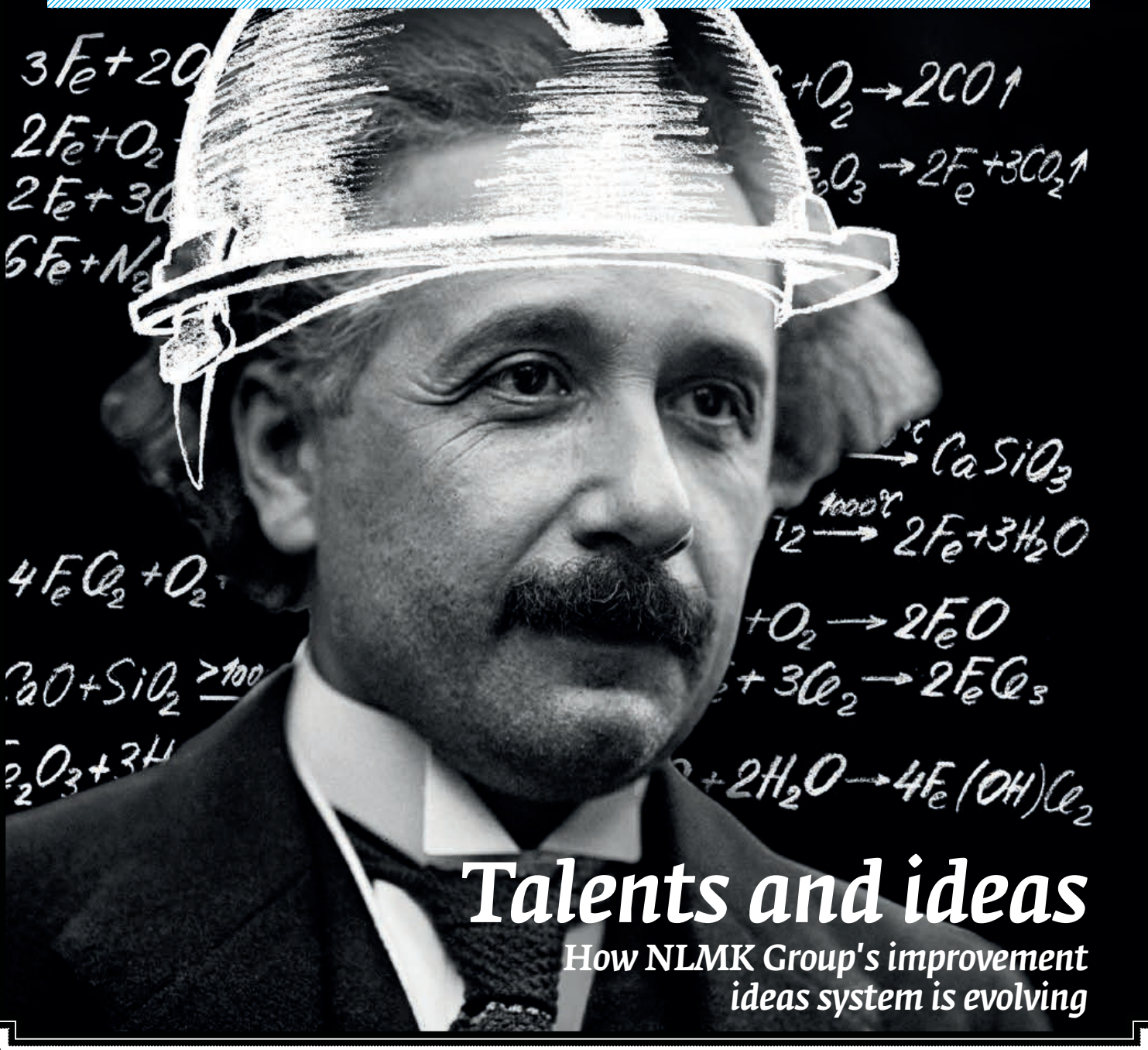
NLMK GROUP

NLMK Group Corporate Magazine

No. 1 (51) January – March 2016



Talents and ideas

How NLMK Group's improvement ideas system is evolving

Contents

NLMK GROUP
Corporate Magazine
No. 1 (53) January – March 2016

Founder and Publisher: NLMK
Address: 2, Ploshchad Metallurgov, Lipetsk 398040
E-mail: magazine@nlmk.com

Editor-in-Chief: Yulia Taranova
Topic Editor: Natalia Sviridenko
Contributors: Alla Nepochatykh, Natalia Sviridenko, Andrey Kazantsev, Olga Nikulshina
Contributing Photographers: Robert Kolykhalov, Oleg Korolev
English Edition Prepared By: Alexander Tseitline, Polina Minor

12+

Design and layout

Office 18, Stroenie 1, 21, Zvyozdny Bulvar, Moscow, 129085
E-mail: ask@vashagazeta.com | vashagazeta.com

Director General: Vladimir Zmeyushchenko
Editor-in-Chief: Eugene Peresypkine
Executive Editor: Vilorika Ivanova
Art Director: Maksim Gelik
Designers: Maria Metcherina, Yulia Ilyina, Natalia Tikhonkova, Alexandra Kukushkina
Photo Editor: Ksenia Petrakova
Colour Corrector: Aleksandr Kiselev
Production Director: Oleg Merochkin

Dear Colleagues,

Overproduction in the world steel industry plus falling demand led NLMK Group in early 2013 to design a new development strategy with a focus on process improvement. We calculated the potential impact of these changes throughout all our production sites and process stages, and started implementing an operational efficiency program.

The impact – a rise in profits due to higher productivity and lower costs – topped half a billion US dollars in three years, and today we are hitting our targets ahead of schedule. This remarkable success helps NLMK Group remain one of the most efficient steelmakers in the world despite challenging market conditions.

But there's a flip side to this success: our operational efficiency program has passed its peak and plateaued. The profit rise driven by the program is slowing down, as we expected, since the short-term and easily-achieved impacts have already been accomplished. They were the result of a few dozens of largescale projects that are now showing a droop in their share of overall performance. Our topmost priority now shifts to increasing the number of projects that take place on a smaller scale. The input of ideas coming from managers, maintenance engineers and operational efficiency staff is no longer enough to sustain the momentum needed for profit growth. We need to involve thousands of staffers in this process to hit similar success levels.

We were running just 29 efficiency projects at the time our ongoing strategic cycle started in 2013, whereas now we have over 16800 of them. Now maybe that looks a huge improvement – but it all depends on where we set the benchmark. In late 2015, Novolipetsk's NLMK Production System passed a compliance audit for the criteria and methods of the Total Toyota Production System (T-TPS). The Japanese team of experts gave high ratings to the use of NLMK Production System, health & safety, and the company's efforts to hit targets through improvement programs. However, employee involvement in the continuous improvement process was lower than the average.

Russian companies consider it an achievement when 5–10% of their employees are involved in improvement initiatives. When we asked the experts what employee involvement should be to meet Toyota's criteria, the answer was "100%."

And so this is what NLMK Group's target is. Each shop at each of our plants is capable of bringing hundreds of improvement ideas to life. All of our company's staff have the chance to contribute to our competitiveness by suggesting ideas and innovative solutions. In this issue you'll learn more about what's needed to participate in the program – and why it is so valuable.

Oleg Bagrin
NLMK Group President

New appointments

NLMK Group strengthens risk management and OHS practices.

There have been changes to NLMK Group's management structure. The changes aim to strengthen NLMK's strategic functions: internal control and risk management, occupational health and safety and the environment

Oleg Bagrin, NLMK CEO said: "Despite challenging market conditions, NLMK Group is well ahead of schedule with the key goals of Strategy 2017. The effectiveness of a company in any market environment stems, to a great degree, from its highly professional personnel – from the production line to the boardroom. We work on strengthening our organization in such strategically important areas as risk management, occupational health and the environmental protection, in order to ensure our leadership positions in these areas. New managers have ambitious goals to deliver, but the basis for successful implementation has already been laid by the company."

Grigory Fedorishin, CFO and Head of NLMK Russia Long Products

NLMK's occupational health and safety and environmental compliance functions were combined. Viktor Togobetsky, who previously held the position of NLMK Group's Director for Occupational Health and Safety (OHS), assumed the role of head of the combined function in the position of Vice President. Viktor Togobetsky's goal will be to continue to improve the Company's performance in these areas in order to ensure its leadership in OHS and to reduce the environmental footprint of NLMK Group's companies in Russia and abroad.

Galina Khristoforova was appointed to the newly created position of Director for the Environment. Prior to joining NLMK, Galina Khristoforova was in charge of environmental safety at leading Russian and international companies. The new role of Director for the Environment was introduced at NLMK Group in order to improve the environmental component of the unified global system of occupational health, safety and the environment.

NLMK created the position of Vice President for Risk Management. Eugene Ovcharov, who is in charge of integrating NLMK's internal control and risk management systems across all Group assets, became the new Vice President for Risk Management.

NLMK Russia Long Products is now headed by Grigory Fedorishin. He combines this role of division head with the role of Vice President for Finance and Member of NLMK Management Board. Alexander Burayev who previously headed the division assumed a different role within NLMK Group due to his retirement.

Sergey Chebotarev was appointed to the position of Vice President for Energy. He previously held the position of NLMK's Director for Energy Efficiency and Energy Markets. He replaced Alexander Starchenko.

In order to boost business process efficiency and improve investment project management, NLMK eliminated the position of Vice President responsible for the Strategic Raw Materials Department held by Alexander Saprykin. The Department's investment projects were transferred to Konstantin Lagutin, Vice President for Investment Projects. Oleg Molchanov, Head of Commercial Services of the Raw Materials Department, was appointed Director for Raw Material Supplies.

These changes came into force in January 2016.

Eugene Ovcharov,
Vice President for Risk Management

Viktor Togobetsky,
Vice President for Occupational Health and Safety and the Environment

Galina Khristoforova,
Director for the Environment

Sergey Chebotarev,
Vice President for Energy

NLMK increases its galvanized steel capacity

Equipment upgrades to boost Novolipetsk galvanized steel capacity by 11%.

NLMK Group has finished hot-testing its continuous hot-dip galvanizing lines - HDG-1 at the Lipetsk production site following upgrades. HDG-1 is expected to reach full capacity (up to 500,000 tonnes per year) in April 2016.

The project boosted the line HDG-1 productivity by 30% to 500,000 tonnes per year; and increased Lipetsk site value added manufacturing capacity to produce HDG steel for the construction, automotive, and 'white goods' sectors, as well as for further use in the production of pre-painted steel, by 11% to 1.25 million tonnes.

This project will enable NLMK to solidify its position in the high value added steel market.

NLMK Production System passes Toyota audit

Toyota Engineering experts noted that NLMK's production processes were in line with the best steelmaking companies.

NLMK Group has successfully passed an audit at its Lipetsk site for compliance with the criteria of the Total Toyota Production System (T-TPS), one of the most efficient production process management systems in the world.

The goal of the audit was to assess the efficiency of NLMK's Production System (NLMK PS) and to obtain recommendations for its further development.

NLMK PS was audited for compliance with T-TPS criteria by leading experts from Toyota Engineering Corporation and TPS Certificate Institute (Japan). The auditors assessed NLMK's blast furnace, steelmaking and rolling operations; the use of NLMK PS tools; procurement, R&M, training and OHS processes.

Auditors noted that NLMK's Production System is more advanced than the average standard at global steelmaking companies. NLMK operations were assessed as being in line with the best European and American steelmaking companies.

Yulia Venza, NLMK Director for Operational Efficiency, said: "The experts had a high opinion of NLMK's use of A3 instruments for problem-solving; as well as of our level of OHS compliance. Toyota Engineering Corporation experts made a special note of the efficiency of our efforts to achieve our objectives through optimization programmes. The auditors indicated how to further develop the system in order to reach the level of the leaders, such as Japanese companies, with increased staff involvement in the continuous improvement process. We will include these recommendations into NLMK's Production System Development Programme for 2016-2017."

Talents and ideas

How our improvement ideas system is evolving to become more user-friendly and beneficial for all NLMK Group employees.

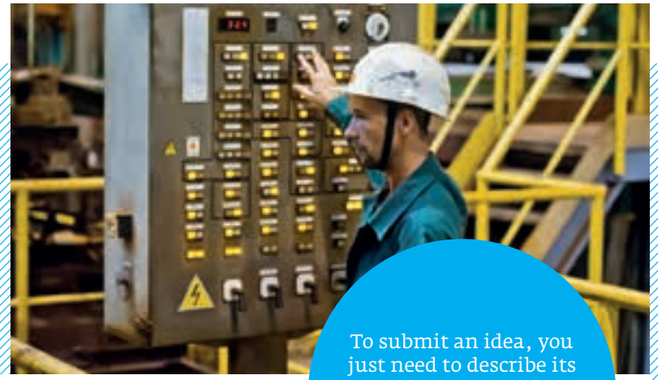
By Alla Nepochatykh

An improvement ideas system is considered to be a universal way to improve production performance which does not usually require large investments. Ideas submitted by employees are aimed at providing creative technical solutions and developing talents. This is the reason advanced industrial companies pay special attention to this area. Innovations at NLMK Group are the key tool to improving production processes. The company's innovators are distinguished professionals recognized throughout the country. A total of over 20,000 improvement ideas has been submitted within the Group over the past ten years.

SUGGESTION BOX

The modern employee suggestion system dates back to 1880 when a manager from a shipbuilding company owned by William Denny invited his colleagues to drop their ideas into special boxes installed in workshops. The ideas were examined and, if found useful, were implemented at production facilities, and their authors were given awards. This approach began spreading widely in many countries, including Russia.

The Soviet Union introduced a single definition of an improvement idea for all plants, which featured stipulations that ideas were to be innovative and useful for the plant and should represent an engineering solution. NLMK engineers had been actively adapting and modernizing equipment and improving iron ore and steel smelting as well as flat rolling processes. The year 2007 saw a new stage of innovation development at NLMK Group's companies. The Group decided to reward employees not only for innovation ideas in their usual sense but also for suggestions that similarly allowed the Company to reduce costs, even without specific innovation. Today, all the Group's companies have suggestion systems as part of the NLMK Production System.



To submit an idea, you just need to describe its technical aspects and, equally importantly, specify its potential benefits

NLMK Group has three parallel innovation areas in operation:
1) Cost reduction ideas
2) Improvement ideas
3) Initiative system

Until recently, there had been a separate submission, review and reward system for each of these areas. Today, these systems are being brought together. To this end, the Group has developed regulations for a technical committee that determines the submission, review, assessment and rewards procedure.

EASIER, FASTER, BETTER

Almost all NLMK Group companies have a system for rewarding employees who contribute innovations to production processes. Previously, rewards depended on the idea submission system: for example, advance payments for improvement ideas were made only after the proposal was implemented. Today, the Group uses a single approach to rewarding its staffers.

> A total of over 20,000 improvement ideas has been submitted within the Group over the past ten years

"To submit an idea, you just need to describe its technical aspects and, equally importantly, specify its potential benefits," said Yulia Venza, Director for Operational Efficiency. "It can be either a measurable indicator such as performance, availability factor or defect rate, i.e. indicators of the economic impact. Or it can be an idea that has no measurable indicator and which is aimed, for example, at improving the workplace – installing a partition for safer and more comfortable operation. If such ideas are found efficient, they are also accepted and rewarded.

"Workshops have special forms, divided into two sections for ideas. The first section is intended for an initial description of the idea and information about its author. The second section is to be completed after the idea is approved by the technical council. The idea form should be submitted to an employee

NLMK Group
No.1 January – March 2016

Innovation today is not just about creative technical solutions and developing talents; it's a universal way to improve production performance.

responsible for idea collection in the unit. Every month, the unit's technical council gathers to review these ideas, and discuss whether a particular idea can improve the production process – whether it is new, reasonable and feasible. In other words, to submit an idea, you need to do just two things: fill in the form and hand it over for review by the technical council.

"Many employees experience difficulties with filling in the form. This is why I am planning to assign several members of my team to meet with the authors before the technical council meeting and check if they have filled in their forms correctly," Yulia Venza said. "If needed, they will help describe the benefits of the idea. Perhaps, this will help improve both the amount and quality of technical ideas. Quite often, they simply haven't been completed fully."

INVENTING MEANS EARNING

If the technical council decides that the idea should be implemented in the production process, the author receives 2,000 to 15,000 rubles (~USD 30 – 230) within a month after the decision was made. This is an advance reward. If the idea has a technical or economic impact, the author will get one or two additional rewards while their solution is used in production.

The size of the advance payment depends on the complexity of the idea or, as experts say, on the engineering level of the solution. The Company uses a special scale to assess ideas accurately. Level 1 ideas are the simplest ones: they include, for example, designing a single part or improving minor characteristics of a product.

The authors of such ideas may expect to get an advance of 2,000 – 4,000 rubles (up to 10% of the average salary). Level 6 solutions are considered to be the most complex: these can include an automated management system, extra complex recipes, new products with better technical parameters, etc. If the technical council classifies the idea as a Level 6 solution, the author gets a 15,000 ruble advance reward.

Once approved by the technical council, the idea is implemented and its technical impact is assessed. One of the key differences of the new system is that the technical impact achieved is assessed through examining changes in key performance indicators. If no technical impact is observed, the author gets the abovementioned incentive pay. If the impact is observed, the author gets an extra reward three months after his or her idea had been put into practice. The size of this reward depends on the achieved technical impact (based on comparing the key performance indicators before and after the implementation) and ranges between 15,000 and 45,000 rubles (~USD 230 – 700).

That's not the end of the story. Ideas with a proven technical impact are then transferred to optimization programs where their economic impact is monitored. The actual impact is assessed a year after the introduction of the idea. If it is positive, the author gets another bonus amounting to 15% of the impact value but no more than ten average monthly salaries. This bonus is usually paid within a month after the assessment of the annual impact.

"This is what we mean when speaking about global work across the entire Group," said Yulia Venza. "Also, these ideas provide a basis for optimization programs aimed at improving EBITDA. The programs are then implemented and monitored, and their effect is reflected in the budget. This way we improve all processes in the Group."

Other companies of the Group also use the reward system. Andrei Koynov, Head of Engineering Department at Altai-Koks, says:

"The plant has developed a fully-fledged employee motivation system, which includes an incentive reward once the idea is approved, plus a final reward once it is implemented. Today, workshops offer a great opportunity to see with your own eyes what ideas your colleagues submit and what rewards they get. Workers are encouraged to move forward and generate ideas to change, improve or supplement a process, making it more efficient, easier or safer."

BEST INNOVATORS

Two years ago, the Novolipetsk plant introduced the *NLMK Best Innovator* honorary title. The first people to receive it were Yury Sukhanov, Chief Engineer at the Technical Center, and Alexander Nichiporov, Electrician at Electrical Equipment and Automation System Repair Shop.

"Our people have always been known for their savvy mind, innovative approach and engineering genius," said Igor Chursin, a distinguished innovator and winner of the regional Engineer of the Year competition. "The problem is that sometimes people lack determination or are a bit lazy in accomplishing their ideas. NLMK is a perfect place to do it, and anyone can try their hand at efficiency improvement. Both the company and the employee benefit from it. All you need is to complete your work and never give up on your idea."

Sergei Bubnov, an honored inventor of the Russian Federation, also works at NLMK. With over 30 years of experience at the company, he is NLMK's leading investment program and FEED engineer. Sergei has about 300 invention patents and about 500 improvement ideas. NLMK uses over 150 of these inventions.

"Innovations are my lifestyle," he said. "Nothing is perfect. Even if everything works smoothly, the process can still be improved through enhancing performance or processing quality. This is why innovation is so important. Besides, it is always exciting to work on a complex issue with many factors to consider."

NLMK Group employs winners of the all-Russian Engineer of the Year competition organized by the Russian Union of Scientific and Engineering Associations (RUSEA). The jury, which includes leading scientists, engineers and industry experts, assesses the contenders according to the results of their research and engineering efforts, i.e. by their developments that meet the advanced requirements to engineering solutions. Thousands of Russian engineers submit their applications for the competition annually.

Over the 80-year history of Novolipetsk, innovators implemented about 100,000 improvement ideas in production processes.

The company's employees received over 1,500 inventor's certificates and patents on inventions and utility models.

"Innovations have always been and remain the most mass-produced engineering creativity products," said Alexei Dagman, Chief Technical Officer at Novolipetsk. "They can aim to improve any area of any unit – from a production process to the layout of a workplace. It would be impossible to improve the company's performance, competitive advantages of our products and working conditions without out-of-the-box solutions and ideas submitted by our employees."

AUTHORS OF IDEAS WITH AN ECONOMIC IMPACT GET A BONUS AMOUNTING TO 15% OF THE IMPACT VALUE

NLMK Group Innovators

Vladimir Dobrynin,
Altai-Koks, NLMK

Initiative: Improvement of the quality of absorption oil used to recover benzene from coke gas.

Quote:
I suggested replacing expensive aromatic thermal oil used in the coal tar pitch cooling system with cheaper absorption oil. Another, more interesting proposal involves additional purification of absorption oil, which makes it more concentrated and allows to lower its consumption. I have long been involved in improvement initiatives, so I'm a veteran innovator already. It's safe to say that there is always room for technical creativity on the shop floor, since problems arise which often require an unconventional approach to solve. Improvement is a familiar everyday pursuit for the design engineers in our department.

Artyom Ivakhnyuk,
Senior Foreman, Electric Arc Furnace Shop, NLMK Kaluga

Initiative: Development of the lifting beam for emergency removal of billets.

Quote:
Following an emergency casting shutdown on the continuous casting machine, there are rejected products in the tundish, the risk of equipment damage is up, and the fault clearing time increases. The drawing of the lifting beam for emergency removal of billets was developed jointly with the engineering design department. Now this lifting beam will be used in emergency situations. This will allow us to continue sequence casting or plan to reprime the CCM without compromising the production process. Practical application of our idea will ensure technological stability, reduce the equipment downtime rate and failures in sequence casting as well as help minimize the reject rate in finished products.

"INNOVATIONS ARE MY LIFESTYLE"

Vladimir Lukhmanov,
Mechanic, Maintenance, Stoilensky

Initiative: Replacement of metal drain pipes on mills with a rubber protection hose, with 15 million rubles (~USD 230,000) in economic impact.

Quote:
Metal drain pipes transporting slurry had to be replaced at one of our units. Replacement of these pipes is a time-consuming process because the space is cramped and the traversing device could not be used. Therefore, the installation had to be completed manually, using hoists. I recalled a composite rubber hose we had installed before on other equipment. Then I thought: why not make a similar rubber hose out of an old conveyor belt, of the required size and thickness, to replace the metal pipes? I'm happy that my idea was able to bring this kind of impact and was recognized by the technical council. I think that such competitions will become a good incentive for innovators who will feel more confident proposing and implementing their ideas.

Achievements: Best Initiative of the Year in 2014.

Konstantin Vdovin,
Head of Engineering Division, NSMMZ

Initiative: Together with his colleagues he implemented the oxygen-limited steel production method which generated an economic impact of 239 million rubles (~USD 3.7 million).

Quote:
The idea came along at the congress of steelmakers attended by me and my colleague and coauthor, Head of EAF Shop Oleg Mozharovsky. An article by Genrikh Dorofeev and Pavel Yantovsky was discussed. It specified that in modern electric arc furnaces iron in furnace charge burnt by oxygen is converted into one of the fuel types. If conversion of one type of energy into another in the furnace seems natural, using iron as a heat source, i.e. fuel, is pretty doubtful. Having reviewed research papers at the congress and assessed the results of the implemented initiative, my colleagues and I came to the following conclusion: it's necessary to reduce the specific oxygen consumption rate by more than 1 cubic meter per ton to improve the shop's operating performance substantially. We conducted a trial steel production series to discover to which extent the oxygen consumption can be lowered without any significant increase in power consumption or a drop in the furnace's output involved. Finally, we were able not only to corroborate the results obtained at the trial production stage but also to improve some of them. Currently, the oxygen-limited production method has been introduced in both furnaces at the shop.

Alexander Kislekov,
Chief Engineer, Recovery Cogeneration Plant, Novolipetsk

Initiative: Changeover in fuel combustion in the boiler units of the recovery cogeneration plant, with the economic impact of 305.5 million rubles (~USD 4.7 million).

Quote:
Our project is aimed at changing the ratio of gas consumption by the boilers of the recovery cogeneration plant. The design gas ratio is as follows: 60% of blast furnace gas and 40% of natural gas. We were able to increase the ratio of blast furnace gas to 85%, reducing the share of natural gas. Consequently, it allowed us to cut back on natural gas spending. That's what generated this kind of economic impact because blast furnace gas is a secondary energy resource which is a by-product of pig iron production. This proposal was coauthored by three other people: Alexei Kichigin, Head of the Boiler and Turbine Subplant of the Recovery Cogeneration Plant; Gennady Ushakov, Head of the Boiler Equipment Operation Unit of the Recovery Cogeneration Plant; and Pavel Laskurinsky, Head of the Department at the Energy Efficiency Center.

Achievements: Alexander Kislekov won the invention and improvement efficiency competition in 2014, the regional Engineer of the Year 2014 contest in the Youth for Engineering category, the Best Young Professional 2010 contest; he is in charge of improvement and cost reduction in his department.

"IT WOULD BE IMPOSSIBLE TO IMPROVE THE COMPANY'S PERFORMANCE WITHOUT OUT-OF-THE-BOX SOLUTIONS AND IDEAS SUBMITTED BY OUR EMPLOYEES

Two years ago, the Novolipetsk plant introduced the *NLMK Best Innovator* honorary title

Evgeny Shalashov,

Senior Heat Treater, Heating Unit No. 2, Cold Rolling Shop, VIZ-Steel

Initiative: Efficiency improvement of the auxiliary thermo-flattening annealing unit.

Quote:

I often have to operate the auxiliary thermo-flattening annealing unit No. 6 where problems used to occur repeatedly when fragments of lining and heaters from the furnace were falling onto the withdrawal roll stand. This caused a defect called a "collar mark". The unit had to be shut down to clean or replace the withdrawal roll stand. Cleaning used to take about 40 minutes whereas replacement required about 2 hours. I suggested installing a tray at the furnace exit to have waste dumped in it instead of on the steel strip. The idea was approved and a special tray was installed by the Maintenance Service of the Maintenance and Repair Shop. I think this will reduce substandard products and unplanned equipment downtime. It's essential to ensure that everyone submits their proposals because steelmakers operating the equipment know the problems better than anyone and understand how to solve them.

Pavel Strukov,

Senior Heat Supply Expert, Energy System Management Directorate, Novolipetsk

Initiative: Changing steam supply from the coke plant to the combined heat and power plant outside of the heating season, with the economic impact of over 20 million rubles (~USD 310,000).

Quote:

For me, innovation is an urge to do something better than it was yesterday. In my opinion, innovation is an instrument which incorporates a creative approach and analytical skills and helps increase production efficiency, accelerating its technical modernization through cost reduction or improvement of organizational and technical processes. In addition, this is an opportunity to enrich one's knowledge of production and enhance one's professional expertise. One of the first improvement ideas I registered as "Supply of chemically treated water for cold rolled steel and coating production in the course of repairs at the first stage of the water treatment facility at the heat and power shop" was coauthored by my colleagues from the heat and power shop. The improvement idea I value most is "Changing steam supply from the coke plant to the combined heat and power plant outside of the heating season." This initiative is aimed at increasing the power output by turbine generator units of the combined heat and power plant outside of the heating season by changing steam supply between the power plant and coke plant. My motto on the job – it's our turn to act.

Achievements: Pavel Strukov won the *NLMK Engineer of the Year 2012* competition, the *Technical Creativity of NLMK Youth* contest in 2015, the *Inventor and Innovator of the Year 2015* regional public competition.

BOTH THE COMPANY AND THE EMPLOYEE BENEFIT FROM NEW IDEAS

FOR ME, INNOVATION IS AN URGE TO DO SOMETHING BETTER THAN IT WAS YESTERDAY

Igor Chursin,

Head of Coke By-Product Recovery Shop, Novolipetsk

Initiative: Improvement of the technological workflow for recovery of benzene hydrocartbons.

Quote:

The initiative allowed us to reduce the absorption oil consumption required to produce a ton of crude benzene, which means substantial saving. I believe that continuous development and growth are the key to success in any business. There are a lot of competitions organized at the plant, where every employee has an opportunity to prove themselves. Anyone can participate, and the odds are even. Everything depends on the person whether they want it or not.

Achievements: Igor Chursin won the *Engineer of the Year* regional competition, the economic impact from the initiatives implemented with his participation totaled over 28 million rubles (~USD 435,000). Since 2004, he has submitted and implemented more than 82 improvement and cost saving ideas.

Sergei Opleukhin,

Head of Recovery Shop, Altai-Koks

Initiative: Alternative benzene cooling solution.

Quote:

My colleague Pavel Syroyezhkov and I proposed to use cold industrial water and a condenser for benzene cooling. We suggested using a heat exchanger we have in the system of coke battery No. 5. This kind of equipment had already been purchased before and is currently available on site. It means there is even no need to buy it now, actually. One large condenser can easily replace three benzene air coolers at once, saving millions of rubles for the company.

Innovation is an opportunity to enrich one's knowledge of production and enhance one's professional expertise

It's essential to ensure that everyone submits their proposals because steelmakers operating the equipment know the problems better than anyone and understand how to solve them

Some thoughts on innovation

Innovators of NLMK Group talk about their work, best initiatives and new ideas.

By Natalia Sviridenko

Nikolai Kikin,
Senior Foreman, Machine Assembly Shop for Steelmaking Equipment, Novolipetsk:

Innovation is a fascinating pursuit where you can always invent new things or remake something. My most significant improvement idea was a combination carbide drill which adds functionality to the gear hobbing machine. My motto on the job – nothing is impossible.

Nikolai Kleshchin,
Maintenance Foreman, Steelmaking Equipment Repair Shop, Novolipetsk:

Implementing innovations is an interesting and useful activity that improves production quality, aesthetics and practices. My first improvement idea was the "Trap for the coke screen belt," and it's also the most significant one because it initially encouraged my interest in innovation. I believe you should put your heart into your work – this is my motto on the job.

Alexander Belousov,
Head of Unit, Basic Oxygen Furnace Shop, Novolipetsk:

From where I'm standing, innovation is a means of self-fulfillment. My first initiative was related to increasing neonhelium mixture output at the BOF shop back in 1998. The improvement idea which meant the most to me was the one submitted in 2014. It changed the method of vacuum treatment of containers in the core storage system, which allowed us to reduce argon losses during storage. My motto is efficiency and safety of our work.

Igor Sidorov,
Foreman, Steelmaking Equipment Repair Shop, Novolipetsk:

Innovation, above all, stands for creating a favorable workplace environment, ensuring safe methods and techniques of operation, as well as improving technological and maintenance procedures.

The purpose of my first improvement idea was to reduce the repair time: "The method for replacing electrical filter insulators in the dust collection system of the bin trestle of blast furnace No. 6." The most significant idea was meant to improve the microclimate in the working areas of the bin trestle of blast furnace No. 7.

Here's my motto: "You may have a lot of concerns, but innovation runs its course, so work hard and innovate smart."

Nikolai Samaluk,
Head of Unit, Basic Oxygen Furnace Shop, Novolipetsk:

Innovation means an opportunity to change the production environment for the better, increase reliability, ensure lean operation of equipment and reduce repair time, which improves the overall performance of the BOF shop's employees. My first proposal was related to the workflow for refilling and operation of the liquid argon gasifier at oxygen plant No. 1. The most significant idea which remarkably improved equipment performance was related to adjusting the way of heating a krypton-xenon mixture pump at air separation plants No. 4 and 5. Efficiency of our work lies in reliable operation of equipment.

Yury Dolgikh,
Lead Engineer, Smelting and Secondary Metallurgy Laboratory, Basic Oxygen Furnace Shop No. 1, Novolipetsk:

Innovation stands for application of non-standard approaches to solving current issues. I submitted my first improvement idea in 2007. It was aimed at reducing costs of low carbon steel production at basic oxygen furnace shop No. 2. The idea was totally new for Novolipetsk and proposed adding a deoxidizer based on the metal's degree of oxidation in the converter. The necessary amount of the deoxidizer was calculated automatically when the degree of oxidation was measured. This initiative was the most significant as well, because that was when my career in innovation started. My motto goes like this: less cost, maximum impact.

Sergei Ryzhkov,
Head of Unit, Water Supply Shop, Novolipetsk:

In my opinion, innovation stands for development and implementation of new unconventional concepts and ideas.

My first improvement suggestion was to change the wastewater disposal system in production unit No. 3 of the refractory shop. Hopefully, my most valuable idea is still ahead.

Anton Volodin,
Turner, Machine Assembly Shop for Steelmaking Equipment, Novolipetsk:

I regard innovation as improvement of the working environment and concern for solving production issues. My first improvement idea was focused on the mandrel for processing internal shells. The most valuable idea of mine was regarding the mandrel for processing the measuring head of the hot blast tuyere.

Vladimir Fedyunin,
Foreman, Steelmaking Equipment Repair Shop, Novolipetsk:

Innovation provides an opportunity to improve equipment reliability and reduce repair manhours. My first improvement initiative was aimed at upgrading hydraulic equipment during commissioning of coke battery No. 6. A series of initiatives for commissioning coke batteries No. 1 and 2 proved the most significant.
My motto on the job is as follows: all problems related to failures in equipment operation can be solved.

Mikhail Zhavrid,
Category 2 Engineer, Maintenance, Novolipetsk:

For me personally, it is a way of self-actualization, an incentive for my cultural and technical awareness growth.

I started my innovation activity in 2011. My first improvement idea was "A mechanism for welding roller bearings of the continuous casting machine No. 4, 6" submitted on April 1, 2011. I have submitted more than 220 improvement ideas over four years of my innovation experience.

Sergei Zakharov,
Deputy Head, Water Supply Shop, Novolipetsk:

Innovation implies an opportunity to propose and implement new ideas in production processes. We installed dirt traps with grids to eliminate the problem that had occurred during operation of sludge pumps. This measure allowed us to increase the reliability of the pump station's performance. This is my most valuable initiative because it became the beginning of my innovation activity.

My motto on the job – do your work honestly and thoroughly.

Vladimir Prokopov,
Foreman, Electrical Service, Water Supply Shop, Novolipetsk:

Innovation means implementation of a new idea in the workflow to ensure savings and improve reliability of equipment.

I think that my most important proposal for now is to improve operational reliability of units supplying water to continuous casting machine No. 4–6 of basic oxygen furnace shop No. 1. Doing my job responsibly is my motto.

Presentation by NLMK Group CEO Oleg Bagrin at the Company's strategy session

Shaping the future

NLMK Group gets down to developing a new strategy for the period after 2017

Olga Nikulshina

Oleg Bagrin, NLMK Group President

"The implementation of Strategy 2017 today has helped NLMK Group become more efficient and strengthen its leadership position by unlocking its inner potential. Replacing a program aimed at rapid capacity growth and major facility upgrades, it allowed us to increase profitability in the past three years despite the protracted crisis in the steel market.

"This sound foundation gives us a chance to take advantage of the unique opportunities in the industry and in our key markets which always arise in the time of crisis. We will definitely be looking at such opportunities during the new strategic planning cycle that started at this session – to decide on their inclusion in our future development program for the period after 2017."

Stanislav Tsyrlin, Vice President, HR & Management System

"We are now building a truly cohesive team. It is stronger than two years ago when we just started getting together and discussing problems facing the company as a whole. Of course there is always room for improvement, but I'm sure that even now NLMK Group's strong and capable management team is ready to meet every challenge."

Pavel Lizogub, General Director of Altai-Koks

The recent session on strategy attended by NLMK Group's executives, function managers and heads of production sites was completely different from the previous ones. The meeting offered its usual chance to reflect on the progress of Strategy 2017, but its keynote was the start of a new strategic planning cycle for the period after 2017.

The strategic process that commenced at this session will involve all NLMK Group employees in Russia and abroad – making them fully-fledged contributors in the planning and shaping of the company's future for many years to come.

When speaking at the session, NLMK Group President Oleg Bagrin reminded the attendees that with the adoption of Strategy 2017, technology and information sharing in the interests of the company as a whole has become the top priority for all Group companies. This was the decisive success factor: together with

NLMK Group's strong and capable management team is ready to meet every challenge

the performance improvement program and new technologies and facilities, it has helped boost the company's competitiveness. Oleg Bagrin called for all NLMK Group employees to become actively engaged in the strategic planning process and work on promising ideas that could form the basis of the future strategy.

Meeting participants reflected on the progress of Strategy 2017

Konstantin Lagutin, Vice President for Investment Projects

Grigory Fedorishin, CFO, General Director of NLMK Russia Long

Grigory Fedorishin, Vice President, Finance, General Director of NLMK Russia Long

"This strategy discussion has been one of the few to arouse so much interest at our executive sessions. It is clear that while putting in such considerable effort to achieve the current strategic goals, the team is raring to get stuck into the development of the new strategy. I was inspired both by the team's zeal and the quality of the ideas they put forward."

Sergey Likharev, Vice President, Logistics

"The situation in the global markets and the Russian steel industry is extremely challenging. Things were much better three years ago. This is why adopting the right priorities and steps to be taken is not only crucial for maximizing profits. The company's entire success or failure rests on these decisions."

Sergey Likharev, Vice President, Logistics

"We have a chance to take advantage of the unique opportunities in the industry and in our key markets which always arise in the time of crisis."

Konstantin Arshakuni, Director, Strategy

"The executive session on strategy was of great practical use for the company. Each participant had their chance to present their development project and answer questions to assess its applicability to NLMK Group. It turned out that the majority of the development ideas and projects presented at the session can be put to practice: they can be analyzed in detail and implemented during the next strategic development cycle."

A paradigm of continuous improvement

Sergey Filatov, Managing Director at NLMK, speaks about the annual results, new approaches to work and a conflict between output and quality which turned into a win-win.

By Alla Nepochatykh, Andrei Kazantsev

We broke all production records at all the key production stages for the second consecutive year

Sergey, let's start with summarizing the company's performance in 2015. What do you think were the main achievements? What projects deserve a special mention?
I wouldn't like to place a special emphasis on any particular project. We have over a thousand initiatives – they are all valuable and, more importantly, closely linked with the others. They are parts of an unbreakable chain which form a single complex – or, if you will, a system of projects under Strategy 2017. If we are talking about achievements, then I'd like to focus on another thing: our employees started working in the paradigm of continuous improvement. Ideas aimed at improving the efficiency of production and business processes are now generated at all levels. This fundamental change in our approach was, in my opinion, a much more important achievement in 2015 than the implementation of separate projects, since it was an attitude change and therefore a guarantee of an entirely new development path for the company in the future.

How do you feel in general about the past year?
I believe it was a successful year. Novolipetsk achieved all its steel production targets. We broke all production records at all the key production stages for the second consecutive year thanks to our highly competent professional staff, top-quality repairs and the well-planned operation of equipment and energy systems. Improvements in steelmaking processes, including higher resistance of converter lining and better logistics at BOF shops also contributed to the overall success. Production staff reduced the amount of substandard output – rejects and waste products – across the entire production chain.

PRODUCTION STAFF REDUCED THE AMOUNT OF SUBSTANDARD OUTPUT – REJECTS AND WASTE PRODUCTS – ACROSS THE ENTIRE PRODUCTION CHAIN

We started thinking and working in the paradigm of continuous improvement

How do you solve the so-called conflict between the output and quality?
I don't agree there has to be a conflict between the output and quality. If the market demands that we produce

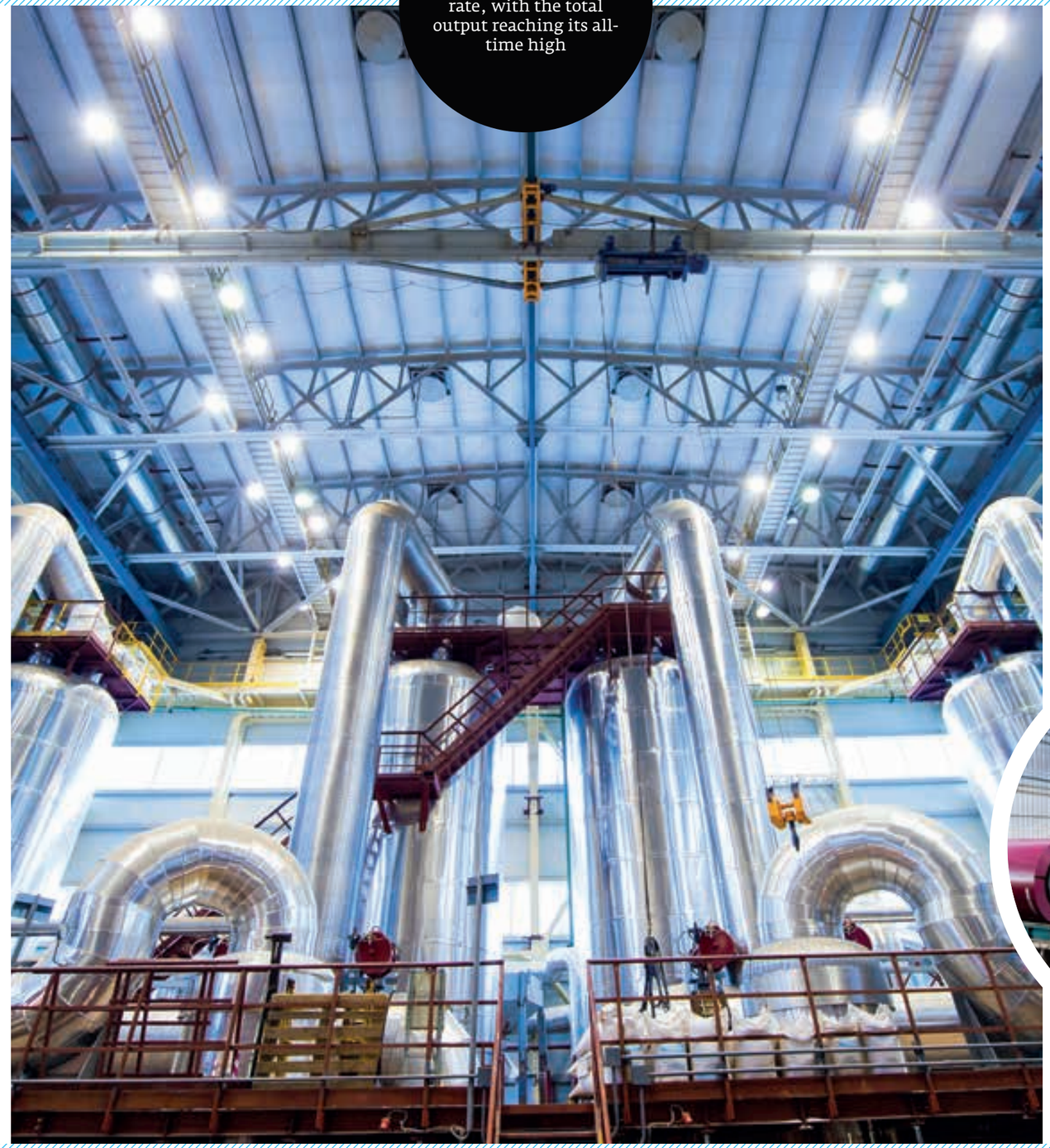
I don't agree there has to be a conflict between the output and quality

a certain volume of products with no loss in quality, we have to comply with it. Sure, it's harder, but we are not into compromises.

How do you meet these targets at the plant?
We eliminate losses at every stage of the production chain. It is easier to rule out problems arising, let's say, at the sinter plant if you start tackling them at the first link of the chain – I mean, at Stoilensky. We analyzed the quality of concentrate, grinding process, charging frequency and a bunch of other parameters. We balanced the particle size distribution of dolomite and limestone at Stagdok and Dolomite. These are just two examples of loss prevention initiatives – and we had thousands of them. As a result, all the links in the combined production chain run smoothly and quality improves. We achieved a 2.5-fold decrease in the defect rate, with the total output reaching its all-time high.

You said that well-coordinated teamwork and competent employees are the key success factors. What do you do to unite people and build a team?
This is about the Olympic effect: when the national team goes to an international competition, the guys know they're on a common mission and start thinking like one organism. We also have a shared Olympic goal:

We achieved a 2.5-fold decrease in the defect rate, with the total output reaching its all-time high



All the links in the combined production chain run smoothly

to become the most efficient steel producer in the world. It's a goal set out in Strategy 2017 that unites all the companies of NLMK Group.

Let's consider the example of Altai-Koks and Lipetsk Coke Plant. Despite the distance of 4,000 km separating the plants, they work as a single unit. We plan the production process jointly and monitor it every day, we see each other. Furthermore, we have installed cameras in our facilities so that Altai-Koks employees can connect to them at any moment and view a live video stream of our processes. Every ten days we discuss business issues in video conferences with representatives of all the parties involved: Altai-Koks, Stoilensky and the Lipetsk site.

Why Stoilensky?
We have also switched to a single operating cycle at Stoilensky. We are

We eliminate losses at every stage of the production chain

The atmosphere in the Group has changed: all units have begun uniting their efforts – despite the distances involved

planning to move over to processing 100% of its raw materials from late 2016. In 2015, Stoilensky's foremen visited our sinter plant, while Novolipetsk's managers went down the mine. I was excited to go 350 meters underground myself: it's really impressive to be deep in the rock formed over a billion years ago.

Novolipetsk and Stoilensky, Novolipetsk and Altai-Koks. This is not an exhaustive list, is it?
It sure isn't. It is no less important to improve coordination between the different units of such a large producer as Novolipetsk. For example, we have synchronized the sinter plant with two blast furnace shops, which helped us maximize the usability of sinter for its intended purpose. Similar synchronous communication was established between the smelting and blast furnace units as well as smelting and rolling sites. We and NLMK Europe have a common technical council: we jointly develop new steel grades and new technologies. Our colleagues from NLMK USA are also planning to join this single engineering group

WE HAVE A SHARED "OLYMPIC" GOAL: TO BECOME THE MOST EFFICIENT STEEL PRODUCER IN THE WORLD

These improvements were possible thanks to a fundamental change in the approach of all employees at all NLMK units

designed to improve the quality of our products. It is safe to say that the atmosphere in the Group has changed: all units see the benefits of cooperation, and have begun uniting their efforts – despite the distances involved.

What modernization and construction projects were completed within Strategy 2017 during 2015?

Last year, we completed one of the key projects of Strategy 2017: upgrading the continuous hot dip galvanizing line No. 1. It allowed us to increase this line's capacity by 30% to 500,000 tonnes a year and consolidated our position in the Russian galvanized steel market.

Current construction projects include the expansion of the BOF shop slab warehouse and the introduction of pulverized coal injection in blast furnaces No. 6 and 7 – as well as merging coke oven gas flows at the coke plant.

Other important projects include replacement of screens at the sinter plant and the launch of another top-pressure recovery turbine at blast furnace No. 6. Two turbines (the first one was launched in 2015. – Editor's note) will generate up to 200 million kWh a year from by-products.

What were Novolipetsk's achievements under the efficiency improvement program and which projects were involved?

The total savings in 2015 amounted to about 7.7 billion rubles. They were achieved through numerous efficiency projects at different scales. Let me take you through the major ones? For example, we improved the performance of sinter machines at the sinter plant and started using sinter fines in pig iron production. We optimized coke flows in blast furnace production. BOF shops started producing long slabs from isotropic electrical steel, which reduced costs. We also improved the hot rolling and non-grain oriented steel production processes. I'd like to emphasize once again that these improvements were possible thanks to a fundamental change in the approach of all employees at all NLMK units: we started thinking and working in the paradigm of continuous improvement.

The total savings in 2015 amounted to about 7.7 billion rubles

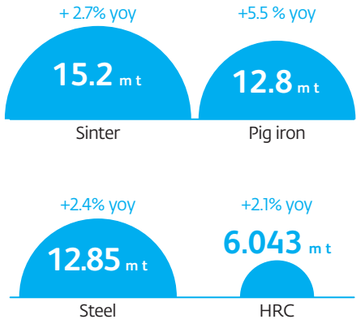
I was excited to go 350 meters underground myself: it's really impressive to be deep in the rock formed over a billion years ago

We will continue developing the conceptof element-by-element process management

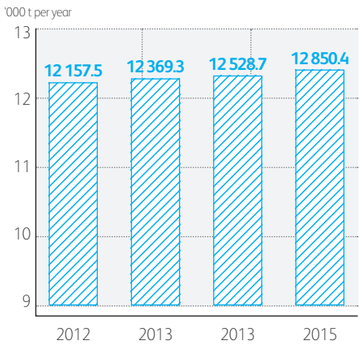
What are the company's plans for this year?

We will continue developing the concept of element-by-element process management. This is the next level of operation in a unified engineering environment based on Mendeleev's Periodic Table. We are planning to split steelmaking processes into elements, as Mendeleev did. Our task is easier, since we have only 20 elements. Today, we are using this approach with regard to three areas: iron, manganese and carbon. If all the processes broken down into elements are connected to form a unified system within a complex production facility, its management efficiency can be improved even further.

NOVOLIPETSK PRODUCTION OUTPUT IN 2015:



STEEL PRODUCTION AT NOVOLIPETSK



From time management to a successful business

NLMK Group Director for Operational Efficiency Yulia Venza speaks about "the North Star," the losses associated with excessive quality and the value of good time management

Yulia Taranova, Natalia Sviridenko

One of the items laid out in the company's plan to develop NLMK Production System is "to set optimization targets based on analyzing the internal and external potential of processes." Please give an example of how the internal and external potential of a process can be exploited in practice.
There is usually great internal potential in being better organized. For example, if you plan your vacations carefully, you can see more while saving time and money. This can be done by choosing the places you want to see in advance, booking tickets for them, scheduling your museum visits for the time when admission is free, or looking through online reviews of cafés and restaurants so as not to go to those that get low ratings. You'll see that you've managed to see more and visit more places than other people usually do while spending the same amount of time and money. People say that time is money, but I would rephrase it like this: time is big money when properly managed.

The same is true for production processes: you can cut the time needed for a process step by organizing materials and tools better, for example. This will increase the time the machine is running and thus improve production volumes.

How can you plan to measure the internal potential of a process? When is it considered fully optimized?
To measure this we need to exclude all types of losses that are not associated with the process itself: equipment breakdowns, failure to follow technical instructions, etc. The internal potential of a process is fully optimized once the indicator reaches its technical limit and its further improvement is possible only through replacing equipment or technology. Until then, we continue to develop optimization projects.

What about the external potential? How do you measure it, and how do you know when there is no more potential left?
Measuring the external potential of processes is basically benchmarking our performance against that of the largest companies in the industry. The external potential is like the North Star, which guides you and shows you the way. This North Star could be a currently known benchmark to be achieved through innovations or investments, e.g., through adopting new technology or replacing equipment. Unlike the internal potential, the external potential is very hard to exploit to the full.

Is this because when we install new equipment, its best practice performance is at a completely new level?
Yes, it is. Let's assume that we have reached the North Star with the help of targeted investments and innovations. That is, the technology and equipment

> *PEOPLE SAY THAT TIME IS MONEY, BUT I WOULD REPHRASE IT LIKE THIS: TIME IS BIG MONEY WHEN PROPERLY MANAGED*

we're now using is more efficient. If we assess the inner potential of the process for this new equipment or technology, we will see that we can make some operational, or in other words, cost-free improvements to it.

Can cost-free improvements replace an entire capex project?
Certainly! For example, NSMMZ and NLMK Kaluga once ran a project aimed at reducing the down time of EAFs – to improve the melting cycle time and furnace productivity. A capex project was proposed to reduce the down time by two minutes; it would have cost each of the plants 65 million rubles. However, we managed to achieve a reduction of three to four minutes with the help of the Production System, i.e., without investments. There are numerous examples of such hidden reserves in the company.

This includes losses associated with excessive quality, doesn't it? Please tell us what these losses are and how they can be addressed.
It's true, they have considerable savings potential. Losses associated with excessive quality arise when customers get products of higher quality than they require at the same price, or when expensive raw materials are bought, but their quality isn't translated into higher prices for the end products. A good example is the extra payments for coal concentrate at Altai-Koks. The price for coal concentrate used to be higher when at least one of its characteristics exceeded our requirements, while the product's performance could be otherwise worse than the producer claimed. We teamed up with Altai-Koks to review our contract terms and developed comprehensive performance requirements for the concentrate we sourced. From June 2015, the overpayments for coal started to decrease, and the quality of coke did not suffer. This delivered 11 million rubles (~USD 170,000) in monthly savings for the plant.

The external potential is like the North Star, which guides you and shows you the way

A production system is about consistent, focused joint work rather than personal achievements and records

The plans for development also include a transition to autonomous use of the Production System. How do you plan to achieve this?
The Production System can be used autonomously when the tools are no longer considered an innovation and become part of the daily routine. You know, when you can't imagine your work without them. Before this happens, we have to carry out audits to look at how the system is used; they help identify problem areas with one or another tool and improve the situation. I think the system starts to function autonomously when people know all the procedures well and use them independently, and the system has an impact.

Let's imagine that several audits find no faults in the Production System. Does this mean that the system has become autonomous and audits are no longer needed? How does this work?
As the project covers more and more plants, the number of audits will decrease anyway. Therefore, the plants where the procedures have become autonomous will be subject to less intense scrutiny: the audits will take place, let's say, every two years rather than once a year as it happens today. It is possible that they would later become even less frequent if we see that the system works well and there is no need to control or improve it – as the process works independently.

Audits are a way to help rather than a test you have to take. After running the diagnostic, we produce recommendations on how to make the tools within the Production System function independently and reduce the number of audits in the future.

What do you expect from the audit by Toyota Engineering?
It is expected to assess NLMK Production System's compliance with global standards. In other words, it is a study of the strengths and weaknesses of our system and its assessment on a global scale; you must admit that development is almost impossible in a vacuum. Assessing how each of the tools works is not the only task to be performed by the experts: they will also look at whether the tools have been rolled out across the entire production process and analyze the degree of employee involvement with NLMK Production System. After all, a production system is about consistent, focused joint work rather than personal achievements and records.

The development strategy designed for the Production System emphasizes the lack of employees in your function. How do you deal with this?
We solve this problem by rotating employees through the Group companies. For example, when we needed to do mapping to improve mill repairs at Stoilensky, we put together a team of employees from the plant and NLMK's repair shop (who have huge experience in this field) to perform the task jointly. This helped us both optimize the mill repair process and provide Stoilensky employees with practical training in mapping.

A project at NSMMZ and NLMK Kaluga aimed at reducing the down time of EAFs saved 65 million rubles at each plant

Will there be a need for new staff when the system is used autonomously?
When the system becomes autonomous, its operation does not require a large number of new employees. They will perform other tasks: for example, rolling out the system across other plants and introducing new tools.

The development strategy we are now discussing aims at greatly expanding the coverage of the system – both in terms of tools, and the number of plants that deploy it. Some of our plants don't have dedicated employees to do this work, which certainly means that we will hire new staff to roll out the system.

Will you recruit for these jobs from within the Group or "from the market," as HR specialists say?
We don't recruit staff for production improvement jobs from the market: we train these people ourselves. We have been quite successful in this: two of our division managers have a "black belt" in Six Sigma and lean management. This makes them experts in areas such as process analysis, project screening and assessment, team management and statistical analysis. Apart from performing their role in optimization projects, they are responsible for implementing the Lean Six Sigma methodology across the company and reshaping our corporate culture. Those who want to join our production improvement team should have a good knowledge of the production process and lean manufacturing. They also need to possess good communication skills – as they will spend most of their working hours talking to people on the shop floor – and be able to explain the basics of different procedures. Since the best way to learn is to use your knowledge in practice, they should be able to move quickly from theory to practice and demonstrate the techniques that enable improvements right at the workplace.

Members of our production improvement team should be able to move quickly from theory to practice

WE DON'T RECRUIT STAFF FOR PRODUCTION IMPROVEMENT JOBS FROM THE MARKET: WE TRAIN THESE PEOPLE OURSELVES

What qualities should your ideal employee have?
When I'm searching for a new person to join my team, the first thing I do is look at his or her ability to generate new ideas, learn quickly and be a good coach. Gaining specialist knowledge is something everybody can do, but learning to generate new ideas is not that easy. We need people who want to know why a process works as it does and are able to find a cost-saving alternative; ask themselves and others why the tools and materials are arranged as they are and suggest a unit layout with time-saving potential. This person should ask questions and continuously look for new, more efficient solutions.

Do you plan to take any steps this year to link the employees' Production System performance to the budget and rewards?
Here we have two priorities: rewards and non-financial motivation. For example, we plan to create a fund that will be completely independent from the salary budget. The money from the fund will be distributed by managers of the functions where the Production System is already in place to provide incentives to employees who effectively use the tools in their work. We also plan to introduce lean KPIs for different levels of employees and increase their share in the bonus structure. We have further plans to include efficiency improvement performance in the management by objectives system and to simplify the procedure for submitting cost-saving initiatives and proposals.

Audits are a way to help rather than a test you have to take

What do you mean by lean KPIs for different levels of employees?
Each employee level has its own role in the Production System. Staff have to make sure that there are no deviations from the required process parameters, i.e., to follow the procedures outlined in the employee's job description. Their lean KPIs are the technical parameters of the equipment they work with. Shop floor managers should communicate ways to submit ideas to the employees and encourage them to bring their ideas forward at the technical council. Their lean KPIs are the number of submitted ideas and the proportion of efficient ideas. With department heads, we measure ongoing A3 projects for all KPIs that the shop failed to achieve. Heads of shops have their own lean KPI: the maturity of the Production System, which is assessed through audits.

Why have a number of Production System tools been only partially introduced?
Well, it takes time for something new to become part of our routine. It usually takes one to three years for employees to grasp the basics of the tools completely. This time is needed to amass the necessary knowledge and learn how to put this knowledge into practice. We try to involve as many employees in this process as possible – from COOs to line personnel. The new techniques should become part of the day-to-day work of every employee; this is where I see potential for a multiplier effect from small, albeit daily improvements in all of the company's processes.

Does the Production System face resistance from employees?
No, there is no resistance to the Production System from employees. Our people are open to innovations. All you have to do is explain to them that the new methods do not imply extra work, but rather provide a way to achieve their objectives faster. As soon as employees realize that the new methods are helpful, they integrate them into their daily work activities and mindsets.

Read us online
nlmk.com

Keep in touch:
press@nlmk.com