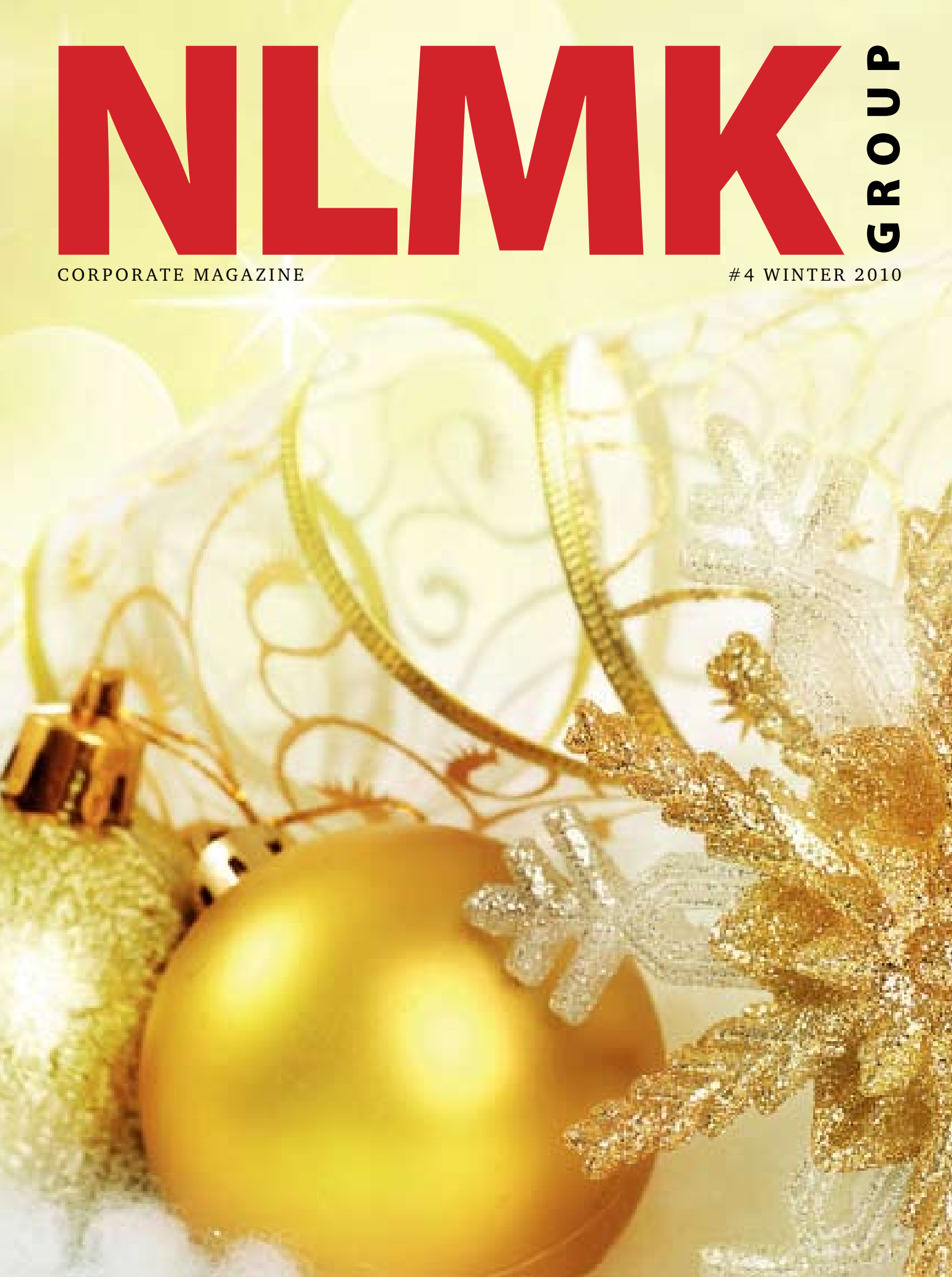
# NLMK GROUP

CORPORATE MAGAZINE

#4 WINTER 2010



## NLMK WELCOMES **NEW MEMBER**

**In late October NLMK, one of Russia's leading steel companies, announced the acquisition of LLC VMI Recycling Group (VMI) from a group of shareholders for a total of USD28.4 million. VMI owns scrap collection and processing assets located in the Moscow region. Russian regulatory authorities approved the transaction.**

VMI operations include four sites equipped with modern scrap collection and processing facilities located in the Moscow region, Russia's largest scrap collection region. Cutting edge equipment (including a shredder machine commissioned in March 2010) allows VMI to process up to 500,000 t of ferrous scrap per year.

This acquisition is in line with NLMK's vertical integration strategy aimed at enhancing the Group's self-sufficiency in main raw materials. It will also allow the Company to optimize scrap deliveries to the main production site in Lipetsk and later to its 1.5 million tpa EAF mini-mill in the Kaluga region, 80 km from Moscow, that is currently under construction.

Alexey Lapshin, NLMK President, said: "This acquisition is another step towards enhancing the Group's self-sufficiency in main raw materials. Moreover, NLMK's presence in the Moscow region, surplus in terms of scrap collection, is strategically important. This region has substantial growth potential. As a result, we will be able to ensure efficient integration both with the Group's existing production facilities and with the Kaluga mini-mill, scheduled for launch in 2012. In the long-term, we are planning to grow VMI's scrap processing capacities."

NLMK's current cash funds and existing credit lines will be used to finance the transaction. VMI will be consolidated on the balance sheets of NLMK Group's 100% subsidiaries, Vtorchermet NLMK and NLMK-Long Products at 99% and 1% respectively. ■

**FOR REFERENCE:**

VMI Group unites 4 sites equipped with scrap collecting and processing facilities with a total capacity of around 500,000 t located in the Moscow regions, in the cities of Liubertsi, Kotelniki, Mytishchi and Reutov.

The sites are equipped with LINDEMANN, Oberlander and Sierra press shears as well as Liebherr and Fuchs loading machines. The Mytishchi site is also equipped with a shredder machine with a capacity of around 120 000 tpa (launched in March 2010).

Moscow and the Moscow region are surplus zones and essentially export scrap to the other regions. According to data provided by Russian Railways (9M 2010), Moscow and the Moscow region are the leading scrap collectors in Russia, accounting for around 12% of the country's total.

## STARTING **YOUNG**

**Novolipetsk introduces a new regulation encouraging young employees to support Technical Upgrade Programs pursued by the Company. It is intended to promote their strong participation in resolving operational challenges.**

Now employees below the age of 30 are invited to participate in technical upgrade activities at their every stage, from pre-design appraisals to commissioning. This presents younger generations with a realistic opportunity for practical implementation of their ideas, encouraging them to master new knowledge and use their experience in innovation in their subsequent occupations.

A database is being created to record all young employees who have expressed their desire to make a personal contribution to the program. After an assessment of their professional skills, level of expertise, and an interview, they will undergo on the job training under the guidance of skilled professionals in one of the design groups covering the sinter, coke and blast furnace operations, steelmaking operations, transportation operations, or environmental issues. Based on their performance young employees will obtain advice on how to further develop their careers with the Company, whether it's participation in a design group or appointment to a promising position. ■

**FOR REFERENCE:**

The youth-oriented policy pursued by Novolipetsk encompasses more than 20 social programs, including adjustment and mentorship, as well as the Young Specialist, Young Leader, Engineer of the Year, Specialist of the Year, Career Management, and other programs. Participation in these programs helps young employees to reach personal fulfilment and promotes their quick professional growth. Over the last five years the share of Novolipetsk employees below the age of 30 years has been increasing consistently and now stands at 22 percent.

## EXPANDING IT SERVICES

**The NLMK IT Directorate, successor to the former Automation and Mechanization Department, has turned 10 years old.**

The new directorate has been developing very rapidly in the past decade. Suffice to say that the length of the fibre-optic data transfer network grew from 7 to 156 kilometres, while the number of users increased many times over. At Novolipetsk one out of three employees interacts with a computer.

Before the ITD was created, computerized monitoring systems had been in use only at Rolling Mill 4 and 5, currently the Cold-Rolling and Coating Mill, and the Non-Grain-Oriented Steel Mill. Now every unit at the main site is equipped with computerized 'eyes and ears'.

We now have the capability to trace a particular coil to a particular slab, and account for all of the steel down to the last pound, - says Sergei Slauta, IT Director and Doctor of Engineering.

Figuratively speaking, the IT Directorate is the brain of the Company. In the same fashion that our brain controls our body, the IT systems operated at Novolipetsk keep an eye on all of the operations, including personnel management, process flows, energy use, road and rail transportation, shipping of products, etc. In other words, IT Directorate employees are involved in each and every business operation. The ITD organizational chart comprises three departments: Information Systems Development; Information Systems Maintenance; and Control Systems Maintenance. Through their efforts all Novolipetsk units now share a common IT environment. Work is under way to extend the network to other Group businesses, including Stoilensky, VIZ-Stal, Altai-Koks, NS-MMZ, Dolomit, Stagdok, and others.

The ITD has developed and successfully implemented an incident management system, which is intended to help users resolve hardware and software issues with their computers. This system assists in quickly resolving any glitches within the IT infrastructure.

The Directorate has an ambitious agenda for the future. In addition to creating a common IT environment for NLMK Group, it also looks forward to a further expansion of IT services, the replacement of paper-based documents with an electronic document exchange system, the extension of the scope of process information available within existing data systems, and to many other goals. A special emphasis shall be placed on improving the quality of services, and quickly responding to the needs of the users. And they are destined to succeed, given the high level of skills possessed by ITD staff. Of its 315 employees, 227 have university-level degrees, 12 hold doctorate degrees in engineering, and many are pursuing postgraduate studies. ■

## RECEPTION IN THE KREMLIN

**At a meeting in the Kremlin President Dmitry Medvedev welcomed Russian athletes who won 2010 World and European championships in Summer Olympics events.**

The meeting with the athletes was also attended by Vladimir Lisin, Chairman of the Board of Directors of NLMK, President of the Shooting Association of Russia, and President of the European Shooting Confederation (ESC). The stars of the day, the winners of the World Volleyball Championship, were joined by winners in other Summer Olympics sports championships, as well as the executives and coaches from athletic federations.

This was the seventh in a series of meetings with the Russian President since the beginning of the year. During the official meeting with the Russian national rifle and trap shooting team in the President's residence in Sochi on August 13 last year, Dmitry Medvedev praised the athletes for winning second place in the 2010 world championships. He also paid attention to certain issues regarding shooting sports raised by Russian athletes. ■

## STOILENSKY PRODUCED 200,000,000 TONNES OF CONCENTRATE

**This is yet another achievement for the miners and a significant milestone in the history of the business.**

In 26 years of operations Stoilensky has processed 440,000,000 tonnes of quartzite. Ever since its acquisition by NLMK, the company has been developing at an accelerated pace, with upgraded equipment, new technology, and improved processes. The facilities housing fine and secondary crushing operations have been renovated, while new ore dressing assets are under construction and commissioning. By now the business operates at well above its original design capacity. The record performance was supported by the experience and skills of the mining team, where every employee is truly dedicated to their work.

The batch of iron ore concentrate including the 200,000,000th tonne was shipped to Novolipetsk. This year the ore dressing factory is expected to produce more than 12 million tonnes of product. ■

# Meeting the Challenges

**Alexey Lapshin, President (Chairman of the Management Board) of NLMK responds to questions from Alexander Sutormin.**

**AS: Mr. Lapshin, it has been a year since we last met. Back then in December 2009 you offered a cautious assessment of economic developments in Russia and the steel industry, and said that the budding recovery from the crisis is likely to be slow and rather fragile. Is your forecast coming true? What is happening in the metals sector, both globally and in Russia? What is happening at NLMK?**

AL: The forecast is turning out to be more than true. The economic reality, unfortunately, for the time being, does not offer any rosy promises. Demand in the steel industry will be recovering at a gradual pace, and a full recovery to pre-crisis levels is likely to happen only around 2012 or 2013. I would prefer for things to move quicker, but the economy is a stubborn thing and it does not take orders from anyone.

The global steel industry is currently undergoing structural transformations caused by significant increases in production and consumption of steel by emerging markets. First of all this is true for China, whose share in global output and consumption increased from 10% to 50% over a mere 10 or 15 years. I believe that demand in emerging markets will continue to grow at a fairly high rate as their economies continue to develop, with further urbanization, a growing share of the middle class, and infrastructure development. The contraction in steel output, which we witnessed in 2008 and 2009, to a larger extent applied to developed economies.

The Russian metals sector overall fared through the crisis quite well, confirming its sustainability. In this connection it is important to understand that access to raw materials will become one factor which in the near future will determine the development of the steel sector as a whole, and individual companies as well.

As regards NLMK, we opted for the right strategy some 10 years ago, following the rationale of the industry - the Company is self-sufficient in raw materials and continues to consistently develop its production capacity. Also, we have rolling capacities which are located close to major consumers. NLMK is a company with an accelerated pace of development, which is increasing its level of output and investments. Efficient operations, quick paced development, and appreciation of the clients' needs, as well as considerate treatment of our employees, place us among the leaders of the domestic metals sector.

**AS: From the perspective of company employees, the crisis had a negative impact on their income. Have wages stabilized?**

AL: Let me remind you that by end of last year the average wage had already reached pre-crisis levels at almost all of the group businesses. In 2010 all of the businesses have complied with the requirements of the collective bargaining agreements, including the commitment to increasing wages. Basically, this is a well known fact. I should add, maybe, that in terms of wages Group businesses are among the leaders in the metals and mining sector in their respective regions.

**AS: What are your plans for 2011?**

AL: This will be a year of major changes! In 2011 we are planning to commission blast furnace No. 7 with a capacity of 3.4 million tonnes of pig iron per year, and at the same time we shall undertake renovations of the BOF facilities at Novolipetsk; we will expand our rolling capacity and launch production of high permeability transformer steel. We also intend to further develop our mining assets; in particular, this will involve the construction of a pellet plant at Stoilensky, and the development of a coal deposit in Siberia. We are also focusing on the long products segment, with the rolling mill at Berezovsky reaching full capacity

of 1,000,000 tonnes, and we are also continuing with the construction of a brand-new and environmentally clean EAF Mini-Mill in the Kaluga region.

**AS: This will bring us to the final leg of Phase 2 of the Technical Upgrade Program. But that is not the end of it. What will happen next?**
AL: We will persist in the same direction – a program for further development in 2013-2020. We are designing the program as we speak. But I can tell you that in terms of its objectives it is going to be more challenging than any of the previous programs. Whereas previously we would focus on installing new equipment for Group businesses, now the objective is to transform quantity into quality. In other words, we need to increase efficiency across the board, to catch up with our foreign peers, and to attempt to become a leader in terms of labor productivity, energy efficiency, and product quality, so that the rest of the world would need to be catching up with us, and not the other way around. And of course, we need to reduce our environmental footprint to a level compatible with best available technology. To achieve all of this, significant efforts will be required. That is why we are inviting everyone to join these efforts! We need people with bold and bright ideas.

**AS: These are very ambitious plans, and they are likely to require further structural changes within the company. What do these changes involve?**
AL: Coal is probably the only raw material where we don't have our own source of supply. For this reason we intend to participate in the tender to acquire a block in the Usinsk deposit in the Vorkuta coal basin, and are looking at other opportunities as well. We have already launched construction of a coal mine in Kuzbass under an existing license at the Zhernovskoye-1 deposit owned by NLMK.
As regards diversification of sales, the main driving factor for our development will be the expansion of output within the framework of our joint venture with Duferco in Europe and the United States. This year the joint venture will process into finished rolled products about 1.6 million tonnes of slab from NLMK; while next year this figure will exceed 2,000,000 tonnes. We continued to invest in new types of products notwithstanding the crisis. We are completing the construction of a thick plate mill at the Clabecq factory in Belgium, and a new continuous furnace was commissioned at the La Louviere factory. These investments are intended to boost output of rolled products, expand the product mix and eventually to increase the share of the company in the EU market. We are now contemplating the options for acquiring the rolling assets of the joint venture, as this will allow us to supply an additional 4 to 5 million tonnes of finished rolled products to overseas markets, to achieve greater stability and profitability of our export sales.

**AS: You mentioned the Zhernovskoye-1 coal deposit. When will it start producing coal?**
AL: Currently we are conducting design work for the development of the deposit and at the same time handling land management issues, obtaining access to local infrastructure assets and a range of other issues. According to the preliminary schedule coal production may begin already in 2013.

**AS: In your opinion, what was the most significant event of the past year and what kind of an impact did it have on the Russian economy and the Company?**
AL: Without doubt this would be the visit of the Russian President to Lipetsk and our main production site, Novolipetsk. An on-site meeting of the Commission for Modernization and Technological Development of the Russian Economy included a serious discussion of how to renovate the economy and the huge resistance to proposed innovations. In particular, one question that was raised focused on the stalling of the industry regulation reform. President Medvedev issued a number of instructions to the cabinet regarding the modernization of technology standards and industrial safety regulations. I believe this to be very important for our economy as a whole, and for the future of the country, because without modernization we are running the risk of falling hopelessly behind and losing any advantages we have today.

**AS: Now that you've mentioned instructions from the President. One of these was issued last May and applies to the development of the National Environmental Strategy until 2030. Obviously, this has a direct impact on the metals sector, among others. In your view, what does this document need to be?**

*NLMK is a company with an accelerated pace of development which is increasing its level of output and investments*

AL: It needs to be realistic.

**AS: Meaning?**
AL: The strategy needs to be linked with certain aspects of the country's economic development; it needs to maintain a balance of interests of the government, the public, the business community, and the environment. We have yet to reach consensus on this. Oftentimes preference is given to administrative coercion, rather than economic measures, and this is hardly a proper way of doing it.

**AS: But something needs to be done about the current excessive environmental impact, the problem is long overdue. Also, something needs to be done about the accumulated environmental impact.**
AL: Let's take this in order. How do we gauge the environmental impact today? Compared to the 1990s the impact on the environment all over the country has significantly decreased. Atmospheric emissions declined by 6% and effluents by 30%

compared to 1995. This suggests that today things have improved compared to yesterday.

As regards what's long overdue. If you look at atmospheric emissions by source you will see that about 42% comes from cars. There exist a number of reasons for this. Firstly the number of cars has increased, which of course is good from a social perspective. Secondly, the quality of fuel remains low, and the cars are outdated. Thirdly, traffic in the cities is poorly managed, and then you have the persistent low quality of roads. I think it's clear exactly what measures are long overdue and how costly they will prove be.

*Upon completion of Phase 2 of the Technical Upgrade and Development Program in 2012, Novolipetsk will have facilities complying with environmental standards applicable to the best available technology*

When it comes to effluents, 62% of these come from the housing sector. The sewerage networks and the treatment facilities, which are in most cases owned by local governments, are 60% amortized; and again where does one find the money to upgrade them? But I would agree that it is worth the effort, because once you upgrade the sewerage facilities, you can reduce the negative impact on water by 60%. As regards the accumulated environmental impact, one has to appreciate that this was brought about by economic practices of the past, when the environment was disregarded altogether. When it comes to operating businesses there is a solution, because someone can be held accountable. Of course this will require certain spending and time, but it is an issue of responsibility for the owners. For example, NLMK has taken a proactive approach towards a legacy issue, the so-called slag dump, and has been tackling it for the past three years. This year alone we recycled 500,000 tonnes of waste. In those cases where companies went out of business and have abandoned dumps, landfills, and the like, this needs to be resolved at a legislative level and with government funding.

**AS: Mr. Lapshin, you said that government officials prefer coercion. Maybe even stronger measures should be used? Would this have an effect?**

AL: Already in Russia we have tight-

er environmental requirements compared to the rest of the world, but the quality of the environment remains inferior. Unless you offer realistic financial incentives coercion will not do the job. Other policies need to be applied. For example, if when fined for excessive environmental impact businesses were allowed instead to spend this money for upgrading their environmental facilities, this would help reduce the environmental footprint in a targeted manner. Basically, this is the most reasonable way.

**AS: Is it likely that anytime soon Russia will have a business with high environmental standards? Will we see NLMK Group businesses among those?**

AL: Yes, and NLMK will be one. Like I said before, upon completion of Phase 2 of the Technical Upgrade and Development Program in 2012, Novolipetsk will have facilities complying with environmental standards applicable to the best available technology. For example, blast furnace No. 7.

**AS: BF-7 is an often quoted example of innovation. But I hope it's not the only one? What other innovations are being designed or pursued by NLMK? And to what effect?**

AL: Technological innovations are being introduced at all Company businesses. A simple listing of these would require a lot of time. Off the top of my head let me name just a few of these. At Novolipetsk we are implementing tar pitch injection at a blast furnace; and we are building installations to prepare and inject pulverized coal into blast furnaces. Both installations will be the first of their kind in Russia. They will help reduce consumption of coal and natural gas during smelting of pig iron, and will resolve the issue of recovering tar pitch.

We are launching production of hot-rolled galvanized steel sheet 0.22 to 0.29 millimetres thick, which is used in construction and by manufacturers of household appliances. Previously, this product had to be imported to Russia. By relying on thinner galvanized rolled stock we can reduce consumption of steel by 15%.

Novolipetsk and VIZ-Stal are implementing a range of research and technology measures to launch production of high permeability electrical steel. When used in the production of transformers it will significantly reduce consumption of electric power. According to our estimates, on a nationwide basis this will save about 2 billion kilowatt-hours per year.

Within the framework of the Private Business Innovation Projects Program sponsored by the President of Russia, NLMK proposed a project for dry scrubbing of process gases with ceramic filters, for use in BFs, BOFs, EAFs, lime burning, and the production of ferroalloys. The innovative part is that instead of traditional wet gas scrubbing systems and bag filters we are proposing to use filters made of mineral fibre, which can withstand higher exhaust gas temperatures. The use of ceramic filters helps reduce consumption of electric power 1.5 to 2.5-fold and decrease capital and maintenance costs by around 50% while providing a high level of scrubbing, which cannot be attained by any other known process... And of course, as I have said before, the list can go on.

**AS: Why are innovations successful at NLMK, but not so much elsewhere in Russia? For many years we've been discussing an innovative path of development, creating technology parks, business incubators, and special economic zones, all without much success. What are we missing? Are we doomed to play catch-up?**

AL: It is true that in recent decades the country has failed to produce any breakthroughs in technology comparable, say, to continuous casting. One solution would be to create industry-focused research and development centres with advanced engineering and educational competencies by relying on cooperation between businesses, higher learning institutions, and international engineering companies.

Another reason is the significant skew in the education sector which disfavours industrial skills. While the number of graduates majoring in economics has increased five-fold, the number of graduates majoring in technology has contracted 2.5-fold.

**AS: In addition one probably needs a desire to introduce these very innovations, and to fight for them, literally speaking. How should we motivate businesses to introduce innovations? What preferences would do the job?**

AL: To a large extent the businesses are already motivated to introduce innovations. In any case, NLMK proves this beyond doubt. It is sad that with only a few exceptions most of these innovations are developed overseas. And this very fact puts the Russian economy behind more advanced countries.

*Our Company has prepared proposals to remove impediments and encourage innovative activities, and we have submitted these proposals to the President of Russia for his review*

Government sponsored efforts to develop innovative activities, to create high-tech research clusters similar to the Skolkovo project offer some hope that things will change for the better. In addition to local innovation projects what we need are consistent efforts to develop fundamental and applied research with a focus on basic industries. The existing arrangements intended to encourage businesses to do research and development work, including with co-financing from the government, are complicated, involve multiple levels, and take a lot of time.

There are other barriers to innovative growth, whether technical or infrastructure related or caused by taxation policies, and so on. Our Company has prepared proposals to remove these impediments and encourage innovative activities, and we have submitted these proposals to the President of Russia for his review.

## FOR THE HOT-ROLLING **MILL**

**Novolipetsk has concluded a EUR2.3 mln contract with Sytco a.g. (Switzerland) for the supply of a new roll grinder for special grinding and proper roll surface profiling for its over 5 mln tpa capacity hot strip mill.**

The installation of this roll treating equipment at NLMK's main production site in Lipetsk will improve hot-rolled strip quality by 75%. It will improve the geometric parameters of the strip, both its flatness and thickness deviation. The Company will also be able to produce up to an additional 50,000 tpa of hot-rolled strip thanks to lower roll wear and fewer scheduled shutdowns.

NLMK plans to install the mill revamping equipment in Q1 2012 as part of the second stage of NLMK's Technical Upgrade Program. At present, two machines are used for special grinding to ensure the required profile of mill rolls for the hot strip mill. One more machine will be able to perform this operation following its reconstruction. ■

## USING **SAP**

**The implementation of an integrated data system designed by SAP continues at VIZ-Stal. Other key elements of the data system are already in use at Novolipetsk and Stoilensky.**

The implementation is undertaken by experts from the Moscow-based BDO Unicon Business Solutions company. The purpose of the project is to introduce SAP as a common platform for accounting and financial analysis across various businesses within the NLMK Group. Currently, some of these businesses are relying on in-house accounting and analysis systems and methodologies. An integrated accounting and analysis system will allow for optimal decision-making by managers, thus promoting the development of all NLMK businesses.

VIZ-Stal is now providing training for employees who will be required to use the system in connection with their job responsibilities. ■

## AND THEN DUST WAS **NO MORE**

**Stoilensky commissions a new spray curtain system for its spoil dam. Eliminating sand bank dusting at spoil heaps is a major challenge for mining businesses.**

Modern science offers several solutions, proposing to cover the sand banks with polymers or resinous material. The sand banks at the Stoilensky spoil heap, however, are created by dredging and change their shape all the time; because of this the application of coating material would be inefficient since a month later they would be covered with a fresh layer of overburden.

After some experiments company engineers came up with a simple solution to repel dust, by using a water curtain. More than four kilometres of pipes were installed, and the crest of the dam was fitted with nine distribution sections equipped with more than 650 sprayers. When in operation, the sprayers create a curtain of water up to seven metres high. Notwithstanding the simple design the installation proved to be effective in two ways: it both retains the dust within the spoil heap, and also moistens the sand, thereby preventing winds from raising dust. This put a stop to the detrimental impact on the environment of the nearby village of Verkhne-Chufichevo.

Next will be the introduction of a more sophisticated system at the master dam maintained by spoil handling operations. This will involve the installation of water monitors operating in different modes, including the 'hanging mist' mode. The spraying system does not require additional sources of water because it uses water from the spoil heap fed by drain pumps. ■

## SEEING BEYOND WHAT **THE EYE CAN SEE**

**The Metrology and Precision Mechanics Laboratory at the Stoilensky Networks, Substations and Automation Mill now boasts a modern thermal imager equipped with an infrared camera, the latest advancement in measuring and control instruments.**

The new device will be used to conduct thermal diagnostics on electrical equipment of substations and power transmission lines. A thermal imager will display things unseen to the naked eye. This is very important for an industrial business, as it will help avoid accidents. Andrey Shevtsov, an electrician trained in Moscow and St. Petersburg, is in charge of conducting thermal diagnostics of electrical equipment.

According to him the device helps to produce the best results in the shortest possible amount of time. ■

## FOUR JOINTS **AT ONCE**

**The vulcanization section at Stoilensky is now equipped with a modern press for joining conveyor belts.** The press can produce joints up to two metres in width and 4.5 meters in length. It is fitted with electronic recorders which can store joint-related data internally and display it in the form of charts and graphs or digitally.

The press comprises three sections, each weighing more than two tonnes. It is operated by a team of four technicians. This new machine will allow for making four joints at the same time for conveyor belts used in strip mining operations and at the dressing works. ■

## MODERNISING **AT FULL SPEED**

**Between January and September VIZ-Stal spent RUR412 million (USD13.6) on its technology development program, a 60 percent increase year-on-year.**

Five technology upgrade projects are under way aiming to improve the competitiveness of its steel stock and to launch production of high permeability steel (HPS), a new and advanced product. Among other things, construction work is progressing on the HPS reversible rolling mill, where most of the foundations are already in place and ready for installation of equipment, and also on the natural gas reforming installation, and the roll grinder; the electrical insulation coating units and the magnesia coating assemblies are also undergoing renovation. Eight high temperature annealing furnaces are already in place; their purpose is to improve the consumer qualities of steel and to lower the cost of finished products by reducing the amount of energy spent for processing steel. Annealing operations at a furnace commissioned earlier have provided some reassuring results; namely, steel shows improved electromagnetic qualities and better surface quality. In addition, the new furnaces will allow for an expedited annealing process.

Other upgrades have already been completed, including the equipment for the mill 1300, the operations and energy consumption recording systems at the Cold-Rolling Mill; also, transformers were replaced in order to reduce the environmental impact. Another 28 investment projects are being implemented with a view to boost equipment reliability, enhance data support and optimise production management processes. ■

## NEW PRODUCTS **LAUNCHED**

**NLMK Long Products businesses have produced more than 30,000 tonnes of new products since the beginning of the year, helping to expand the product mix and strengthen the division's standing in the market.**

The new NSMMZ rolling mill at Berezovsky, operating in testing and commissioning mode, is now producing Class A500C and Class A400 reinforcement bars in the 6 to 16 millimetres range, and wire rod in the 5.5 to 14 millimetres range; these include both low carbon steel grades, as well as high carbon and special welding grade steels used in super duty items, for example, welded seams of pipes in oil and gas mains. The business also succeeded in launching the production of wire rod made of the St70 grade steel which is further processed into steel rope, bead and spring wire, as well as wire-rod alloyed with manganese, silicon, chromium, nickel and molybdenum, used in the manufacturing of copper-coated welding wire. Another project now in the fine tuning stage involves the production of wire-rod for cold heading, later to be used to manufacture fasteners and cold strained reinforcement bars. NSMMZ capacities at Berezovsky are capable of manufacturing up to 1 million tonnes of high value-added long products.

The business also produces heat-strengthened At800 type reinforcement bars, including in the most popular 10, 12, and 14 millimetre sizes. NSMMZ has obtained compliance certificates for these products from NIIZhB-Sertifikatsiya. Since the beginning of the year about a dozen new steel grades with special properties have been introduced, including the Grade 70 steel, which is used in furniture making, and the manufacturing of steel wire cord, cables and ropes for vertical transport and the mining industry.

In terms of steel hardware the NSMMZ expanded its product mix with new types of wire, including welding wire. It is now also manufacturing nail screws, the most versatile and popular variety of fasteners. ■


## CLEAR **READING**

**A modern sensor panel board was installed in the control room of the Altai-Koks central distribution station. In real time it displays the status of the plant's electricity supply network, making it significantly more reliable and safe.**

Previously the operator's workplace was equipped with three screens, each depicting only a part of the network. In case of an accident this could mean loss of valuable response time. The new sensor panel board shows any changes in the electrical supply network in real time. In case of an emergency shutdown of any installation one can quickly decide how to resume power supply to it. The new sensor panel also helps to monitor current and voltage readings at one or another location. ■

# Logistics Logic

**Transportation logistics continues to focus on improving the quality of services provided to businesses and the cost of transportation.** How can Nezavisimaya Transportnaya Kompaniya (NTK, Independent Transportation Company) assist in resolving these issues? What is its place in the overall logistics framework? Viktor Kirilenko, NLMK Logistics Director, answers these questions in the following article.

Logistics as a new field of research and practical knowledge emerged and began to develop quickly in Russia during the early transition years of the 1990s.

Research suggested that the share of overall logistics expenses in the GDP of developed nations varies within a fairly wide margin, with around 10% in the United States, 16.7% in Germany, 14.5% in Finland, and around 21% in China. According to a number of experts, logistics expenses in Russia account for between 17.3% and 25% of GDP, 1.5 times higher than the global average.

The very creation of NTK was linked to the quality of transportation services. And by the early 2000s the quality was becoming very unreliable. There was an acute shortage of rolling stock, while the Russian Railways fleet of railroad cars was growing obsolete and was not being replenished for a number of reasons, including lack of investments.

Figure 1 shows the forecast for the undersupply of rolling stock.

The logistics directorate was facing two important challenges. One was to safeguard NLMK from any eventualities in connection with the shipment of freight, and the other was to control and manage logistics expenses. NTK was to play a significant role in dealing with these challenges. Let me explain the expenses involved by using the following example. Every year Novolipetsk receives and ships more than 35 million tonnes of various cargos at a cost of more than RUR25 billion (USD810 million). Let's assume that we can reduce these expenses by 5% or 10%. Can you imagine how much savings that would generate?! That's billions of roubles which may be otherwise spent on business development. The appearance of NTK spearheaded a division of labor at Novolipetsk and later at other businesses acquired by NLMK Group. The transportation units of the logistics directorate were now in a position to focus more on in-house logistics, i.e. forwarding of freight on-site at Novolipetsk. As soon as a rail car leaves the factory or plant the transportation company takes over and becomes responsible for outside transportation via the railroad network. This way everyone involved appreciates where in-house and outside logistics meet. The best effect can only be obtained by consolidating these processes and making them consistent.

Figure 2 represents cargo transported on-site at NLMK businesses.

FIGURE 1

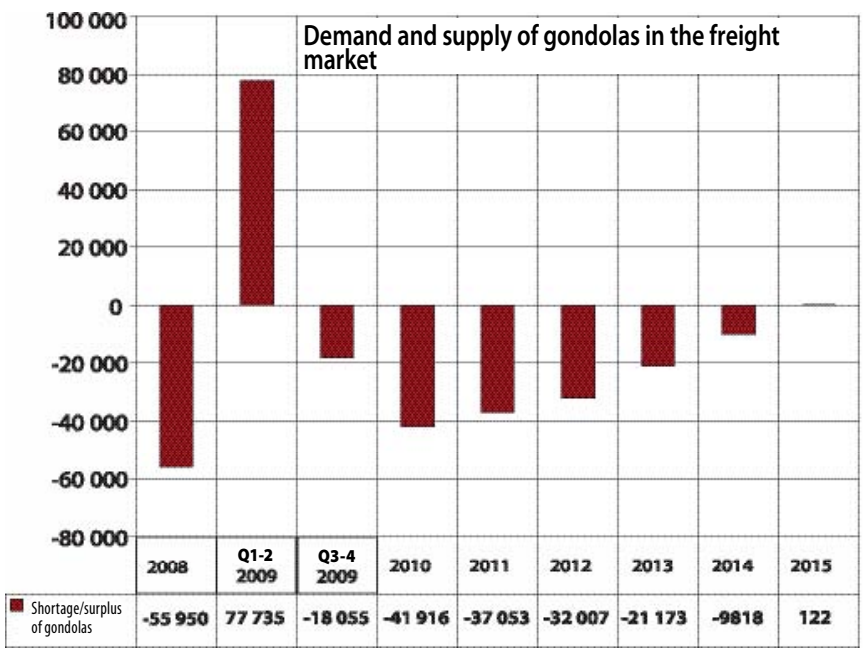
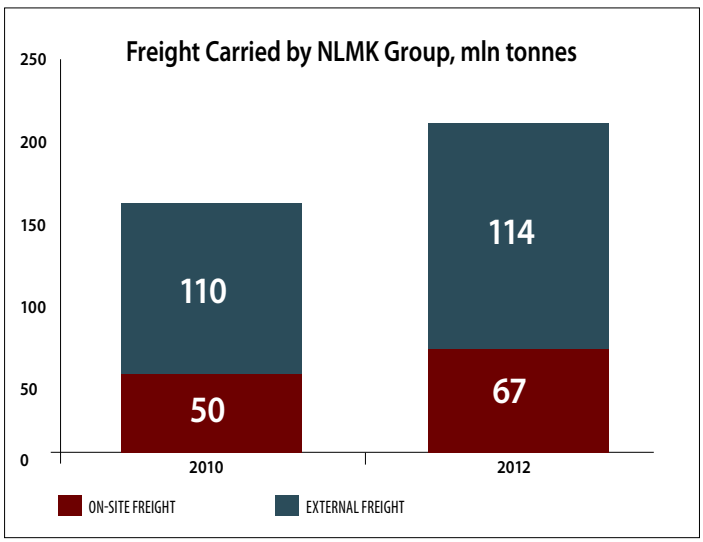



FIGURE 2




NTK maintains a team of skilled professionals capable of speaking the same language to the managers of businesses within the Group. The core of our team consists of experienced employees, who had previously worked for the Russian Railways and other transportation and forwarding businesses, and who are familiar with the intricacies of this market. They were well complemented by a younger generation of employees, who proved to be proactive, diligent, and adequately trained. They manage a fleet of gondolas, sinter carriers, flat cars, including covered flat cars, cement carri-

ers, and tankers, allowing them to offer a wide range of freight carrying services. But the largest acquisition item is versatile rolling stock, namely the gondolas used to transport bulk cargo, like coal, gravel, ore, etc.

Next year NTK projects that it will carry at least 75,000,000 tonnes of cargo and deliver it to the right place at the right time and at the lowest possible cost. This includes both NLMK products, as well as freight carried for outside businesses. NTK never differentiated its customers and offers the same high quality of services to all.

What do I mean by 'the lowest possible cost'? It involves a number of elements and I shall mention only some. Since the very first days of its existence NTK has been working hard to reduce empty runs of railway cars because they do not generate revenue and are ruinous in terms of transportation economics. For example, a railway car loaded with products is sent to Novorossiysk, and NTK does everything possible to ensure that the railroad car returns loaded with some other opportune cargo. It may not necessarily carry the cargo all the way, but the important thing is to reduce the empty run to a minimum. And it may not necessarily be opportune cargo, because sometimes NTK cars travel around for up to six months, getting loaded, unloaded, and then loaded again, transporting cargo for third-party clients, before they arrive back at one of the Group businesses for loading. But no matter how far and wide the rolling stock is spread out across Russia and CIS railroads, our logistics people plan its utilization in such a way so that NLMK businesses always obtain the required number of railroad cars for loading. Novolipetsk, for example, requires between 500 and 600 railroad cars every day. Here the number one objective is to ensure there is sufficient rolling stock available for loading. Consistent deliveries of rolling stock are assured both by the increase in the number of cars, and by reliance on information technology. For several years the Company has been using a software program that keeps track of each individual railroad car, and which tells at any point in time where to the car is headed or where it is being loaded. A similar solution is used by the Russian Railways. NTK maintains close contact with the IS Transport data centre, with the Russian Railways and railroad information and data processing centres in major transportation hubs, allowing it to obtain response to queries about any particular car. In addition, NTK maintains its own dispatch centres in Lipetsk, Voronezh, Rostov-on-Don, St. Petersburg, Yekaterinburg, and Novosibirsk, allowing it to monitor the movement of its railroad cars almost anywhere in the country. NTK also uses these centres to monitor faulty cars, decoupled from trains, to have them repaired and put back into operation in an expedited manner.

*Since the very first days of its existence, NTK has been working hard to reduce empty runs of railway cars because they do not generate revenue and are ruinous in terms of transportation economics*

Reducing empty runs is an important factor for improving transportation operations and decreasing the cost of delivering cargo. Given the geography of NLMK Group businesses, i.e. their locations and cargo flows, and the provision of services to third parties, NTK is capable of maintaining an empty run ratio of no more than 30%, whereas for other large owners of gondolas this ratio reaches 40%, or, in other words, almost half of all runs are empty runs.

Another important option for reducing transportation costs within the overall logistics strategy is to increase the train tonnage within the existing useful length of receiving-and-departure tracks. Novolipetsk has completed renovations of the yards at the Novolipetsk Station of the South-Eastern Railroad for arrival and departure of trains weighing up to 6,000 tonnes and up to 70 cars long. Today this allows the company to form fully loaded trains in connection with the shipment of finished products, and allows it to obtain a significant discount from the applicable price, while significantly reducing the time required to deliver the cargo.

Another term used at the railroad is 'car turnaround time'. The quicker a car is loaded, delivered to its destination, unloaded and returned for loading again, the shorter the car turnaround time and the faster the same car may be offered to another sender. Our logistics experts diligently monitor that railcars are not

## CV

Viktor P. Kirilenko was born in the village of Godovo, Tver (formerly Kalinin) Province in 1957. He graduated from the Moscow Institute of Steel and Alloys in 1979. Upon graduation, he was employed by the Bardin Ferrous Metallurgy Research Institute, where he stayed until 1996, and was subsequently employed by businesses associated with NLMK. Currently, Mr Kirilenko serves as the Logistics Director at NLMK; he is member of the Board of Directors in several companies, and Chairman of the Board of Directors of NTK LLC.

Doctor of Engineering. Winner of the Lenin Komsomol Prize in manufacturing of automotive steel sheet.

used as mobile storage by the Group businesses or other clients. The Group businesses are required to comply with certain loading and unloading standards in order to reduce the car turnaround time.

One of the most important transportation logistics principles is called 'just in time', and it is widely applied by our experts. The principle implies that the flows of inputs are carefully synchronized with the requirements of the production schedule. According to this principle raw materials or other products have to be delivered to a particular destination exactly when they are required, neither before nor after. This helps exclude excess inventories both at the production and the distribution levels. Excess inventories lead to higher warehousing costs. In response to the requirements of our production units, the logistics directorate experts and NTK operate with a daily schedule of incoming and outgoing deliveries. This is by no means simple, but it is exactly this carefully maintained logistics system that allows us to exercise control over all of the transportation process, from loading to carrying by rail, sea or river to the destination. Whether it's Novolipetsk, Stoilensky, Altai-Koks, or any other business which is not part of the NLMK Group. Here NTK provides significant assistance within the overall delivery chain, and offers its clients solutions to transportation challenges of any difficulty. It can offer a customized approach to every client, irrespective of the volume of freight.

*NTK aims to become one of the top five companies in the country in terms of its fleet of railroad cars in the near future*

NTK aims to become one of the top five companies in the country in terms of its fleet of railroad cars and to account for a respective share of the market for freight transportation in the near future. It is a challenging task, but I believe it to be doable. And my confidence is backed by NTK's good standing in the business community.

# To the Tune of Railcar Wheels

**Nezavisimaya Transportnaya Kompaniya (NTK – Independent Transportation Company) provides NLMK Group with transportation and logistics services.** In December 2010 more than 80% of NLMK Group freight was carried by proprietary rolling stock. Alexander Sapronov, NTK Chief Executive Officer, discusses the reliability of freight forwarding operations, NTK performance and the challenges faced by the company.

Presently, railroad transport is the only option available to NLMK Group businesses for delivering raw materials and finished products, and, essentially, it is an extension of the manufacturing processes operated by them. Reliable functioning of the transportation element is of vital importance for NLMK Group businesses.

In October of 2009 the NLMK Management Board reviewed the development strategy for NTK, defined the profile of its assets, their rate of growth, and other forward-looking arrangements for the company. The developments in the railroad freight transportation sector, the creation of subsidiaries by Russian Railways, and the liquidation of inventoried stock confirmed that NTK had chosen and consistently pursued a proper development strategy. The fact that NLMK Group, unlike other steel and coal companies, is not experiencing any major problems with transportation of raw materials and finished products, in my view, is the direct consequence of the strategy approved by the NLMK Management Board one year ago. The Company has achieved the required level of transportation security by relying on its own fleet of railroad cars used for freight transportation.

*The Company has achieved the required level of transportation security by relying on its own fleet of railroad cars used for freight transportation*

With the consent of the NLMK Management Board we undertook a restructuring of railcar assets owned by NTK. The company fleet included more than 1,000 cement carriers. We divested these assets, taking into account that these are not core assets for a steel making company. The cement carriers are operated within a narrow and specialized segment of the freight transportation market; these are not versatile assets, in the sense that they cannot be used to carry other types of freight. Against this background and in view of the market price developments the cement carrier railcars became a loss-making asset for NTK. Instead, we focused on multi-purpose gondolas, which are in very high demand in the Russian railroad freight transportation sector. More than 50% of all freight shipped by rail in Russia travels in gondolas. And when it comes to hauling freight for metallurgy (ore, metals, coke, coal) gondolas are beyond competition. In 2009 we managed to buy several thousand gondolas at affordable prices. By December 2010 the price of a new gondola reached RUR2 million (USD66000).

In view of pricing considerations we adjusted our procurement policy for gondolas and were actively participating in auctions arranged by Russian Railways to sell gondolas with expired service life. In 2010 NTK won two auctions, on July 5 and on September 30, and acquired 20,000 gondolas.

Allowing for the cost of repairs and the payback period, the price of an open wagon acquired at the auction remains very competitive compared to the price of a new car. Economically, this was a very lucrative deal for NTK. At the same time it helps control transportation costs for NLMK Group companies. When you buy an expensive railroad car, you are assuming that the carrying cost of the investment required for this will be higher. In addition, there is a strategic forward-looking element to acquiring railcars at an auction. New gondolas manufactured by wagon-building companies are of an older design, with a low load capacity and poor economics. In the next 3 to 5 years we expect to see the launch of mass production of a new generation of gondolas, with higher load capacity and improved economics. These cars would make a better investment opportunity and generate appropriate returns. Again, this will allow NTK to gain a competitive advantage over other market players.

So far we have repaired and put into operation more than 20,000 cars. According to the terms and conditions of the auction we were required to do this within 12 months. We were working ahead of schedule, aware of the very unfavourable developments in the railroad freight transportation market and the severe shortage of gondolas; as mentioned earlier, because of this many businesses were facing grave problems with delivering supplies and finished products.

By winning the auctions NTK gained the opportunity both to service the needs of the NLMK Group businesses, and to offer services to third-party clients. Whereas in 2009 we were carrying on average 100,000 tonnes of freight for third-party clients, by now the figure has reached 1 million tonnes per month.

In 2010 in cooperation with Altaivagonzavod and with the participation of experts from the NLMK Railroad Transportation Department NTK designed a new model of flat cars in which the cargo can be protected from atmospheric precipitation. Altaivagonzavod has completed its certification testing and is ready to launch it into production. The new flat car will be equipped with a flexible, accordion-like cover, which can be easily extended or collapsed. And it has another advantage. Since its steel cargo will be safeguarded against exposure to the elements, this may translate into savings for NLMK in terms of packaging required for coils.

Last year saw yet another important event for NTK. In partnership with Russian Railways we created a joint venture called the Gryazi Wagon Repair Company, in which NTK owns the controlling stake of 50% plus one share. The company is located 38 kilometres away from Novolipetsk and specializes in making roundhouse repairs and overhauls of various types of freight railcars, including gondolas, flat cars, and sinter carriers. As a result NLMK now has its own repair facility, allowing it to make quick and high quality repairs of freight cars required for loading. In a comparatively short period of time we were able to achieve a fairly strong performance.

When it was operated solely by Russian Railways the business would on average complete 160 repairs per month, and by now the figure has increased to more than 330, implying that we have basically doubled the business' productivity using the same facilities and equipment. This, however, required us to make some adjustments to how labor was managed, to the processes applied, and also to appoint several new managers. As a result, the formerly loss-making business is now operating at a profit.

Let's return to the freight transportation market. We shall certainly continue to expand our railcar fleet, and the NTK budget for 2011 proposes acquisition of rolling stock. Freight volumes shall also grow. Not only because NLMK Group businesses shall be commissioning new capacity and increasing product output, but also because we shall be offering services to clients outside the NLMK family.

Our forward-looking objective is to raise the share of freight carried by NTK for third-parties to 50% (for comparison, in December 2010 the share was 26%), and to achieve this by attracting new customers, rather than by reducing the share of NLMK Group freight. This is very important.

*We shall certainly continue to expand our railcar fleet, and the NTK budget for 2011 proposes acquisition of rolling stock*

An increased number of third-party clients shall allow us to utilize our rolling stock in a more effective fashion and to generate our own revenue stream without charging NLMK Group businesses for empty runs and the cost of fleet maintenance.

We are willing to embrace new projects and are in a position to offer our in-house and third-party clients professional solutions to transportation and logistics challenges of any complexity.

We shall continue to focus on NLMK Group businesses. Providing them with reliable and guaranteed railroad freight carrying services will remain our key priority.

## CV

Alexander A. Sapronov was born in Khabarovsk in 1953. He graduated from the All-Russian Extramural Institute of Law and the Russian Academy of Management. In 2007 Mr Sapronov obtained an MBA from the Higher School of Economics.

His previous jobs included: Deputy Chairman of the State Committee for Anti-Monopoly Policy and Support of New Economic Structures; President, Russkiy Mir; Vice President and First Vice President, YUKOS RM; Vice President, Rosneft Oil Company.

In March 2008 he was appointed Deputy CEO for Strategy and Corporate Development of Pervaya Gruzovaya Kompaniya. Mr Sapronov has been the CEO of NTK since March 2009.

# Skills and Thrills

**Throughout the year NLMK has been holding a series of professional skill competitions. This photo spread displays the tight race to clinch the Best in Profession titles.**

NLMK. VASILY ZEVAKIN, BEST YOUNG COKING MACHINE OPERATOR

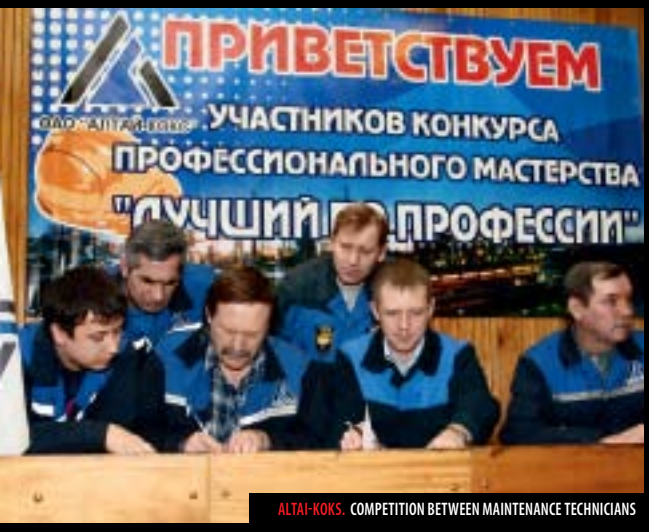

ALTAI-KOKS. OPERATIONS DIRECTOR VADIM VALYAS PRESENTS AWARD TO NIKOLAY MISHAKOV, WINNER OF THE COMPETITION BETWEEN GAS BLOWER OPERATORS

ALTAI-KOKS. ELECTRO-GAS WELDERS' COMPETITION. PANEL OF JUDGES

NLMK. FURNACE WORKER CONTEST

VIZ-STAL. CRANE OPERATORS' COMPETITION

VIZ-STAL. ANDREY KISELEV AND MAXIM STEPANENKO PARTICIPATING IN THE COMPETITION BETWEEN ELECTRICIANS




**ALTAI-KOKS.** COMPETITION BETWEEN MAINTENANCE TECHNICIANS

**VIZ-STAL.** IRINA GOROZHANKINA PARTICIPATING IN THE QC CONTROLLERS' COMPETITION

**NSMMZ.** COMPETITION BETWEEN CRANE OPERATORS AND RIGGERS

**STOILENSKY.** ANATOLY GOROZHANKIN, BEST TURNER

**ALTAI-KOKS.** SERGEY SURIN, NIKOLAY MISHAKOV, ALEXEY KOZHEVIN, AND MAXIM GAYDUKOV, BEST GAS BLOWER OPERATORS

**VIZ-STAL.** COMPETITION BETWEEN MECHANICS

ALTAI-KOKS.
EVGENIY GOLBEV, SPECIALIST OF THE YEAR 2010

NSMMZ. ANDREY BAZHENOV, IGOR ZVONAREV, AND IVAN SYCHEV, WINNERS OF THE COMPETITION BETWEEN ROLL GRINDERS

NOVOLIPETSK. COMPETITION BETWEEN INSTRUMENTATION TECHNICIANS

NOVOLIPETSK. COMPETITION BETWEEN SPINNERS IN THE ELECTRICAL REPAIRS SHOP

NOVOLIPETSK. SERGEY SEDYKH, WINNER OF THE REGIONAL COMPETITION BETWEEN METAL WORKERS

VIZ-STAL. DRIVERS' COMPETITION

## WORTH A **THOUSAND WORDS**

**A group of students from the polytechnic college toured Stoilensky in November. The tour was part of their studies involving electrical equipment.**

This was their first visit to the Stoilensky open-pit mine for most of the third-year polytechnic college students, and they just couldn't stop taking photos. This is only natural, because it's not often that one gets the opportunity to take a photo of oneself next to an excavator, the bucket of which fits six persons with room to spare. After getting acquainted with mining equipment the tour continued through factory shops. The variety and power capacity of electrical machinery were a revelation to the students; the same was also true for the skill requirements. Knowledge of mechanical, radio and electrical devices is a must if you want to operate and maintain this machinery.

The polytechnic college students were shown the equipment in the three main shops of the factory. According to their professors, this should be sufficient to provide them with an overall perception of the electrical machinery that they are about to study.

In the meantime, VIZ-Stal in November welcomed a group of students from secondary school No. 203 in Yekaterinburg. A lesson in technology was taught in the cold-rolling mill. Students were offered a walk-through of the process of making grain-oriented steel and were very much impressed by it. The most frequent guests at the factory, however, are students of the School of Metallurgy at the Urals Federal University. In October future steelworkers got acquainted with the process of making cold-rolled steel. They were genuinely thrilled while observing the operations of the rolling mills, the tower furnaces, the flattening and high temperature annealing machines, and the slitting machines. ■

## IT'S **A CHANCE**

**The final results are out for the annual competition between students of the Lipetsk University of Technology (LGTU).**

They were competing for the right to receive a scholarship paid by Vladimir Lisin, Chairman of the Board of Directors of NLMK. A total of 30 top students attending different LGTU schools, including Chemistry and Metallurgy, Physics and Technology, Mechanics and Machine-building, Transportation Engineering, Automation and IT, and Economics, were selected following a review of their resumes, academic performance, and interviews with senior company managers and members of the scholarship committee. Six of the students have won the competition on previous occasions. An important criterion for selection is the willingness of the contender to find employment with the Company in the future. During the academic year all finalists will receive 3,000 roubles every month in addition to their regular scholarship. Winning the entitlement to the scholarship paid by Vladimir Lisin provides the LGTU graduates with certain advantages when applying for a job at Novolipetsk and pursuing a career, as well as a number of fringe benefits. For example, when hired by Novolipetsk after graduation from a higher learning institution they receive an additional 5,500 roubles per month during the first six months of employment. In addition, during their first year of employment they are guaranteed a minimum monthly wage of 23,000 roubles. ■

## ON-SITE **PHYSICAL**

**VIZ-Stal steelworkers exposed to harmful and dangerous environments enjoyed the opportunity to complete a physical examination on-site for the first time in the last 20 years.**

This time they could avoid queues at the local clinic because the doctors came to see them at the factory. One can say that the doctors made a 'house call'. VIZ-Stal contracted the Profmed Medical Centre to conduct a physical examination of its employees. This was the first time that the examination was performed on VIZ-Stal premises, and it was completed quickly and without hassle. A medical examination which previously would have taken months to complete was done in only three weeks' time. ■

## NEW **ARRIVALS**

**Last year Novolipetsk hired more than 400 new young professionals. Eighty percent of them are graduates of 'farm' educational establishments, including the Lipetsk University of Technology, the Metallurgy College and Vocational Middle School No. 10. Fifty-eight employees were hired for engineer jobs. The newcomers will benefit from adjustment programs and mentorship by skilled workers or direct supervisors.**

Stoilensky is hosting 32 graduates of secondary and tertiary learning institutions for 6 months of training. According to Roman Timchenko, a graduate of the Stary Oskol Polytechnic Vocational School, who has been hired to work for the networks and substations shop, there was never a dull moment during training and almost no downtime. Roman also says that his concept of a trainee, who does nothing else but passes the pliers to his mentor, was proven wrong at Stoilensky. During their training young people receive an allowance of 3,800 roubles from the Employment Office. Stoilensky also offers cash incentives for good performance. In 2009 four former trainees were hired as full-time employees. Last year another two young professionals joined the company after two months of training. The company's HR office looks forward to hiring most of the trainees after they complete six months of training.

VIZ-Stal is also assisting in the training of young talent for the company. Between January and September more than 100 students attending higher learning and vocational training institutions have completed technology awareness and pre-graduation training at the company. ■

# A Theme Tour for Steelworkers

**The history of mining and metallurgy was first reflected in collections, rather than in treatises or chronicles.** Today there exist an unusually large number of museums which to a greater or lesser extent focus on mining and metallurgy. And they do it in many different ways.


THE AMERICAN MUSEUM OF NATURAL HISTORY

Modern museums offer their visitors an in-depth journey into the history of their exhibits. There are a number of ways in which one can explore the world of minerals and metals. You can descend into a real mine (often museums are located in underground mining galleries), or go on a tour of a factory, or use a computer to simulate metallurgical processes. Sometimes visitors can even work in an ancient smithy or feed ore into a blast furnace.

But then, the traditional approach is also available. And that's good. Classical museums, the safekeepers of the past, remain a model and backbone of the museum business.

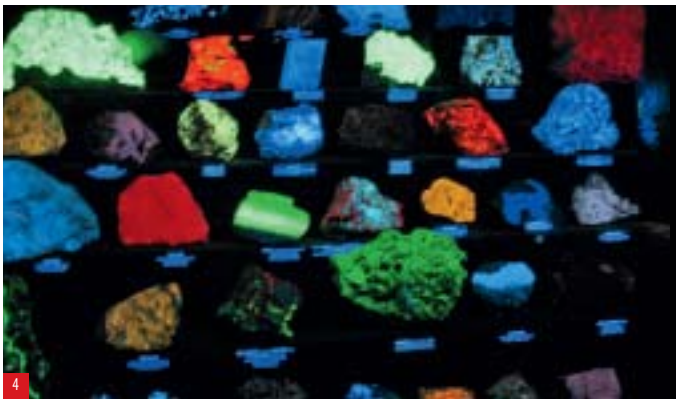
## United States

There is a very large number of mining and metallurgy museums in the United States, because the country boasts a well developed metallurgical sector. Almost every American museum maintains its own excellent website, making it possible to do remote tours.

These museums evolved from collections of minerals, and there are many wonderful collections of rocks in the US. The Frank Guggenheim Hall of Minerals at the American Museum of Natural History exhibits hundreds of samples of rare minerals from all over the world, while more than a hundred thousand altogether are stored in the museum's depository. Apart from the Hall of Minerals another major attraction is the meteorite exhibition where visitors can see the Anhighito meteorite complex, the largest on display. These huge lumps of iron, the largest of them weighing 31 tonnes, landed in Greenland 10,000 years ago. Over the centuries local Eskimos would 'pinch' smaller chunks and use the metal for household purposes.

A rare and unbelievably beautiful collection of minerals is kept in the Franklin Mineral Museum in New Jersey. It is famous for its exhibition of fluorescent minerals, large quantities of which are mined in the state.

Shining rocks can also be seen at a museum in the nearby Ogdensburg. The now defunct Ogdensburg zinc mine in Sterling Hill is used for exhibition purposes. The underground part of the mine preserves real-life mining facilities (lamp room, ventilation system), equipment and old galleries. Life-size wax figure installations demonstrate the work of miners and the ore that they produced. The

Rainbow Room leaves an unforgettable impression. Fluorescent zinc ore appears from the broken walls, filling the room with rainbow colors. The Rainbow Room is also an installation, but the museum claims that a similar phenomenon can be observed during real mining operations.

Topside structures at the Ogdensburg mine are also put to good use. They are well maintained and used as part of the tour. Some also contain exhibition rooms.

In fact, mines operated as museums are quite common in the US. For example, the former gold mine in North Dakota, or the copper mines in Montana and Illinois. The latter, in addition to relevant exhibits, also maintain large subject archives and conduct research.

## Europe

Americans are not the only ones who thought of using abandoned mines to exhibit the history of the industry. Europe also has quite a few of these museums, with some of them even larger than their US counterparts.

Take, for example, the Scottish Mining Museum. It is situated in the historical buildings of Lady Victoria, one of the largest coal mines in Victorian times, 9 miles outside Edinburgh. The exhibitions depicting the coal mining industry of Scotland and the lives of the miners are created with the help of various multimedia devices (computers, audio and video equipment) and traditional museum exhibits. Visitors are immersed in the atmosphere of a particular period in time, and to make the impression complete in the Operations Centre many of the items can be activated, spun or otherwise handled, giving one a hands-on experience of how they operate. A special tour runs only twice a week and displays large mining machinery used in coal mining. And of course the museum offers tours of the pit shaft.

The museum in Cleveland, England is arranged in a very similar fashion; the only difference is that it is located at an iron mine.

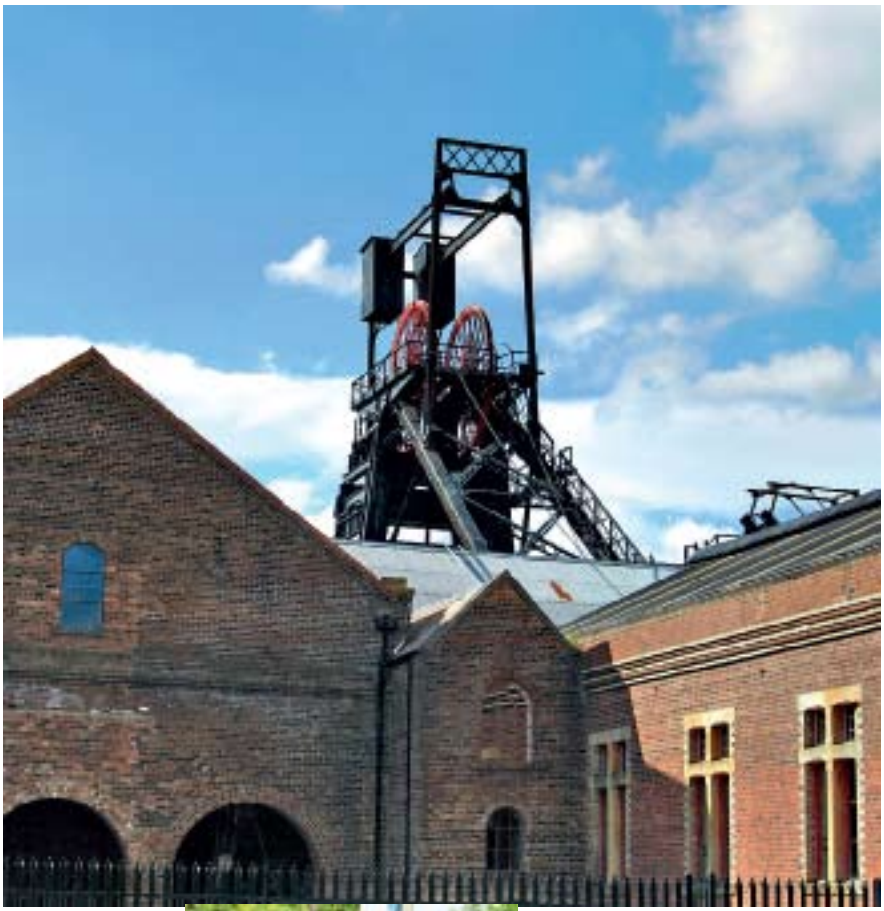
Meanwhile in the city of Volklingen, Germany the entire local ironworks was converted into a museum. Built in 1873 the Volklingen Hutte factory looks like a true dinosaur next to the new factories surrounding it. Its corroded mills, rusted railroad tracks and steam engine, huge old boilers, furnac-

1 ENTRANCE TO THE STERLING HILL MINING MUSEUM

2 WAX FIGURES OF DEMOLITION WORKERS

3 EXHIBITION IN THE MUSEUM

4 EXHIBITS IN THE RAINBOW ROOM




THE SCOTTISH MINING MUSEUM

es and other equipment are left as they are in order to preserve the 'spirit of the age'. In 2004 it became home to the Ferrodom, a multimedia centre, whose staff lead guided tours of the ironworks and conduct research activities.

A special cultural program, launched several years ago, promotes the successful preservation of European industrial heritage. Through this program many mining and metallurgical industrial sites, and not just mines and factories, are now converted into open-air museums. For example, the Kelham Island in Sheffield is a true preserve for 19th century industry. What remains of the local factory is a large Bessemer converter and the giant steam engine located on the Don River. At one point it was one of the most powerful engines in the world, with a capacity of 12,000 horsepower and was used to power immense steel rolling machines.

A similar history preserve is located in Rammelsberg, formerly one of the largest mining centres in Germany.

## China

China is the birthplace of foundry engineering and the largest mining and metals state of ancient times. In the 20th century it spearheaded the unusual practice of small-scale metallurgy and is now the leading producer of pig iron and steel. Nowadays every metallurgical factory in China has its own museum, and their exhibits portray the development of each individual factory and, in part, of the industry as a whole. Other major museums, like the National Museum of China, also have mineral halls and mining

### The Living History of Ghamor

The false impression that museums are history's rubbish dumps is refuted by the unique Ghamor smithy museum in the village of Lisichevo in the Transcarpathia Province of Ukraine. For more than 300 years the local Lisichanka River has been powering forging hammers, and the sounds of a smithy in operation are heard throughout the village. Some say that this rather loud sound is the origin for the village's unusual name, because 'ghamor' means 'noise' in Ukrainian. Today the smithy makes mattocks and horse-shoes.

The museum also hosts festivals of ethnic music and blacksmith skills.

VOLKLINGEN HUTTE

THE MUSEUM OF ANCIENT METALLURGY IN TONGLU

EXHIBITS AT THE MUSEUM IN VOLKLINGEN HUTTE

exhibits. There are also some specialised museums. There are few of these, but they are very interesting.

The Geology Museum in China is the largest of its kind in Asia. It was founded in 1916 under the Ministry of Agriculture and Commerce, and was moved to a large separate building when the Communist Party came to power. Today the museum owns an amazing collection of minerals, and ex-

## Metallurgical Secrets of the Samurai

The small Japanese town of Yasugi is home to a very fascinating museum of wako, strong Japanese steel used to make samurai swords. This museum was founded in 1941 by the metallurgical division of Hitachi for the purposes of researching and popularizing wako steel and the technology for its manufacturing. Today the museum in Yasugi has numerous articles made of wako steel,

and the traditional tatara furnaces, which according to ancient formulas, were used to make wako steel.

1 POLYTECHNICAL MUSEUM

2 EXPOSITION DEDICATED TO PAVEL ANOSOV (1799-1851), AN OUTSTANDING RUSSIAN METALLURGIST

3 MARTIN FURNACE MODEL, USSR, 1932

perts claim it to be one of the best in the world.

A truly unique collection is maintained at the Museum of Ancient Metallurgy in Tonglu. It was founded at the site of an archaeological excavation near Mount Tonglushan, where hundreds of ancient copper mines and several smelting furnaces had been discovered; the finds date back to the first millennium A.D. The mines discovered by the archaeologists and nearby equipment have become an organic part of the museum's lower exhibition hall, and visitors can see all the exhibits from the ground floor balcony.

## Russia

Before the 18th century Russian collections related to the mining industry consisted of minerals, ore samples, books on mining, and a small number of deposit maps. In 1774 a museum was created at the newly founded Mining School, an educational establishment. It was assembled from private collections. According to its statute the museum had three chambers, or what we today would call halls, each dedicated to Minerals, Mining, and Metals. Fifty years later the museum grew to be one of Europe's largest collections, with some 40,000 samples of minerals, ores and soils, 375 paleontological exhibits, and 68 study models. One of the teaching aids was a mock mine with four shafts. A separate exhibition displayed tools used in mining and metallurgy.

Today the Mining Museum of the St. Petersburg Mining Institute (University of Technology) is situated in a beautiful classical building, which may be called a museum by itself, designed by A.N. Voronin, an outstanding architect.

In addition to the Mining Museum, the Polytechnic Museum in Moscow also boasts a rich collection of metallurgical tools and technology. Its halls exhibit scale models of blast, bloom, and open-hearth furnaces, among other things. A major advantage of the existing exhibition is that it allows visitors to grasp the concept of technology and processes.

Provincial mining museums are also of interest. The museum of local history in Barnaul has an extensive collection portraying the Kolyvano-Voznesenky factories and mechanization of labor. Among other things, it holds the blueprints and models of machines designed by I.I. Polzunov, a famous Russian inventor.

Russia's first museum-factory was established several years ago in Nizhniy Tagil. The Nizhniy Tagil Technology Preserve of Mining and Metallurgy in the Middle Urals contains the former office of the manager of the mining and metallurgy district, the ironworks with a blast furnace, rolling mill, access tracks, and the famous Demidov levee, which served as a lifeline to the factory for three centuries.

There are very few museums in Russia similar to the one in Tagil, and the only other museum-factory is located in Solikamsk. The industrial heritage of our country is immense, and researchers and the authorities are seriously discussing how to preserve it. There is a chance that in several years' time we shall have a much larger number of innovative museums, similar to those in the US and Europe. ✪

NIZHNY TAGIL OPEN-AIR MUSEUM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