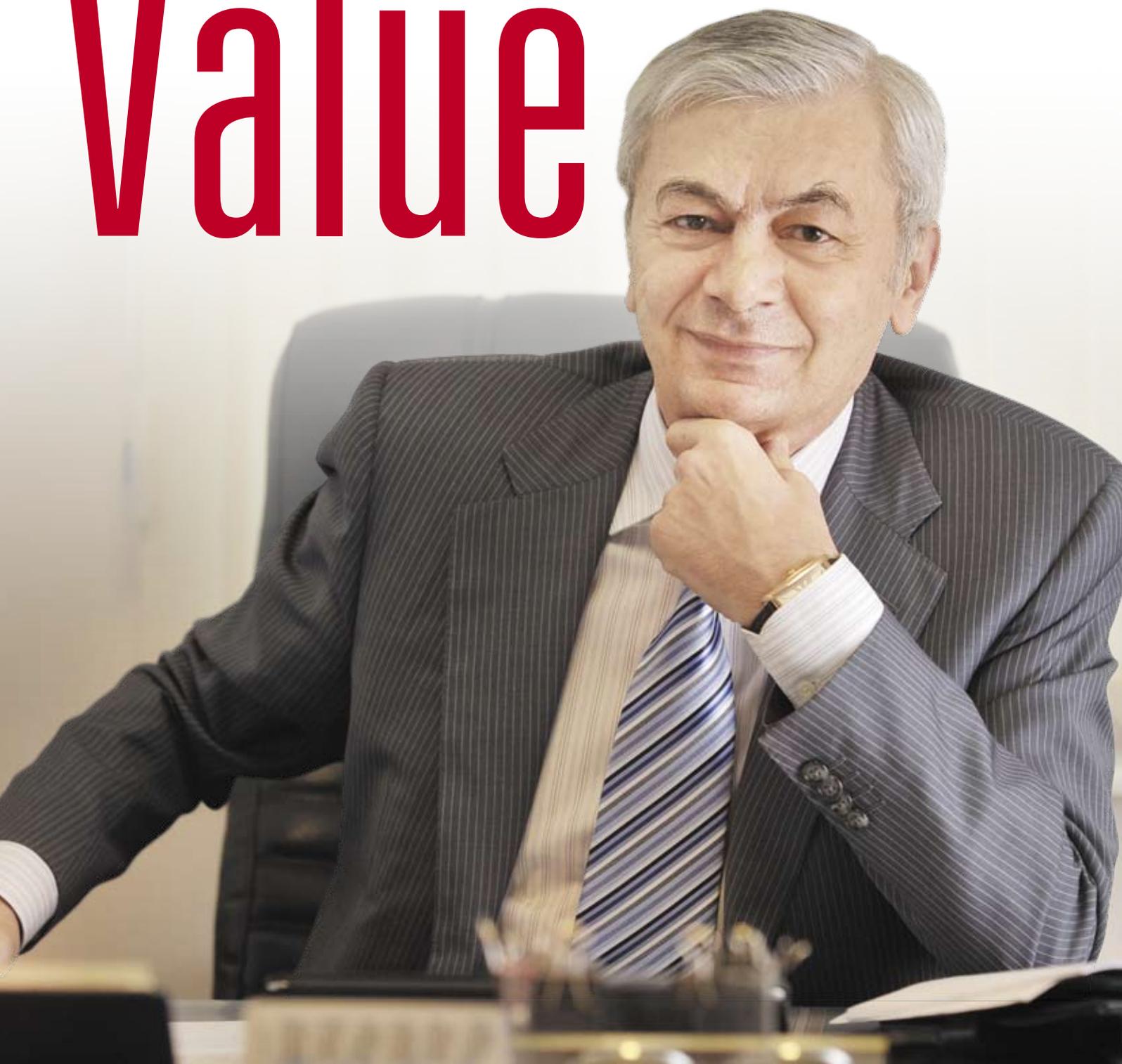
– There is a well-known phrase “Cadres are the key”, and it explains a lot. The modern corporate governance strategy requires better qualified and professionally trained personnel. This, in turn, increases significantly the responsibility and the scope of work for HR services, taking into account the tough competition on the labor market. The HR activities are not limited to the selection, hiring and dismissal of employees, but cover a much wider range, touching upon the whole structure of corporate governance. These activities include interaction with other functional subdivisions and government authorities on issues related to regulation of the Labor Code of Russia, personnel selection and rotation between enterprises, the necessary

dossier:

Valeriy MELKUMOV

- Born in 1946
- Graduated from the Power Plant Engineering Department of the Bauman Moscow Higher Technical School qualifying as machine engineer in 1970
- Began work after the graduation and held executive positions in major Russian companies
- Graduated from the Foreign Trade Academy in 1979 qualifying as foreign trade economist
- In 1984-89, worked for a joint Australian-Soviet company in Sydney (Australia)
- In 2005, became the head of Foreign Trade Department of CJSC Transmashholding
- Since 2009, has been in charge of the Personnel Management Department
- In 2010, received an honorary certificate from the Ministry of Industry and Trade of the RF for major individual contribution to the development of industry, for long faithful labor and was awarded the title “Veteran of Labor”
- In 2010, was included in the TOP-1000 Russian managers rating prepared by the joint project by the Russian Managers Association and Kommersant
- Fluent in English and Spanish

Value



From the first person

training and retraining of employees, personnel assessment, forming the talent pool, and staff motivation.

– **Any HR Service is faced with a complex, although very important task – preserving the talent pool.**

What are your actions in this respect?

– Transmashholding is one of the largest global companies specializing in transport machinery. The holding comprises 14 industrial enterprises with the total number of employees reaching about 55 thousand. Preservation of the talent pool is among our priority tasks. The holding always offers career growth opportunities to specialists. We have several examples where people went all the way from a working man, such as an electrician or a test man, to the general director's position. We form annually a talent pool made up of highly skilled specialists and managers with a view to subsequent promotion. Our system is based on several core principles: openness of the talent pool for employees, voluntary participation, clear and distinct selection criteria, objectivity and collegiality in making decisions regarding the talent pool formation. Nowadays, our holding has both an operational and strategic talent pool. The operational pool includes candidates who can replace managers in certain positions. The strategic pool means a specially selected group of young employees (under 30 years of age) with leadership qualities, i.e., the specialists who, following preliminary training, can occupy executive positions at the holding's enterprises in certain lines of activity.

– **What are your selection criteria for new employees?**

– Obviously, the holding's enterprises are interested in attracting highly-skilled, knowledgeable specialists who continually demonstrate excellent results. The professional selection of new employees builds the foundation for our future success. That is why we consider carefully all the candidates, while hiring. Surely, they are interviewed, including interviews on other levels than the departments and services where

they are being hired. During the initial stage, we consider the availability of certain competences needed for a given vacancy. By competences we mean personal qualities, professional knowledge, expertise and skills. In addition, we carry out regular assessment of the current employees. We check their adequacy for the job, their work quality, scope of work, labor discipline, loyalty and other parameters depending on the objectives of the assessment procedures.

THE HOLDING COMPRISES
14 INDUSTRIAL
ENTERPRISES WITH THE TOTAL
NUMBER OF EMPLOYEES REACHING
ABOUT **55 THOUSAND**,
SO PRESERVATION OF THE TALENT
POOL IS AMONG OUR
PRIORITY TASKS.

– **Any company, especially a large one like Transmashholding, requires regular recruitment. How do you deal with this issue at your enterprises?**

– We pay special attention to the process. Among other things, we cooperate with the training centers, including the country's leading technical higher educational institutions in Moscow, Bryansk, Kolomna, Rostov Region, and other regions. Almost every

enterprise signs agreements with the institutes, provides them with plant sites to ensure qualified training and apprenticeship, and invites senior students for traineeship. That is why young people graduating from higher educational institutions know where they can find a job, are familiar with the work conditions, and understand the prospects for career growth. In addition, we offer continual professional development courses and cross-training to our employees. A skilled person who wants to gain new knowledge has a wide range of opportunities. For instance, we make it possible for our employees to visit a different enterprise and look at the new production – from railway car works to diesel building, from locomotive and electric locomotive to metro car building. Thus, we create quite different areas for the application of our employees' skills. In addition, for large projects we invite people from various enterprises dealing with different types of machinery so that they can work together on designing the new product.

– **Could you tell us about the professional development opportunities available due to cooperation with your foreign partners?**

– We have recently allied with a global leader in the production of power equipment and railway transport – Alstom, a large French machine-building company. We started to use not only our partner's experience, while developing our products, but also the tools for creation and design of new projects. In particular, we are now using 3D-design, a computer platform, and new software. But the most important thing is that we regularly send our specialists to work at foreign enterprises for periods from several months to a year. Our employees learn about the modern equipment, study the production process of new machines, and gain overall advanced experience in transport design and production.

– **However trite it may seem, but the main driver of personnel attraction**

and retention is the salary. What approaches do you use for determining the salary levels?

– We do it based on the applicable internal corporate standards and regulations. An employee's salary level depends on their professional and business qualities, on the relevance of the profession or position, and on the individual contribution into the enterprise's performance. Naturally, while selecting and hiring personnel, the HR services are guided by the contemporary labor market requirements in the area of each enterprise's operation and the demand for this or that profession in a certain industry, taking into account the external influence by enterprises competing on the labor market.

– Nowadays, great attention in the world is paid to social support of employees. Some companies stimulate their employees by offering fringe benefits and bonuses. How do you motivate the employees of Transmashholding? Is social support provided at your enterprises?

– The holding uses a wide specter of personnel motivation tools. Enterprises have implemented a system of bonuses and fringe benefits which encourage the employees to work more efficiently. The payment terms are clear and potentially achievable by employees. As the need arises, we track the growth of the consumer price index, which we compensate by raising the employees' salaries at our enterprises. We pay great attention to this process.

The holding's enterprises have valid collective agreements which regulate the additional types of social support provided to employees and their families. First of all, these include financial aid associated with various life circumstances. In addition, we guarantee medical coverage and treatment at sanatoriums and resorts, providing, among others, trips to children's recreation camps for employees' children. Finally, we allocate funds to cover the childcare fees at preschool facilities and have our own kindergartens. We also have clubs where

our employees can enjoy leisure activities. Great attention is paid to relations with trade unions which are active in all of our enterprises. We define the tasks set by our trade unions and try to solve them together. Finally, the most substantial social support is provided to young families – we help them solve residential issues. Our communication with employees is not limited to the plant's precincts. It's important for the company to know how our employees feel after the shift, at the weekend, and during their holidays. We want them to live in a positive and worthy social environment which would promote their future development and wellbeing.



– Valeriy Dmitriyevich, what are the peculiarities of the holding's corporate culture?

– Corporate culture is quite a broad notion. It includes, of course, all of the professional holidays celebrated at all enterprises. This surely creates the atmosphere of belonging to a single culture, a single community. We organize regular professional contests for different occupations and between various plants and regions. We regularly distinguish the best young specialists in this or that line of activity. A lot of employees take an active part in the

artistic life of their enterprises and organize amateur groups. The employee's children attend thematic and sport clubs. We hold Olympics among the employees where they not only develop their competitive spirit but also learn how to become a single team. Many of our enterprises enjoy well-deserved popularity in their regions and their employees are proud of their work.

– What are the main personnel objectives for the holding in the coming year?

– The main value of our holding lies with our people. That is why our objective is to retain all of the employees who have

become very experienced during their years of work in the equipment industry. The contemporary market sets the objectives of producing new, high-speed, and comfortable machines, and this can be achieved only with the help of skilled and competent personnel.

We are optimistic about the future. Our order volumes are growing, that is why I think the need for, and the capability of, hiring new employees will arise in the near future. And the selection of highly-skilled personnel is among the priority functions of the HR service. ☺

Getting acquainted

KMT: the Quality



KMT Production Company, one of the youngest plants of CJSC “Transmashholding”, is located in Lomonosov, a picturesque suburb of St. Petersburg. **DURING ITS 20 YEARS OF EXISTENCE, THE ENTERPRISE HAS REVOLUTIONIZED THE PRODUCTION OF RAILWAY COMPONENTS.** It was here that, for the first time in Russia, batch production of new-generation aluminum plastic windows for locomotive-hauled cars, suburban trains, metro and city ground transport was organized.

Territory

What is KMT? Company employees are often asked this question and their reply is surprising: “Conversion of marine technologies.” Two decades ago, when an urgent need arose to convert the military-industrial complex enterprises to the production of consumer goods, three former defense industry employees created a plant with an absolutely new line of activity.

KEEPING UP WITH THE TIMES

Oleg Karmadonov, the current Director General of KMT, recalls that his colleagues and he were inspired by self-supporting basis, primarily from the organizational viewpoint, if not from the economic one. The line of activity was chosen accidentally: after the collapse of the USSR and dissolution of the Council for Mutual Economic Assistance, the Tver Car-Building Works had an urgent demand for high-voltage car couplers which were not being manufactured in our country at the time.

“We were able to organize the production of the said components quite fast and made the first step to winning the market over,” says Oleg Karmadonov.

In 1994, the company acquired a plant in Lomonosov, which had almost been reduced to ruins by that time. To restore the enterprise, we needed major investments which could be compensated only by large innovative projects. That is when we had an idea to produce aluminum plastic windows for passenger cars at the plant. It took only three years to start the batch production.

Years passed, and other state-of-the-art projects were needed to develop the enterprise, all the more so because Western competitors were developing a growing appetite for the Russian market of railway components. Thus, we decided to master the production of new-generation automatic doors at KMT. Their fundamental difference is that they have an automatic drive for door leaf control.



Oleg KARMADONOV,
Director General of JSC
“KMT Production
Company”:

– Nowadays, the strategies of developed companies are based on new projects and, therefore, on attracting new consumers for their products. We are mainly focused on automatic doors. We are making them not only for mainline cars now. This year, we have started delivering automatic doors for electric trains. In the future, we are planning to start the production of subway cars and other types of transport. However, we also expect our mainline car orders to grow because the mainline car fleet is extremely worn out as of today. I am sure we have occupied a stable competitive position on the market of rolling stock components.



Getting acquainted



Plasma arc cutting unit

Currently, the enterprise operates with all of the leading car works in Russia, delivers its products to Belarus, Ukraine, Kazakhstan and the Baltic countries. Last year, the company was selected as a railway components supplier for the Siemens international concern within the framework of the project stipulating delivery of RIC sleeping cars to JSC "Russian Railways." According to the program, 200 cars will be equipped with our plant's products by 2014.

THE STAKES ARE ON HI-TECH

As always, everything starts with an idea. At KMT, new technical solutions are generated by the company's own engineering center divided into two sectors. One of them constitutes a design and construction office which designs new products. The specialists from the other sector deal with batch products support.

Quite recently, the engineering sector received some good news: no

problems have been detected upon expiry of the warranty period for automatic doors installed, for instance, in the cars of the "Red Arrow" train.

'As of today, we have produced about 3,000 cars with such doors, and no operating problems have been detected so far,' says cheerfully head of the construction office Yuriy Akhremeyev.

Before it becomes a car door or step, a steel or aluminum sheet undergoes long processing: cutting - alignment - bending - welding - cleaning - painting. Only then the final stage, the assembly, takes place. Depending on the complexity of an article, the production cycle can last anywhere from two days to six weeks.

In the blank preparation shop, only eight people are employed. No more personnel are necessary because all machine tools are controlled by computers. Since the enterprise was born, we have set the objective of minimizing costs and using only state-

of-the-art, highly efficient equipment. Smart machines operate in other shops as well, which, in turn, requires extremely skilled workers. That is why the percentage of employees with a higher education is so high. One fifth of our employees are former military professionals of the Russian Army, such as Alexandr Novikov, a laser cutting machine operator.

'The machine is home-produced, although it corresponds to similar German machines based on its parameters,' tells us Alexandr about his 'iron assistant'. 'While the German machines have been produced since the 1970s, ours are only a few years old.'

Two machines draw our attention in the blank preparation shop - a bending press and a plasma arc cutting unit. The former, which has a laser-controlled bending angle, bends metal with extreme precision. After the press acquisition, the reject rate at the enterprise has dropped significantly.

reference data

'We have decided to buy a double-head plasma arc cutting unit,' explains Deputy Executive Director Vladimir Kriger. 'One head is equipped with a turret which allows cutting a work piece at the right angle. While a laser can cut metal up to 20 mm thick, plasma can easily cope with a sheet up to 70 mm thick.'

ENVIRONMENTAL SAFETY

A new two-storey building houses a paint shop. The cleanness inside reminds you of an operating theater. But the most striking feature is an almost complete lack of paint smell. 'This is due to a well-designed and made extract-and-input ventilation,' reveals the secret Vladimir Kriger. 'The input air is thoroughly filtered and only after that it is discharged in the atmosphere. Our facility undergoes regular environmental checks. Air samples are taken and no deviations from the norm are found, which is not surprising at all.'

Unlike many other operations, complete automation of the painting process does not seem possible. The range of components is too large. Thus, the painting quality is ensured by a highly skilled painter with his sharp eye and sure hand, who performs better than a machine: he would always notice any defects and correct them promptly. In addition, a human, unlike a computer, does not require a lot of time in order to switch to a different component or color. The modern requirements to paint and lacquer coatings are very high. That is why the shine on a freshly-painted car door is no worse than that on a new car.

CADRES DECIDE EVERYTHING

Windows are assembled at the adjoining building. One of the lots is not quite ordinary, with a greenish toning. According to Viktor Milyukov, a senior specialist on windows, this type of toning improves the climatic

- Closed Joint-Stock Company "KMT Production Company" was created in 1992.
- The enterprise is located in Lomonosov (St. Petersburg) and is a member of Transmashholding.
- The number of employees is 800 people.
- The company specializes in design and production of equipment for railway passenger cars. KMT products include windows, manual and automatic doors, car couplers, and other equipment for newly-built cars and cars undergoing overhaul reconditioning.
- KMT products are supplied to the markets of Russia, Belarus, Kazakhstan, Latvia, Moldova, Uzbekistan, Ukraine and Estonia.

characteristics of a car and creates a more comfortable atmosphere. A machining shop located in a different building where the components are processed seems to be the noisiest one. Its employees are generally qualified young specialists who are not easy to find on the local market. That is why KMT has to form its human capital independently. The company engages in close cooperation with educational establishments trying to attract some clever graduates who grow into excellent specialists after acquiring some years of experience at the enterprise. Personnel are retained not only by means of a good salary, but also due to good working conditions. In addition, the company provides free lunches for employees. A special bus takes people to and from work. The company offers excellent conditions for professional development, including training abroad. KMT is currently implementing the so-called lean production system. It allows reducing losses from overproduction, waiting time, unnecessary transportation, excessive processing stages, and losses due to defective products. Lean production allows cutting down the costs without any expenses, only by applying certain organizational methods. The stages of program implementation are shown in 'before and after' photos on the information stand. Detailed information about the program is provided on page 20. Nowadays, the enterprise employs 800 people. The work is organized in two or, at some lines, even in three shifts. Everything depends on the volume of orders which fell significantly after the crisis and is gradually restoring now. Despite the above, the enterprise makes continual and significant investments in the modernization of production. In the near future, new equipment for the machining shop will be purchased, flow production at the assembly line will be organized, and the welding shop will be modernized. New projects and developments are going to take KMT to international markets. 



A man, with his sharp eye and skilled hands directing the spray nozzle, is better at painting than the machine

Attention! The doors are closing!

Not so long ago, almost every train passenger could understand the construction of car windows and doors. **AT THAT TIME, THE MOST DESIRABLE TRAVEL COMPANION WAS A STRONG MAN WHO COULD OPEN THE WINDOW WITH A WOODEN FRAME SWOLLEN WITH MOISTURE OR PUSH A JAMMED DOOR WITH HIS SHOULDER.** However, the demand for such 'services' faded when the old car components were replaced with new, up-to-date aluminum-plastic windows and automatic doors.



SMART DOORS

Manual swing doors in passenger cars are gradually being replaced with automatic ones. The ideology of contemporary passenger transport engineering is based on maximum convenience for staff and passengers, which, in particular, is achieved by using automated systems. That is why the price factor, which constitutes an advantage of swing doors, is slowly fading away, giving place to safety, comfort and availability of various additional functions.

In 2007, Tver Car-Building Works began serial assembly of new models of cars which were to be equipped with sliding plug side doors with an electric drive. By that time, KMT specialists, who had considerable experience in making swing doors, were able to satisfy the new needs of their customer as they had carried out serious work on design and process development and had tested the reliability of the first specimens of the new product. During the same year, KMT delivered the first automatic doors. Nowadays, virtually all new long-distance passenger rolling stock is equipped with sliding plug side doors. The doors can be controlled both from the car and centrally. Their operating principle is slightly more complex than that of subway and electric train cars. In the latter, the door leaves move in a single plane, while in long-distance cars, the leaves of sliding plug side doors move in several planes, as they first protract outside, and then move parallel to the car wall. On the one hand, such

doors are more difficult to operate; on the other hand, they can be sealed more tightly. This is especially important at mainline railway sections where cars are often subjected to significant fluctuations in air pressure, for instance, when two high-speed trains meet en route.

The only things a passenger notices while looking at a modern sliding plug side door with an automatic drive are the leaves of a prefabricated frame structure, a door panel with a glass unit and two lighted buttons – ‘Open’ and ‘Close’. Naturally, the most interesting details are hidden from the eye. Those include an electro-mechanical drive with a gear motor and a toothed belt on pulleys, which ensure movement of the door leaves. The adjacent components include the ‘brain’ of the automatic door – the control unit. The list of its functions, i.e., the extent of automation of a certain door, depends, in the end, on the car design.

The information on the condition of the door is delivered to the train control and monitoring system (TCMS) from the control unit. Locally, the door is controlled from two control consoles: the exterior and the interior one (in the vestibule). In addition, the door is equipped with a ‘buzzer’ sound alarm signaling opening/closing and a sensor for detecting obstacles in the frame. The rated voltage of electric equipment makes up 110 V DC. If necessary, an automatic door can be switched into manual operating mode. This is done by pressing an automatic switch in the vestibule wall niche. The

The total of

2250

car units have been produced
(including the estimates for 2011)

reference data

Automatic doors from KMT

- single-leaf sliding plug door with electric drive;
- single-leaf sliding door with electric drive;
- double-leaf sliding door with electric drive;
- analogues of automatic doors with manual drives.

The mass batch production started in 2007. Consumers: JSC “Tver Car-Building Works”, JSC “Metrowagonmash”, JSC “Demikhovskiy Engineering Plant”, CJSC “Vagonmash”.



The main drive type is the electro-pneumatic drive, while mainly electro-mechanical drives are used for doors in long-distance cars

Glass units are made from float-glass which is characterized by perfect smoothness and lack of optic defects. All windows are equipped with special safety hardened glass. If broken, such glass does not fly in splinters, but breaks into injury-safe chips. In addition, a toned polymeric film can be applied onto the exterior glass which ensures comfort interior temperatures even in bright sunlight. On the one hand, toning saves up on air conditioning during the summer; on the other hand, it reduces heat loss from the car during wintertime.

Window frames and vents are made as aluminum frames with thermal insulation between the exterior and the interior contours. In new profile designs, thermal insulation is achieved by using plate elements, such as glass-nylon composite. Window design is completed with rubber sealing elements.

Windows in a modern passenger car must possess a set of qualities, the most important being air-tightness, which is ensured by a whole system of rubber sealing elements. According to General Technical Requirements to

door is equipped with two types of locks – a regular lock and a backup locking device which is not easy for a stranger to find. The signal to lock the doors can also be sent centrally, i.e., from the locomotive.

Speaking about automatic doors for subway and EMU trains, it should be said that they are fundamentally different, although look quite similar to the doors of long-distance trains. The most obvious difference is the availability of two synchronously operating door leaves. In addition, the most popular drive type is electro-pneumatic, while in long-distance cars mainly the electro-mechanic drives are used. The drive is controlled either from the driver's cab or directly from the car, which can often be observed in subway trains of various European countries. The doors are similar in that the door operation algorithm is realized via the control unit. The unit also transfers the information on the condition of the door to the train control system. Each door is usually equipped with a sensor for detecting obstacles in the door frame. The door design includes a device for fixing the leaves in a closed position and for emergency manual opening in case of electro-pneumatic drive failure.

IT'S NOT ENOUGH TO BE TRANSPARENT

Aluminum-plastic windows and automatic doors for passenger cars are among the most popular and demanded products of JSC "KMT Production Company". Thus, windows account for one third of the total volume of sold items. Currently, the company produces the whole range of windows used in the production and repair of passenger cars. Depending on the car type, windows can be equipped with single- or double-chamber glass units.



Windows of Locomotive-Hauled Passenger Cars, effective since October 1, 2010, the heat-transfer coefficient of newly installed windows must not exceed $2.0 \text{ W/m}^2\text{K}$. In addition, glass units in passenger cars must have a range of optic and strength characteristics. During counter-motion of two long-distance trains, their total speed can reach 400 km/h . A powerful shock wave is formed in the narrow air corridor between trains, which results in excessive dynamic pressure. It is easy to imagine the consequences of possible scattering glass splinters for the people. To avoid this, KMT windows are designed to withstand the pressure of $\pm 6000 \text{ Pa}$. The windows must retain those characteristics at temperatures from -50 to $+45$ degrees Centigrade, being free from mist and withstanding all of the weather caprices. That is why the selection of component parts and the manufacturing of quality products constitute a complex and responsible task.

Passengers in the Russian trains have acquired a real breathing space due to windows with vents that can be opened or closed by a person with any degree of physical strength. The vent tilts inside at 30 degrees and is equipped with a special lock. Currently, KMT has developed windows with vents of a new design which significantly enhance the capabilities for salon ventilation and are designated primarily for electric trains.

One of the designs has a higher vent block, and the other has a sliding plug vent which ensures much better ventilation during the summer heat and sultriness because it opens the vent hole completely. This vent can also be fixed in any assigned position, which enables to regulate the air flow. Emergency exit windows have their own peculiarities defined by their designated purpose. Emergency windows of AVSh1 and AVSh2 types operate based on the well-known principle "pull the string, push the glass". In case of an emergency, windows of the first type require pulling a handle to remove the rubber seal on the lock and then pushing the glass unit which then hangs on security ropes outside. In case of emergency exit through AVSh2, one must pull the handle and fully remove the rubber seal on the lock together with the cotter, following which the glass unit descends into a space between the body walls. Such windows can be brought back to normal using a lifting device. AVSh3 windows, however, operate based on a different principle. In an emergency, the window is broken with a special sharp hammer and passengers are evacuated using a rope attached to the upper window frame. Fortunately, emergency windows are not used for their designated purpose very frequently, so in regular hours they perform all the functions of fixed windows. ©

KMT windows

- fixed wide and narrow windows (GSh, GU);
- wide and narrow windows with vent (FSh, FU);
- emergency exit windows (AVSh1, AVSh2, AVSh3);

Batch production started in 1997.

The total production volume (including 2011 estimates) – 329 000 pieces.

Consumers: JSC "Tver Car-Building Works", JSC "Metrowagonmash", JSC "Demikhovskiy Engineering Plant", CJSC "Vagonmash", JSC "TorVZ", car repair enterprises in Russia, Belarus, etc.



The Magnificent Seven

EXPO-1520 INTERNATIONAL RAILWAY EXHIBITION took place in September in Shcherbinka, a town in Moscow Region. The salon participants and guests were shown more than 50 items of new railway rolling stock. Transmashholding brought seven prototypes created by the company over the past years.



- ▲ The main exhibit was a dual-system electric passenger locomotive EP20, which was developed in cooperation with the strategic partner, the French company Alstom Transport. This is the first high-speed dual-system electric locomotive (capable of driving trains along both DC and AC lines) in the history of the Russian engineering and the main project of the program aimed at creating a line of fifth-generation Russian electric locomotives. The locomotive is capable of reaching the speed of up to 200 km/h. The use of dual-system electric locomotives cancels the need to change locomotives at junction points where railway lines with various types of current are connected. This will help significantly reduce the train travel times. EP20 electric locomotives are to be supplied to the Russian railways starting from 2012.



President of JSC Russian Railways Vladimir Yakunin and Vice-President Valentin Gapanovich look at the stand of Transmashholding



◀ The professionals from Bryansk Machine-Building Plant brought to Shcherbinka their bonneted shunting locomotive TEM-TMH which was designed together with the Czech CZ Loko and the Vilnius Locomotive Repair Depot. The locomotive tests, which were completed in the spring of 2011, demonstrated its efficiency and fault tolerance. The modular structure of the locomotive enables to create a configuration which meets the customer's needs to the greatest extent possible.



Innovations

Demikhov Machine-Building Plant presented two new modifications of ED4M direct-current electric train. The supplies of the 2011 modification to the Russian railways have already started.



▲ The advanced modification of ED4M differs by its smooth body and a completely new cab, the use of energy-saving electrical equipment, backlash-free couplers and video surveillance systems. ▶



The designers have fully altered the saloon, installed air conditioning systems in the saloons and vestibules, used new inter-car walkways, the systems of lighting, video surveillance and diagnostics. They have installed sealed doors and the auxiliary converter with increased capacity.





Tver Wagon Works presented to the guests two models of cars designed for maintenance of freight and service trains. The cars are aimed to create comfortable conditions for the work and rest of railway personnel engaged in train servicing. They are equipped with compartments, showers with a water-heating system, a storage room, a clothes dryer, and a workshop. The cars are also fitted with air

conditioning and a self-contained diesel burner for the boiler, ensuring operation in various climatic conditions. The kitchen has all the necessary appliances, including an electric cooker, a microwave and a fridge. A TV antenna can be connected. A special modification has been created for dosing hopper trains. It differs by a compressor that is used during unloading.



Another design by Bryansk Machine-Building Plant includes a gondola car of 12-3090 model. This product is new for the plant. In terms of design, the gondola car differs by the use of a reinforced top cord structure, wheel-saving asbestos-free brake blocks and some other features.

Labor organization

"Surely, there is no more need to persuade anyone to implement lean production methods and tools at the plants"

(from the speech by A. A. Andreyev, Director General of CJSC "Transmashholding")

Lean production system

GAEL DUMETIE,
Director for Production
System of CJSC
Transmashholding

Most of the contemporary industrial leaders on a global scale have long recognized the efficiency of the lean production system. Over the past years, the trend has been developing in Russia as well. **LEAN PRODUCTION SYSTEM IS BEING FULLY IMPLEMENTED AT THE HOLDING'S ENTERPRISES AND CONSTITUTES A PRIORITY TASK.**



The process was launched two years ago at five of the holding's enterprises - TVZ, BMZ, DMZ, MVM, and NEVZ. This year, another four plants have implemented lean production - KMT, OEVRZ, TsSM and KZ. The enterprises have nominated the candidates and formed structural subdivisions - lean production departments included in the restructuring directorates. The main process document, 'the roadmap,' comprises requirements to five areas of the production system development: management, production planning, quality, production, and logistics. A new version of the 'roadmap' has been developed in cooperation with the plants' restructuring directorates and approved at plant level. As for



the current state of process implementation, the targets have been reached or even exceeded at certain pilot sites. Deviations of mean values from the targets do not exceed 27%. By the year end, lean production is to be introduced at up to 25% of production sites with regard to the total production area of the main and auxiliary shops and over 3700 people are to be involved in the project at nine plants. A priority task of the lean production system constitutes its implementation at pilot sites and engagement of plant personnel. During the period from 2009 to 2011, some positive changes in the plant staff's attitude to the lean production system implementation have been observed. The workers, foremen, and specialists of enterprises became

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Labor organization



interested and began to participate actively in the implementation of new methods and tools facilitating the improvement in working conditions, the reduction of losses and the optimization of production processes on the sites. To train the employees on the basics of lean production, the production system directorate of TMH and the plant restructuring directorates have held working

seminars on practical use of tools in shops during the year. The trainings included, among others, line balancing, smed, Kanban, swip, 5S program, TPM, VSM, and quality tools, such as QRQC, PDCA, 8D, FMEA. The implementation of such new tools as line balancing, smed and Kanban reduces the work-in-progress, inventory, the order implementation time and the

equipment changeover time, increases the efficiency and production flexibility. Based on the results of three audits conducted at the plants, we can observe continual, if imbalanced, increase of the overall scores, while the task is to increase the overall score by at least 0.5 point. Based on the 2010-2011 audits, the leading enterprises are NEVZ, DMZ, and TVZ,

THE EVENTS SCHEDULED FOR NEXT YEAR INCLUDE PERSONNEL TRAINING, IMPLEMENTATION OF TOOLS AND METHODS AT NEW SITES, MASTERING OF NEW TOOLS, ACTIVATION OF ACTIVITIES AT ENTERPRISES AIMED AT IMPROVING THE WORKING CONDITIONS AND INCREASING PRODUCT QUALITY.



while KMT was best among the plants participating in the audit for the first time.

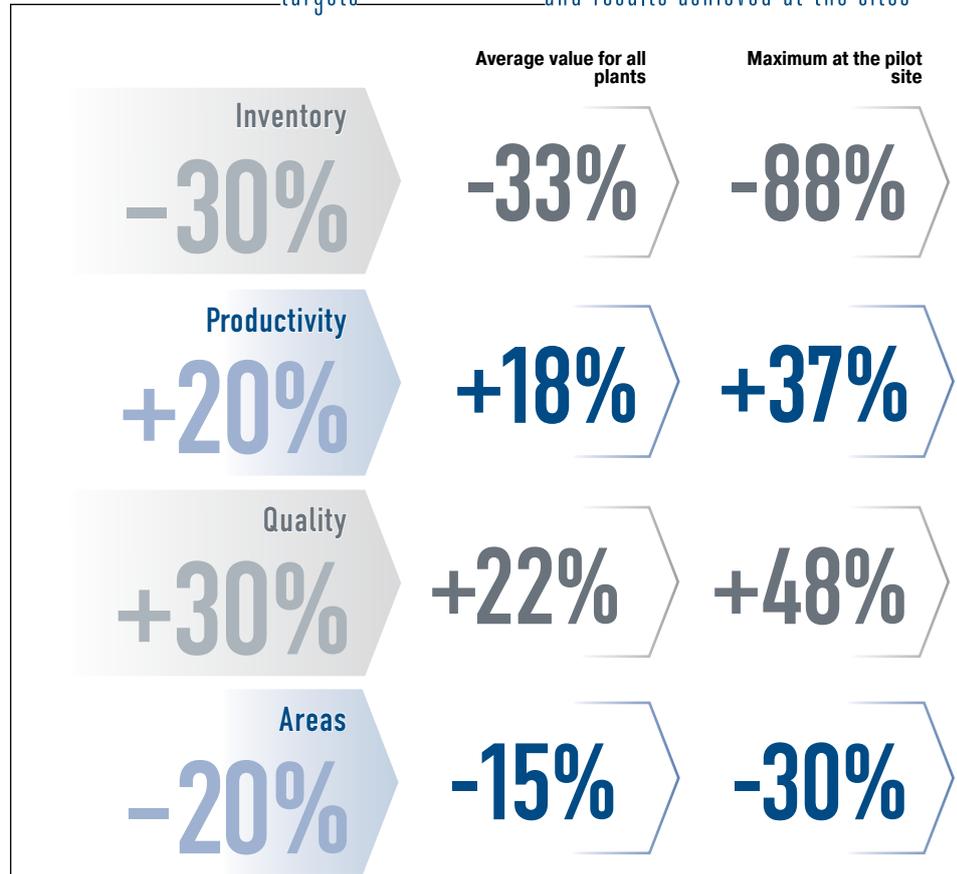
Next year, another enterprise – Penzadizelmash – is going to participate in the process of creating the TMH lean production system.

In addition, two audits are scheduled for 2012, the nearest one to take place in April. That is why, immediately after the audit, the plants began to prepare their action plans aimed at achieving the target values in key directions of the roadmap.

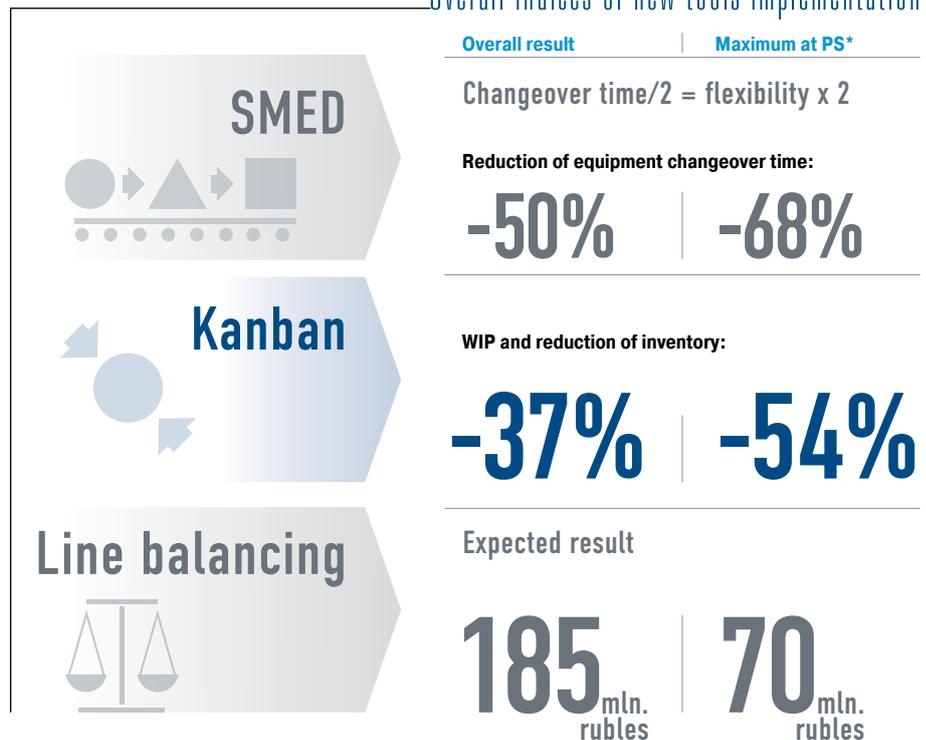
In 2012, further involvement of pilot sites at the plants is scheduled, with the total number of pilot sites to reach 50% with regard to the areas of the main and auxiliary shops. According to the schedule, lean production tools are to be implemented at over 30 pilot sites at every plant.

Trainings of the enterprises' specialists on the use of standardized methods, lean production tools and quality will facilitate a successful formation of the lean community in TMH.

targets and results achieved at the sites



Overall indices of new tools implementation



*(PS – production site)

Window to Europe

Nowadays, the aluminum plastic windows on Russian long-distance cars are no news. However, it was not so long ago that **THE FIRST SET OF CAR WINDOWS FROM KMT PLANT CAUSED REAL FURORE AMONG PROFESSIONALS.**



In the past, wood frames were installed even in the engine driver's cabin. See 027 for the motor car of the electric train. Year of manufacture is 1932

Let us look back a little and peep into the workshops of Alexandrovskiy Plant (the current Oktyabrskiy EVRZ) in the mid-19th century. At that time, the Plant was constructing three classes of cars. Window frames in the first and second classes were made of redwood, while in the third class the frames were from ash tree. The lower, and not the upper, section of the window could be opened. The practice of making windows from wood was maintained up to the end of the 20th century. The main materials included oak, beech, and larch. Conventional thick toughened glass panes were fitted into wooden frames with rather primitive rubber seals.

Being relatively cheap, the wooden windows had several material drawbacks, including draughts, swelling of the wooden frame in rainy weather, which caused the 'catching' of the vent window, and water penetrating both between the frame and the car wall and between the glass and the frame.

The solution to the problem of such archaic elements requiring replacement was found in St. Petersburg.

In 1995, the professionals from KMT decided to offer to car manufacturers the windows with frames made from aluminum plastic profile and insulated glass units instead of glass. The designers took a thorough approach to the issue: they had

studied the foreign experience and carefully selected the grade of the aluminum alloy, the composition of the liquid compound for filling the space inside the aluminum profile.

Difficulties arose even at the stage of selecting the profile supplier. Some manufacturers with whom the designers negotiated frankly admitted that they were unable to produce a profile of the specified configuration (in some areas the profile wall thickness was to be only 0.3 mm). Finally, the supplier was found, the first samples were made and filled with the compound. The test bending of the profile was performed at "Pella" ship-building yard in St. Petersburg, where the required equipment was available and the bending tools had been ordered in advance. The test was successful and the decision to buy the machine tools was made.

Another task was to find a supplier of rubber profile. In Russia, no profile of the required physical and operational properties was being made at the time. A publication in a scientific-research journal informed the company professionals that there was a rubber manufacturer which could theoretically produce the profile of the required configuration and properties. The manufacture lived up to the expectations and accepted the sent drawings for execution. But the KMT professionals were yet to find a supplier of insulated glass units. The samples they had studied were no good because the glass surface was wavy. After a long search, the contractor was found – it was RSK, a manufacturer of insulated glass units from float glass.

Eighteen months of strenuous, science-intensive work resulted in the construction of the first set of aluminum plastic windows for railway cars. The November of 1996 became the starting point for conversion to the new windows by the Russian car-building plants. Today, 15 years later, the main process principles of window manufacture for long-distance cars are still preserved, although they are being continually improved. ©



- 1 The largest rolling stock manufacturer and seller in the CIS
- 2 A top ten world manufacturer of rolling stock
- 3 The only Russian company with expertise in development and production of rolling stock for Arctic climate
- 4 Transmashholding-manufactured rolling stock is in service in all climate zones

PRODUCTS AND SERVICES PROVIDED BY THE COMPANY:

- Main line and industrial electric locomotives
- Main line and industrial diesel locomotives
- Freight cars and passenger coaches
- Electric train cars and metro cars
- Rail buses and diesel trains
- Car castings
- Diesel engines for diesel locomotives and marine vessels
- Diesel-generators and turbo chargers
- Components for transport
- Spare parts
- Repairs and maintenance

