

The background of the entire page is a blurred industrial scene. In the foreground, a yellow triangular warning sign is visible, featuring a black exclamation mark and the text "DANGER Heavy Equipment". The sign is attached to a metal structure. The background shows various industrial components, including pipes and machinery, in shades of blue and grey.

NLMK GROUP

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Corporate Magazine

Feature Story

Dealing with Risk Means Dealing with People

First Person

Interview with Ben de Vos,
Chief Executive Officer
of NLMK Europe Strip
Products

2

Training

Jason Adams, NLMK USA
Vice President, talks about
a unique training program

6

Panorama. Art

Extraordinary
Fancywork

22

IN THIS ISSUE:

- 2** **Economy and Production. First Person**
Ben de Vos: «The Group strategy is destined to succeed»
- 6** **Economy and Production. Training**
NLMK USA: Education for the Steel Marketplace
- 8** **Economy and Production. Hi-tech**
Interview with Alexey Osekov, Head of Center for Equipment Repairs and Maintenance
- 11** **Economy and Production. Safety**
Dealing with Risk Means Dealing with People
- 17** **Panorama. Science**
Dmitry Chernov, The Father of Russian Metallurgy
- 20** **Infographics. At First Sight**
Evolution of Blast Furnaces till BF-7
- 22** **Panorama. Art**
Extraordinary Fancywork



2

Economy and Production. First Person

BEN DE VOS:

«The Group strategy is destined to succeed»



11

Economy and Production. Safety

DEALING WITH RISK
MEANS DEALING WITH PEOPLE



17

Panorama. Science

THE FATHER
OF RUSSIAN METALLURGY



22

Panorama. Art

EXTRAORDINARY FANCYWORK

A portrait of Ben de Vos, a middle-aged man with a receding hairline, smiling at the camera. He is wearing a dark grey V-neck sweater over a light blue collared shirt. He is seated at a wooden desk, with his hands resting on the surface. In the background, there is a wooden bookshelf filled with books and papers.

BEN DE VOS: «The Group strategy is destined to succeed»

Mr Ben de Vos, Chief Executive Officer of NLMK Europe Strip Products, discusses the market outlook, cars and the crisis that's not going to happen with Yulia Taranova, NLMK Magazine

Q: Ben, how is the European steel market doing? One keeps hearing about its lack of stability.

A: It is clear that the European market suffered more than other areas after the global slowdown of 2008 – and we have not been left unaffected by these changes. It is however important to know that despite the slowdown, Europe remains a large consumer of steel and the biggest manufacturer of automobiles, with 25% of all cars worldwide produced in Europe. This implies that there will be continued demand for steel and good opportunities for efficient producers, as before.

Q: Today, do you continue to feel the impact of the crisis?

A: Of course, because after 2008 the European market sales of strip products declined from more than 80 mt/y to the current level of roughly 70 mt/y. Naturally, given these developments, we had to fight to maintain our position. The European market, nevertheless, remains very important in terms of consumption. Hence the Group strategy of producing steel in Russia, close to mineral deposits, and marketing it in Europe looks very sound to me. I am certain that this strategy will allow the Group to gain a strong foothold in the market for many years to come. This strategy is destined to succeed.

Q: What are the advantages, in your view, of NLMK Group when compared to other European steel makers?

A: Where does the Group find its strength? Naturally, in the fact that Russian production assets cover the full cycle of steelmaking, from ore mining to rolling. At the same time, the Group has access to a very large market with demand for many grades of steel, and European clients are quite exacting when it comes to quality. On the other hand, however, this is why they are willing to pay a good price, because the quality of steel, among other things, determines the quality of their products and their profit margins. This is a definite advantage of the European market.

Q: How are you able to meet the high expectations of European consumers?

A: We have been very satisfied with the quality of slabs we have received from Novolipetsk. The

surface quality and internal cleanliness are better than what we received previously and we are very happy to work with these slabs. The initial performance on interstitial free (IF) steels was not as good as alternative sources, but this has been constantly improving and with the new RH degasser in Lipetsk now operational, we hope to achieve the same low Carbon levels as from the best European producers. The other area of targeted improvement is in the bar-coding of slabs, which would greatly improve the tracking of slabs.

Q: What are the challenges that you face today?

A: As we are now receiving our slabs from Lipetsk, we have a longer lead time and this requires more flexibility in using our slab so that we don't lose customers who depend on the timing of our product deliveries.

In addition to this as many of our local competitors in Europe are bigger than we are, we have to make flexibility and delivery performance our strength.

In this regard, we are planning the installation of an edger (a powerful vertical rolling stand) in order to have bigger width reduction capability and to improve control of the strip width. In turn, this will translate into greater flexibility vis-à-vis our clients.

Q: Please tell us about the other European assets of the Group that specialize in flat products.

A: Our three plants, in Strasbourg, Beautor, and La Louvière, originally came from different steel companies and were not integrated in any way. The same can be said about the service centers. So the first thing we did after the acquisition was to start making all of the plants compatible with a common standard, to turn them into parts of an integrated business. We have been taking the best practices of each company to create a more efficient whole.

Q: And what would be the purpose of that?

A: Over the past six years we have been focusing on becoming one of the major high-tech producers of steel in Europe. This was driven both by our ambition and by the market, which is very sensitive to quality.

“*«We are proud to say that VW, Daimler, GM, Opel, Fiat, Renault and many other automobile manufacturers are relying on steel produced by NLMK to make their cars»*”

Our most important sector is the automotive and truck sector, where we supply today roughly 33% of our production to carmakers, subcontractors and steel service centers on a contract basis.

The second most important sector is construction. We are also supplying quite a big volume to re-rollers and tube manufacturers whose products also end up to a large extent in either automotive or construction applications. The automotive sector provides us with good stability in off-take and pricing, whereas demand in construction and other general steel manufacturing sectors tends to be more seasonal and variable.

In order to compete successfully we have developed steel grades tailored for use in fabricated steel products, including high-carbon steel, renowned for its strength, and the so-called interstitial free steel, which, on the contrary, has very low carbon content. There is strong demand for IF steel from the automotive industry, because of its lowered propensity for strain ageing. Working together with colleagues in Lipetsk we now produce a wide range of steels for the automotive sector and are planning to increase this segment to almost 50% of our sales.

Q: How did you manage that?

A: Initially we supplied only indirectly, via service centers which marketed steel to automobile body manufacturers and subcontractors; they were the first to hear about us. Later, relying on the plants in Strasbourg and Beautor, which were known to car manufacturers, we gradually gained our share of the market. Today we are proud to say that VW, Daimler, GM, Opel, Fiat, Renault and many other automobile manufacturers are relying on steel produced by NLMK to make their cars.

Our first step was to redesign our product line so that it would favor the types of steel required by the

automotive industry. Another important step was to improve our delivery capability, supplying steel directly to the automobile manufacturers and their sub-contractors in a just-in-time fashion.

As direct consumers the automotive companies became very important clients. But then, of course, we also continued to pay attention to our other clients, like pipe and tube manufacturers, hardware producers, and service centers.

Q: How do you see the strategy for developing the European assets over the next five years?

A: As I have mentioned before, the objective is to increase our share in the European markets. Our main target is the automotive industry, which is the market for products with highest value-added. We intend to achieve this by profiting from our increasing service performance and by producing the high-tech grades of steel required by this market.

This would be the first part of our strategy.

The second part would be to engage the construction sector as well as the general steel manufacturing industries. These markets are more variable, compared to the automotive industry, and one needs to be very flexible in order to succeed.

We are now in the process of implementing our greatest transformation in recent years, by decoupling completely the NLMK rolling assets from the Duferco steelmaking assets that previously supplied our hot strip mill.

Q: What is the main challenge in changing from slab supplied by Duferco to slab supplied from NLMK in Russia?

A: Clearly, in the past we received slabs made on the same site or a few kilometers away. We had no logistical challenges, the production chain and lead time was very short, we would order slabs and get them within a few days (sometimes the next day), allowing us to quickly deliver rolled products to our clients.

Today, unfortunately, it takes six to seven weeks for the slabs to reach our rolling operations. This is our biggest challenge compared to our local competitors



who all produce their slab locally. We will address this challenge by investing in the edger to make more dimensions with the same slab and also by working on the efficiency of the supply chain.

Q: Redesigning the supply arrangements for slabs is also part of your core strategy?

A: Absolutely, we are working with Novolipetsk in Russia to reduce the total slab lead time in order for the distance of our slab supplier to be invisible to our customers, without the need to carry huge slab stocks.

We have two major markets for our products, a very stable one in the automotive and overall machine-building sectors — here we know well in advance what they need, but service performance has to be perfect. The other is the general steel market, which is very volatile, and in order to complete any orders from the clients we need to act fast. They are often faced with coil lead times from other suppliers of 3-4 weeks. This is where it gets challenging if slab lead time is too long.

We are confident however that we will find solutions for these challenges. Although their markets are slightly different, both DanSteel and the assets in the US have extensive experience of successful cooperation with Novolipetsk as re-rollers.

Q: How do you see the European market developing over the next few years?

A: Before the crisis, in 2007, strip product steel consumption in Europe exceeded 82 mt/y. During

the crisis it contracted to almost 50 mt. Naturally, at this stage one should not expect it to recover to pre-crisis levels. I estimate that in 2013 the European steel market will remain somewhat on a par with 2012 at roughly 70 mt of strip products. We believe after this the market will continue to grow, albeit gradually.

Despite this modest growth view, our objective is to focus on our “home markets” of Benelux, Germany, France, and the UK, all major producers of automobiles and other manufactured goods. The value that we can unlock for the group is in developing stable sales into these markets, adding more value to the slabs.

Europe remains today the biggest car producing region in the world, with 25% of world passenger car production in 2010. In addition, machine manufacturing remains a key sector for Europe, in particular Germany and Italy. The exports of manufactured products have buffered European steel consumption when local end user consumption reduced after the 2008 crisis.

Q: In your opinion, is the NLMK Group sufficiently strong to weather economic instability?

A: Of course, the Novolipetsk asset is above any competition, but the problem is that the demand for final steel products in the Russian market is fairly low compared to the slab capacity. This is why I believe that the Group management have chosen wisely to develop exports to group rolling assets, where the Company can deal with its customers directly. ■

NLMK USA: EDUCATION FOR THE STEEL MARKETPLACE

Jason Adams, NLMK USA Vice President – Quality & Metallurgical Engineering, talks about the unique training program offered to clients to help them handle the challenges of choosing and purchasing steel

The steel industry is teeming with high tech equipment, expanded product offerings and the innovation of a work force committed to continuously improving all aspects of the business – and this is especially true at NLMK. We in the industry feel we cannot do enough to ‘educate’ the marketplace on the fine points of the way we produce our product and the science that governs the processes. However, and most importantly, we feel it is critical as a marketing initiative to dispel the deep misconceptions from some of the customer base that steelmaking and flat rolling are limited technologies steeped in past practices and archaic methods.

CLIENTS NEED TO COMPREHEND

To that end, on an annual basis each March during a vacation session at a local state university near the Farrell Pennsylvania facility, a technical course is offered for the NLMK USA customer base and employees of the NLMK US Operations. When the course was developed in 2003, the intent was primarily to educate the purchasing organizations within our primary customer base to improve their understanding of the steel products they are buying, the processes required to produce those products, and the nature and definitions of the applicable industry specifications. Our philosophy is that we all benefit when the customer knows how to order steel correctly for their intended application. While this is still a core principle of the course, the objective has expanded into the realm of marketing

as a way to differentiate NLMK from the rest of the steel industry in the US. This is done by offering a comprehensive way to bring us together with our customers for learning, technical discussion and on-the-spot material-related analysis / problem solving of the customers’ top product issues.

At its inception, the class was attended by about 30 to 40 steel buyers and a group of internal people from Farrell. Because of the interconnected network of our customer base, knowledge of the class has quickly travelled and current attendance level is a full house – nearly 200 attendees each year with a 30 person waiting list.

WHAT WE TEACH

On the first day the course begins with an introduction to product definitions and industry specifications covering the slab, hot rolled, cold rolled, specialty and coated product lines. From there we move into the science. A concise review of the governing physical metallurgy principles of melting, casting and flat-rolling are discussed where the intent is two-fold – first, to illustrate the connection between the product and the metallurgy, and second to illustrate the depth of scientific understanding within the organization required to produce a quality product on all levels. On the second day, the focus is entirely on the processes beginning with iron-making in the blast furnace and moving all the way through to cold finishing and galvanizing. We complete the second day with a comprehensive discussion of chemical

Profile

Jason Adams

Position: Vice President, Quality & Metallurgical Engineering

Training: University of Pittsburgh, Department of Metallurgy (1990—1995)

Responsibilities: Technical leadership of product development, process technology. Oversees activities of 40 professional / engineering / management personnel at three organizations (NLMK Pennsylvania, Sharon Coating, and NLMK Indiana). Designed and currently teaches a basic physical and process metallurgy course to customers and facility personnel.



What is NLMK USA?

The NLMK USA business division was created on July 1, 2011 as a result of the NLMK acquisition of the rolling business of Steel Invest and Finance. NLMK USA has a diversified base of flat steel producing assets comprising three production sites at NLMK Indiana, NLMK Pennsylvania (formerly, Duferco Farrell) and Sharon Coating, manufacturing slabs, hot-rolled, cold-rolled and galvanized products. It has a hot-rolling capacity of 2.7 million tonnes. The new division brings synergies through a common distribution structure offering a wide range of steel products to the construction, pipe and tubes and machinery sectors in the United States.

and mechanical testing as it relates to what the customers in our specific industry requires and what we certify in the product. To tie it all together, we offer mill tours of the Farrell and Sharon Coating facilities at the end of each session, which are always very well received.

In order to facilitate more intimate technical discussion with individual customers attending the course, we host a social gathering on the evening of the first day.

OUR CREDO

From the beginning, within our Technical Organization, our credo is very well captured in a quote by John Ruskin (English essayist and reformer):

"Quality is never an accident; it is always the result of intelligent effort. There must be a will to produce a superior thing."

The NLMK USA 'Physical & Process Metallurgy Fundamentals' course is one important expression of that credo we work hard to pass along to our customers and colleagues each year. ■





ALEXEY OSEKOV: «AUTOMATION OF REPAIR AND MAINTENANCE PROCESSES IS A GOOD INCENTIVE FOR EVERYONE»

BY SERGEY IVANOV

In mid-2010 Novolipetsk launched a project to introduce automation for more than 30 equipment repair and maintenance (ERM) processes, as part of the in-house restructuring of the maintenance and repair services and other units, which involves the creation of a common Center for Equipment Repairs and Maintenance (CERM). The project covered more than 60 shops at Novolipetsk and was closely linked with the introduction of SAP, in particular, its ERM module. The project has helped enhance transparency of identifying the cost of repairs and personnel utilization rates. More than 600 NLMK employees have become active users of the automated system. Alexey Osekov, who manages the operations at CERM, shares his impressions on the project.

Q: Mr Osekov, what was the reason for such an extensive restructuring of the maintenance and repair services?

A: The core objective was to enhance the effectiveness of repair work, its planning and

recording, and to improve the utilization of material and human resources. Before the restructuring was launched, each shop maintained its own repair services, which would operate independently, with their own budgets and stockpiles of spare parts and materials. At the same time, maintenance personnel and funding allocated for repairs and maintenance of fixed assets were used unwisely. Repair costs were booked at an aggregated level, preventing management from obtaining a detailed breakdown for all sites across budget planning items. Planning and recording were done on paper. The restructuring exercise was intended to separate repair and maintenance units from core shops and establish a common centralized unit, CERM, while moving to automated planning and recording using SAP, which was already being introduced at Novolipetsk.

At this stage we have completed the introduction of phase one of SAP ERM, which handles the economics component. Company management now has access to a comprehensive report on where

and how much money is being spent. During the next stage we shall complement the data with information regarding the health of the equipment, and this will allow us to make quick and informed decisions about when to idle and repair machinery. In order to build up the database we would like to rely on a new and very promising tool called "mobile maintenance".

The system is intended to record all issues and work performed by our personnel immediately on site and at the time of the repairs by using portable mobile devices.

Q: How did the repair personnel benefit from the automation, and how quick were they to adapt to new practices?

A: At the time when the project was initiated I was Head of the Metallurgy Equipment Repair Shop (MERS), which served as the starting point for the introduction of the new system. We all recognized that the success of the project would to a large extent depend on how people would respond to this innovation. At that point many employees had been with the shop for 10 or 15 years, so they were accustomed to certain routines, valued the stability and were not all prepared for change. Nevertheless, many of them appreciated the fact that there was need for change and embraced the project and the challenges associated with it with understanding and even enthusiasm.

More than half of the 600 employees now using the system only had very general prior knowledge of how to operate a computer. We had to explain the new practices to them, at the same time teaching them the basics of computer-aided work. Gradually we were able to overcome their suspicions. Now our employees recognize the benefits of the system and are proposing ways to improve it.

Our training efforts were greatly assisted by experts from Asteros Consulting, a leading systems integrator. I would like to specially note the work of Tatyana Dremaylova, who supervises the project on behalf of the Novolipetsk Department for Integrated IT System Implementation. A major contribution to the success of the project was made by Vladimir Garbuzov, Senior Specialist at CERM in charge of automation. He is continuously



Background

Alexey Osekov

has been with NLMK since 2003. After graduating from the Lipetsk State Technical University he was offered a three-month internship at Novolipetsk, and stayed on to work as a repairman at one of the repair shops. Three years later he was promoted to foreman, then chief mechanic, then chief specialist, later he supervised technical services in the repair shop, and then became deputy shop manager responsible for repairs and equipment.

In March 2010, when the CERM was being implemented, Alexey was charged with the task of establishing a new shop to handle repairs of metallurgical equipment.

Since June 2011 Alexey Osekov has been Acting Head of CERM.

He is married and has three children.



coming up with new ideas and encourages us all to move forward. Finally, the project would never have happened without the support of Novolipetsk management, in particular without the participation of its mastermind, Novolipetsk Vice-President for IT Vadim Uryas.

I should say that many employees took an active part in the project. They identified drawbacks, proposed sound ideas and eagerly shared their knowledge with others. A team of young experts from several shops where the system had been first implemented volunteered to visit other shops where implementation was just beginning. They would help expedite familiarization with new practices and explain how to obtain the most benefits from automation. We continue to receive many comments on the operation of the system and recommendations as to how it could be improved, especially in terms of creating flexible analytical reports using SAP Business Objects.

Q: How do the employees feel about the results of the project?



A: During the restructuring we often faced challenges and there were complaints from employees. Many feared that the separation of repair services into a stand-alone unit would cause misunderstandings between maintenance and process employees, resulting in an increased number of equipment malfunctions. Now things are improving. Automation requires stronger discipline, and it also assists each and every one in organizing their work in the best possible manner. For example, the system requires a work plan for the upcoming period to be developed and approved by the twenty-first day of the current month. Previously, everyone would unanimously claim that it was impossible to do so in advance, because they need to clock in, review the developments over the preceding several hours, and then plan their actions based on that. It turned out that it was not like that. Clear routines and performance of scheduled maintenance help to reduce the amount of unplanned activities.

I would say that the work ethic in the shops is changing; better yet, employees' perceptions of life are changing. Previously, managers, deputy shop supervisors responsible for equipment or repair preparations were tasked with the planning. Now this function is handled by foremen, who are directly overseeing equipment. Because of this the foremen have gained a sense of ownership and responsibility within their units, so that now instead of simply reporting for work and following up on someone else's orders, they do their own assessment of the situation, develop work schedules, and allocate material and human resources. The foremen now make a direct impact on the output cost of products.

This opportunity to operate on their own and the novelty of things encourage people to pursue self-development. It is a known fact that when you spend a long time doing the same routine job, you become less efficient, or as they say, you lose clarity of vision. The project made people see things from a different perspective. The employees now feel that the company cares about what they are doing and how effectively they perform their everyday work. This is a good incentive for all of us. ■

A portrait of Alexey Suvorov, a middle-aged man with glasses, wearing a dark suit and a patterned tie. He is looking directly at the camera with a slight smile. The background is softly blurred, showing an office environment with a lamp and some papers.

DEALING WITH RISK MEANS DEALING WITH PEOPLE

BY YULIA TARANOVA

Over the last decade VIZ-Stal has not seen a single fatality, and in 2010 the overall number of accidents was zero. Alexey Suvorov, Head of Occupational Health and Safety, talks about how this was achieved

AS: I may disappoint you if I tell you we don't have any special recipe or secret for achieving this. In fact, this is the outcome of many years of work and dedicated efforts of several generations. Like any other business which is focused on compliance with occupational health and safety regulations, we have developed our own system of practices. Any system is based on the distribution of duties and responsibilities, and this is true for occupational safety as well. We have a document which defines these responsibilities for all employees, from the Chief Executive Officer down to the rank-and-file workers.

YT: Mr Suvorov, what are the objectives of your unit within this system?

AS: Our purpose is to minimize the risks which exist at the workplace. We recognize that it is impossible to avoid these risks altogether; we are, after all, an industrial business. But we are quite capable of creating an environment in which risks can be controlled.

“ «We never mention the name of the injured employee in any of the findings of our inquiries, whether we describe the causes or identify the parties at fault. One needs to identify the true causes of an event, and not the ones that are at the surface»

YT: What does it take to minimize risks?

AS: Risk mitigation begins with every structural unit identifying any hazards, in terms of place or event, which give rise to potential incidents.

**YT: And this is done by designated people?**

AS: First and foremost, this is done by VIZ-Stal employees. One way or another, the bulk of the work needs to be handled at the grass-roots level. It begins with the rank-and-file, then involves foremen, and then unit heads. At one point we created dedicated working groups. We also relied on the strong participation by our occupational safety experts, who were also part of the working groups.

YT: How long did this effort take?

AS: A fair amount of time. You cannot possibly identify all the potential risks at once without linking them to core operations. Again, we weren't concerned with the timing, in this case, but with the end result. And we did have an end result.

YT: What exactly was it?

AS: Generally speaking, several things came out of this effort. First, we identified hazardous situations. Then, having assessed the potential impact, we made every effort to prevent them or minimize as much as possible the impact of these events. This was our first major step towards reducing injury rates. Second, we introduced the necessary changes to our occupational safety guidelines, which direct employee actions in case of hazardous events. Now employees are aware

of a clear and safe course of action in a hazardous situation, and they no longer need to look for a way out; all they have to do is follow a pre-defined procedure. Third, and this was the most important outcome, we saw a decline in injury rates. I wouldn't say that before people would disregard the hazards. What we did was identify the sore points and highlight them.

YT: Does the Government encourage this and similar initiatives?

AS: Yes, I should say that our corporate magazine was not the only one to take note of our achievements. The Sverdlovsk Region Labor Inspectorate lauded our efforts and in mid-2011 we were awarded a Certificate of Confidence.

YT: How does the business benefit from this certificate?

AS: A Certificate of Confidence offers a number of privileges. Among other things, the Labor Inspectorate will exclude the business from its schedule of annual audits for the next three years.

For us it was important to have received this recognition of our efforts. We are pleased to have been identified and selected in this manner from a list of many. There are only six businesses in the Sverdlovsk Region who possess Certificates of Confidence, and we are now one of them.

YT: Are exemplary businesses eligible for any monetary rewards?

AS: We have not received any rewards or bonuses per se. There is, however, another government agency, the Social Security Fund, which for two years now has been giving us a discount off their insurance premium in view of our excellent performance in terms of compliance with occupational safety requirements and regulations.

By the way, the discount that they offer is quite substantial. We insure our employees against occupational accidents, and the premium that we pay to the Social Security Fund annually amounts to around RUR12 million (~US\$366,700; ~EUR301,000). With the discount, the government refunds 40% of the premium.

The Fund also maintains another program, under which a business may spend up to 20% of the premiums paid for the purposes of so-called occupational injury prevention activities, e.g. to acquire personal protective equipment, for medical check-ups, treatments at health resorts, etc.

Eventually, our business can reclaim up to 60% of the RUR12 million (~US\$366,700; ~EUR301,000) which we pay to the Social Security Fund as premiums.

YT: Do they apply any penalties or fines?

AS: Yes, as of January 1, 2012 the law says that if a business suffers a fatal accident, the Fund will not give a discount, irrespective of any other performance indicators. Moreover, if you have two or more fatal accidents in one year, your insurance premium will be automatically adjusted upwards at the highest rate of 40%.

YT: What did you do with the savings?

AS: I am proud to say that the money was used purposefully to further improve occupational safety. To a larger extent this included repair work aimed at providing a more comfortable working environment.

YT: Do you believe that, by definition, rolling operations are less hazardous than smelting?

AS: I would put it this way: each operation has its own set of occupational hazards. VIZ-Stal, which produces cold-rolled transformer steel, is recognized as a Class 16 occupational hazard category business. By the way, all domestic metallurgical businesses, whether ferrous or non-ferrous, are within the same occupational hazard category. If you take statistics averaged across the sector in terms of the number of insured events and days of disability, then the highest risk would be in the traditional metallurgical sector of steelmaking.

YT: Within this list, which would be the most and the least hazardous?

AS: The classification of occupational hazard categories comprises a total of 32 classes. At the bottom of the list they have the least hazardous types of industrial activities. You may be surprised to hear this, but these include restoration of fisheries, production of natural gas, manufacturing of tobacco products, commerce and others.

“ «If today you have an accident which does not result in disability, then next time you should expect an injury to happen»

The most hazardous category, or Class 32, includes extraction of mineral resources. These businesses contribute up to 8.5% of their wage bill to the Social Security Fund as premiums.

YT: How would occupational safety personnel respond in case of an accident?

AS: As soon as an employee reports to a medical aid station, this would be recorded in a logbook and then forwarded on to the occupational safety service. Thereafter a supervising officer for the relevant unit would launch an inquiry into the circumstances and causes of the accident. We make inquiries in all cases, irrespective of whether they do or do not lead to disability. Because, if today you have an accident which does not result in disability, then next time you should expect a disability. Our aim is to prevent any negative

“ «We are strongly convinced that unless we are in control of a situation, the outcome may be unpredictable »

event, this is why we examine each and every hazardous incident, no matter how small.

YT: How do you examine accidents?

AS: I should note that we do not run our inquiries for the purposes of identifying the fault of the injured person. That is we are focused on identifying the reasons which may have led a person to behave in a certain manner. Why? It is a common mistake at many businesses to try and pin the blame on the employee who was hurt in the accident. We rejected this approach from the outset. We believe that injured employees have done enough harm to themselves in the first place. And the task of the employer in this case would be to identify the cause of improper action, i.e. whether the work process was handled in an unsatisfactory fashion, or the employee was not adequately trained for the job, or the workplace was improperly designed, etc. We never mention the name of the injured employee in any of the findings of our inquiries, whether we describe the causes or identify the parties at fault. This is our core principle, we have adopted it and we are guided by it. One needs to identify the true causes of an event, and not the ones that are at the surface.

YT: What prompted you to reconsider the conventional approach?

AS: We have some very good traditions, which are carried down from one generation to another. And we respect these traditions. Yes, we are very much focused on examining any industrial incident with a view to prevent it from happening again. But most importantly, we are absolutely convinced that we need to stay ahead of developments. By managing risk one can control the situation in general, thereby preventing accidents, rather than doing damage control.

Shop Manager Comment

“ «Our objective is not punishment. Our objective is to understand why something has happened»



Boris Parshakov, Manager, Cold-Rolling Shop

I can't say that in the last year or two we have introduced numerous innovations in terms of occupational safety and this has led to improved statistics. No, we are just doing the job consistently and continuously. In brief, the principle may be described as follows: when an employee can handle the issue on his or her own, e.g. install an enclosure, etc., they do it, if not, they raise the issue at an occupational safety meeting, and other specialists are then invited to do the job.

In case of an accident our inquiries are aimed at understanding the reasons behind it and how it can be prevented from happening again, rather than punishing anyone. It is easy to void everyone's bonus, but it is not a very efficient measure. This is why in our in-house circulars we describe the accident and its causes, rather than who was at fault and how they should be punished.

Once a week, on Thursdays, I do my own rounds of the shop, on other days the rounds are made by the industrial safety engineer, my deputy, and section managers. Let me tell you this: when it comes to safety measures, at the CRS all issues are resolved very quickly, without any red tape. I believe it is important to stay alert and to keep your eyes and mind open for issues. And then anything can be resolved.

As regards comments from employees, they are all invited to record them in a special shop logbook reserved for occupational safety issues. All of these comments will be considered and in many cases will lead to follow-up action, which will also be recorded in the logbook. We have people working with other people, and if someone applies for help, it suggests that a person is uncomfortable with the job. And this needs to be looked into.

The way we operate, any employee may approach me, my deputy or the chief engineer on the shop floor. If, for any reason, a direct supervisor does not respond to someone's complaint, it will not go unattended.

We have a zero-tolerance policy towards alcohol abuse: even if you clock in with a hangover, let alone allow alcohol consumption on the job, you would immediately face a discharge board. If a shift manager allows that person to clock in, then both of them will face the discharge board. This is very serious, because once discharged on these grounds, the person will never be re-hired by our business again.

Our trade union holds corporate parties, outings, and celebrations, where people can relax as they like. But alcohol is absolutely forbidden at the workplace.

Our employees themselves keep a close eye on this. If someone comes to work under the influence, how good a job can they do, how can they be relied on as a workmate? New employees immediately understand this policy, and we have had very few precedents.

Comments



◀ Vyacheslav Pilschikov,
Occupational Health
and Safety Engineer

In my view the CRS has an efficient occupational safety system in place. I see one of my core objectives in properly arranging the work of occupational safety supervisors, who are assigned to each section. These employees handle occupational safety issues in addition to their core duties. They are crucial to identifying any additional hazards at the workplace. Occupational safety efforts require both a top down approach and involvement at the grass-roots level.



◀ Larissa Talashmanova,
Electrician, Electrical
Equipment Repair and
Maintenance, CRS

Frankly speaking, we do adhere to a very strict safety policy. It all begins at the hiring stage: you will not be cleared for work until you complete all the training and pass the occupational safety examination. Then you have on-the-job training and another examination to test your professional skills. It takes something like three months until an employee is allowed to work on his/her own, unsupervised. In addition, we also have semi-annual safety briefings and annual examinations. We prepare for these with utmost seriousness, and go through the examination questions several times, just like in school!

We simply won't allow for any holes to appear anywhere or leave litter lying around, because this will be immediately noticed during the weekly rounds, and the person responsible for the section may be reprimanded. Everyone takes extra care to prepare for these rounds, because they get appraised. And everyone is excited, because nobody wants to get a bad appraisal.



◀ Anatoly Petrov,
Repairman, CRS

There are three pillars of safety. One is the system of briefings and training. Second, all employees need to have sound minds and look after themselves. And third, your skills. One needs to learn how to do the job properly and stay out of harm's way while doing it.

I am not a proponent of false bravery, when one does a hazardous operation without proper protection. In fact, I believe there is no place for heroic exploits on the job, this is not war. Everything needs to be done calmly, "with feeling, wit and punctuation". If someone tries to show off by working without gloves or otherwise disobeying certain obvious requirements, as a team we have a

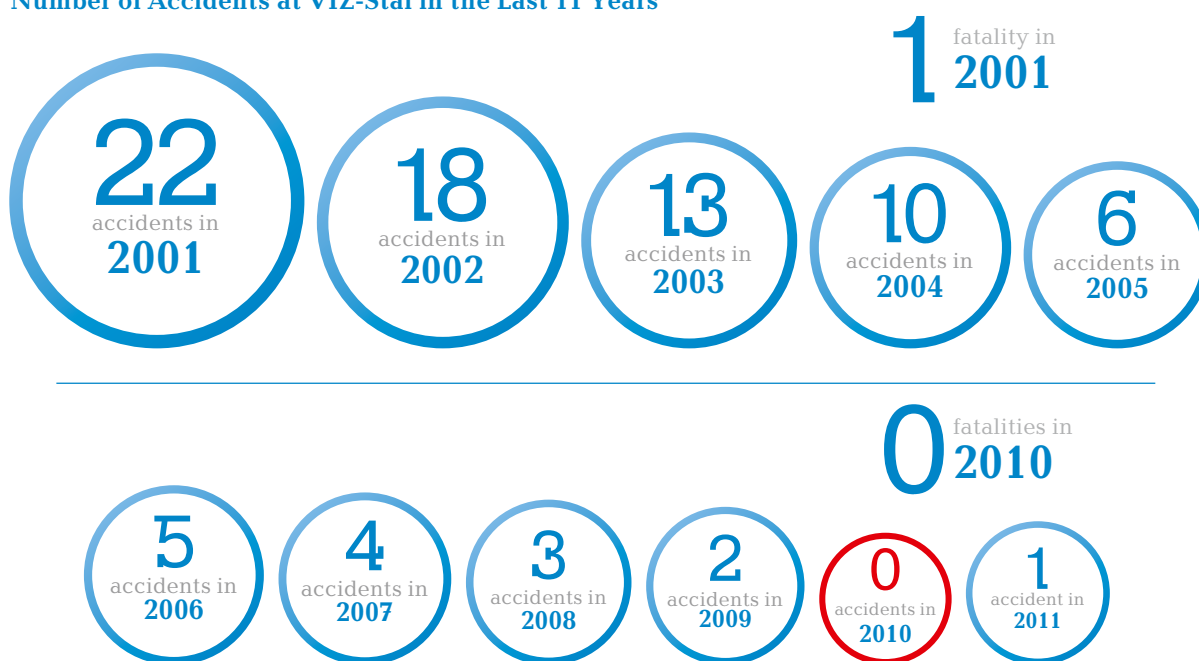
policy of telling them to stop. And any newcomers are advised by everyone, including people from other sections, of any hazards or potential injuries. In other words, we do our best to help.



◀ Igor Mikhailov,
Roller, Cold-Rolling Mill

At my workplace we have a lot of moving parts, and one needs to exercise caution at all times. The steel is rolling, one may get cut by accident, or the strip may break. One should not venture, for example, beyond the driving elements, there is a risk of getting cut. There have been some fatal accidents. This is why we treat occupational safety with utmost respect; your life may depend on it, it is no joke! ■

Number of Accidents at VIZ-Stal in the Last 11 Years



DMITRY CHERNOV — THE FATHER OF RUSSIAN METALLURGY

Dmitry Chernov is a Russian scientist of international fame, who discovered the structural changes happening to steel during the heating and cooling phases, making a great stride in scientific metallography

Dmitry Chernov was born to the family of a medical assistant. In 1858 he graduated from the Saint Petersburg Practical Technological Institute and went to work for the mechanical department of the Saint Petersburg Mint. In 1859 he returned to the university as a lecturer and museum keeper.

Several years later, in 1866, Chernov found employment with the Obukhovsky Steel Foundry in Petersburg as an engineer in the forging shop. It was here that he began his research which would later revolutionize science.

After two years of hard work Dmitry Chernov made his most important discovery. He established that, as the temperature changes, the properties of steel also change, because it undergoes polymorphic transformations. The same year he published his findings in the *Journals of the Russian Technical Society*. The article was titled *Critical Review of Articles by Mr Lavrov and Mr Kalakutzky about Steel and Steel Guns as well as D.K. Chernov's own Research on this Subject*. Many researchers believe that with the publication of this article metallurgy made the transition from a craft to a science.



THE ARMS LEAP

Chernov's discovery made it possible to utilize new methods for processing steel and helped avoid frequent ruptures of artillery gun barrels during firing, the causes of which could not be properly explained before Chernov. Chernov's theory was adopted by steelmakers in other countries.

Chernov's work resulted in the creation of special grades of very strong steel, which was used for armor-plating combat vessels and land-based fortifications. This armor could only be pierced by very heavy artillery shells with very high impact velocity. Artillery factories had to design and launch the production of powerful long-range guns. Several figures serve as a good illustration of the progress made in artillery over a span of 50 years: in 1840 the largest gun weighed 5 tonnes and fired 28 kilogram shells with an 8 kilogram gun powder charge; by 1890 the heaviest gun weighed 110 tonnes and fired projectiles weighing 720 kilograms with 340 kilograms of gun powder, while muzzle velocity reached 600 meters per second.

As it turns out, the Russian Empire owes the leap in the development of its arms industry to Dmitry Chernov, a steel forging engineer.

Point a (700 degrees centigrade) — is the lowest temperature at which steel can be quenched

Point b (900 degrees centigrade) — is the temperature at which the crystalline structure of steel can be modified

Point c (1300–1400 degrees centigrade) — is the melting point of steel

Point d (200 degrees centigrade) — is the temperature to which steel needs to be cooled before quenching

CHERNOV'S POINTS

In the course of his research Chernov also defined several points, or special critical temperatures, at which steel undergoes phase and structural transformations during heating or cooling.

The most important points discovered by Chernov in 1868 are points *a* and *b*. After they were identified and charted on a temperature scale, this laid the beginning of the science of heat treatment of steel, and had immense practical implications.

According to Chernov, the meaning of point *a* (dark red incandescence) is that if the temperature of steel is below this point, it cannot become quenched irrespective of how quickly cooling is done. According to Chernov, point *a* is the temperature above which steel needs to be heated to so it can be quenched, while heating steel above point *b* will result in correcting its crystalline structure. Chernov identified point *c* as the melting point of steel. Later, in 1878, Chernov introduced point *d*, at around 200 degrees centigrade, as the temperature needed to cool the steel to achieve full quenching.

THE FAMOUS CRYSTAL

Ten years after his first article, in 1879, Chernov published a treatise titled *Research into the Structure of Steel Slabs*. In this work he described the main crystal structures in steel and their effect

on the properties of slabs. Dendrites, one of the types of steel crystals, were named after Chernov.

While developing his theory of the structure of steel slabs Chernov assembled a collection of iron crystals. The largest of these were up to 5 millimeters long, while most were up to 3 millimeters long and between 1 and 1.5 millimeters across. Occasionally, some crystals would have very fine shapes, but they were so small that they could only be seen with magnification of 100 or 150 times.

The famous Chernov crystal, however, described in all metallography textbooks, was 39 centimeters long and weighed in excess of three kilograms! The story behind this crystal is as follows.

Mr Bersenev, a Lieutenant Colonel of Naval Artillery and inspector at a large steel factory, found a huge crystal in a steel scrap dump at the charge yard. As it happened, the crystal grew out of a 100 tonne slab of steel. The factory managers allowed Bersenev to remove the crystal, and he presented it to his mentor, Chernov, who carefully studied the unique crystal.



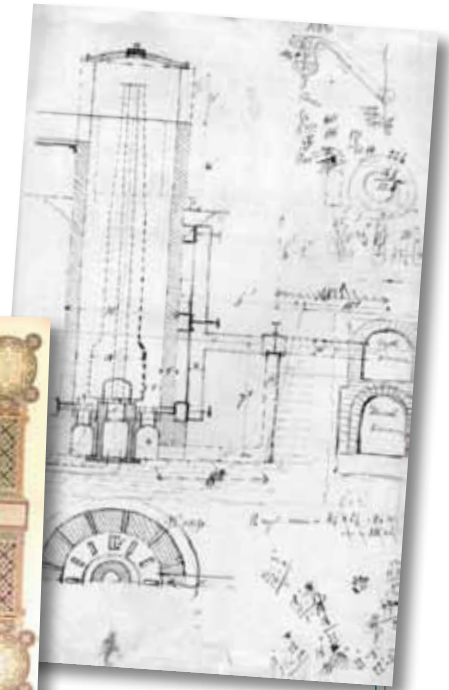
Group of experts of the Russian Department at the World Fair in Paris



Chernov's patent
for a gas blast furnace



Russian Technical Society Membership
Certificate, 1884



Drawings of furnaces at
Obukhovskiy Steel Foundry

A smaller branch of this double crystal, once dissected into several pieces, was closely examined by both Dmitry Chernov and other reputable metallographers. The crystal was instrumental in further research and scientific presentations made by Chernov and other Russian and foreign researchers.

OFFICES OF HONOR

Returning to the capital of the Russian Empire in 1884 after exploring for salt deposits in the Ukraine, Chernov accepted a job with the Marine Technical Committee. Two years later he became Chief Inspector of the Ministry of Railways, supervising deliveries by steel mills. Several years later he joined the Mikhailovskaya Artillery Academy as a professor.

Chernov spent these years improving the Siemens-Martin process theory, applicable to open-hearth furnaces. He was one of the first

to propose the use of pure oxygen for making steel. This technology later became known as the converter process. He also researched the opportunities for utilizing spongy iron and participated in the design of steel gun barrels, armor-piercing shells and took interest in the nascent aviation.

Dmitry Chernov was one of the leading experts in steelmaking in his time. He is by right recognized as the founder of modern metallography and the large school of Russian metallurgists and metallographers. His scientific discoveries have gained international recognition.

In his later years Dmitry Chernov was elected Honorary President of the Russian Metallurgical Society, Honorary Vice President of the British Institute for Iron and Steel, as well as honorary member of the American Society of Mining Engineers. ■

1000 B.C. – Tenth Century A.D.

Pit Firing Forge

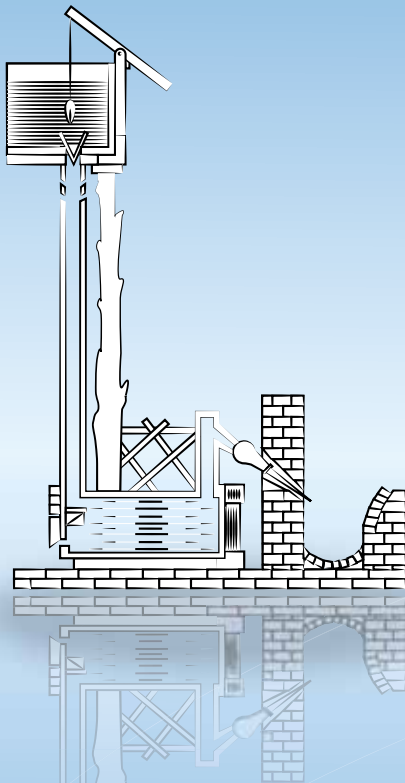
A pit is dug in the ground, where ore and charcoal are placed, covered with a dome with a short smoke stack, and a bellows for blasting fitted on one side. Once the process was completed, the forge would be dismantled and the bloom removed.



Tenth and Eleventh Centuries A.D.

Catalan Forge

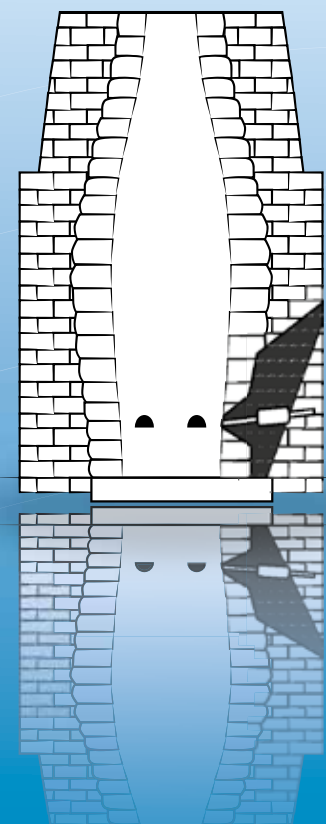
Early Middle Ages saw the development of a design to increase the productivity of pit firing forges. It involved the development of a low-rise continuously charged forge.



Thirteenth Century A.D.

Stuckofen

In the Alps region tall furnaces were called 'stuckofen' (from German *stuck*, meaning bloom, and *ofen*, meaning furnace), as opposed to conventional *rennofen*, or flowing slag furnaces.



2011

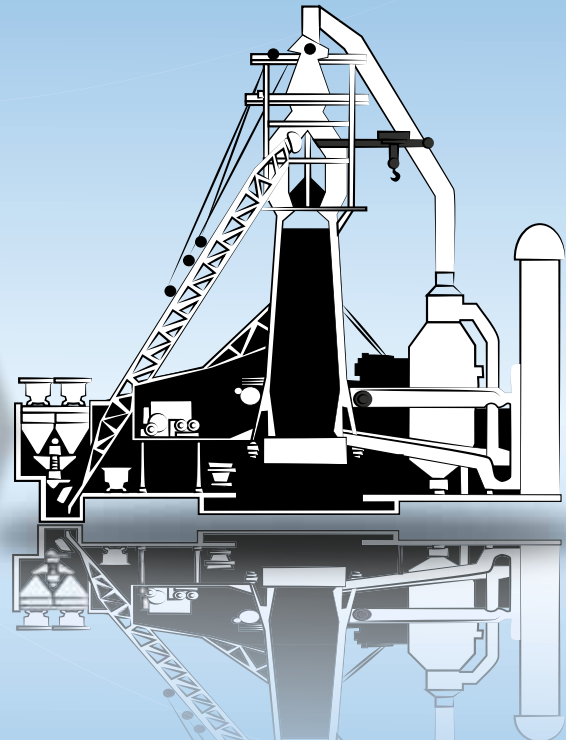
NLMK's Blast Furnace

The new Blast Furnace #7 (named *Rossiyanka*) was built in 2011 and has a capacity of more than 3.4 million tonnes of pig iron per year. It is the most advanced blast furnace in Russia, and the only one to be built in the last 25 years. The design incorporates state-of-the-art Russian and foreign engineering solutions. Some of the innovations involved are cutting-edge not only in Russia, but internationally as well.

Second Half
of the Fifteenth Century A.D.

Blast Furnace

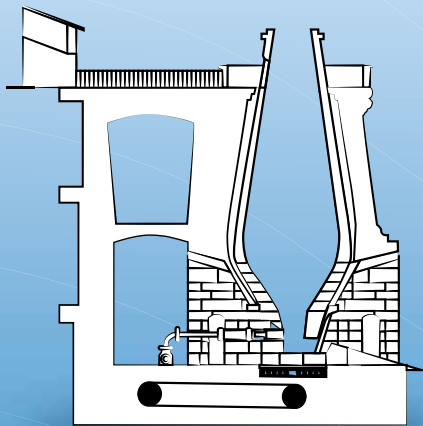
Improvements in *blauofens* led to the emergence of a new design solution, the blast furnace, intended exclusively for the production of pig iron. This also led to changes in the process for producing iron. First, the ore was smelted to make pig iron, and then pig iron would be re-smelted into iron. The oldest blast furnaces appeared in Ziegerland (Westphalia) in the second half of the fifteenth century. Their design differed from *blauofens* in three major ways: they had a higher stack, a more powerful blast, and a larger upper part of the stack. A blast furnace with a height of 4.5 meters would produce up to 1,600 kilograms of pig iron per day.



Early Fifteenth Century A.D.

Bloomery (*blauofen*)

Casting of pig iron required certain changes in the design of the furnace. This led to the emergence of *blauofens* (bloomeries), which became the next step towards blast furnaces.





EXTRAORDINARY FANCYWORK

Severija Inčirauskaitė - Kriaunevičienė, a creative personality from Lithuania with a tongue-twister name, enjoys the traditional female hobby of embroidery. Except that she embroiders metals, rather than fabric.



Severija is 32 years old and was born in Vilnius. She won her first award at the age of 22. International recognition came to her at *The Face and the Wrong Side* textiles fair after another four years of hard work.

The artist was propelled to official stardom after exhibiting her metal embroidery at the *Strich Und Faden* arts show in Berlin in May 2009.

Using a drill, she makes even-spaced holes in a metal piece. And then with a regular cross-stitch she embroiders metal as if it were fabric. She embroiders all sorts of metal objects, from old pails and spades to new automobile hoods.

"I enjoy things which are of no value to most other people," says Severija. "In my work I attempt to add

meaning to the commonplace elements of human life. I find true inspiration in the simple, mundane beauty of everyday things."

The Lithuanian needlewoman embroiders hoods and doors of cars, as well as kitchen utensils, like spoons, plates, ladles and saucepan covers. Today her collection includes spoons with embroidered flies going for cotton crumbs, frying pans with eggs, trays with fruit, and irons with flowers.

"I often resort to the plain and clear language of symbols," says Severija. "For example, flowers are a symbol of beauty, while saucepan covers, baskets, watering cans and graters signify the domestic and material side of life."

Good morning, 2005



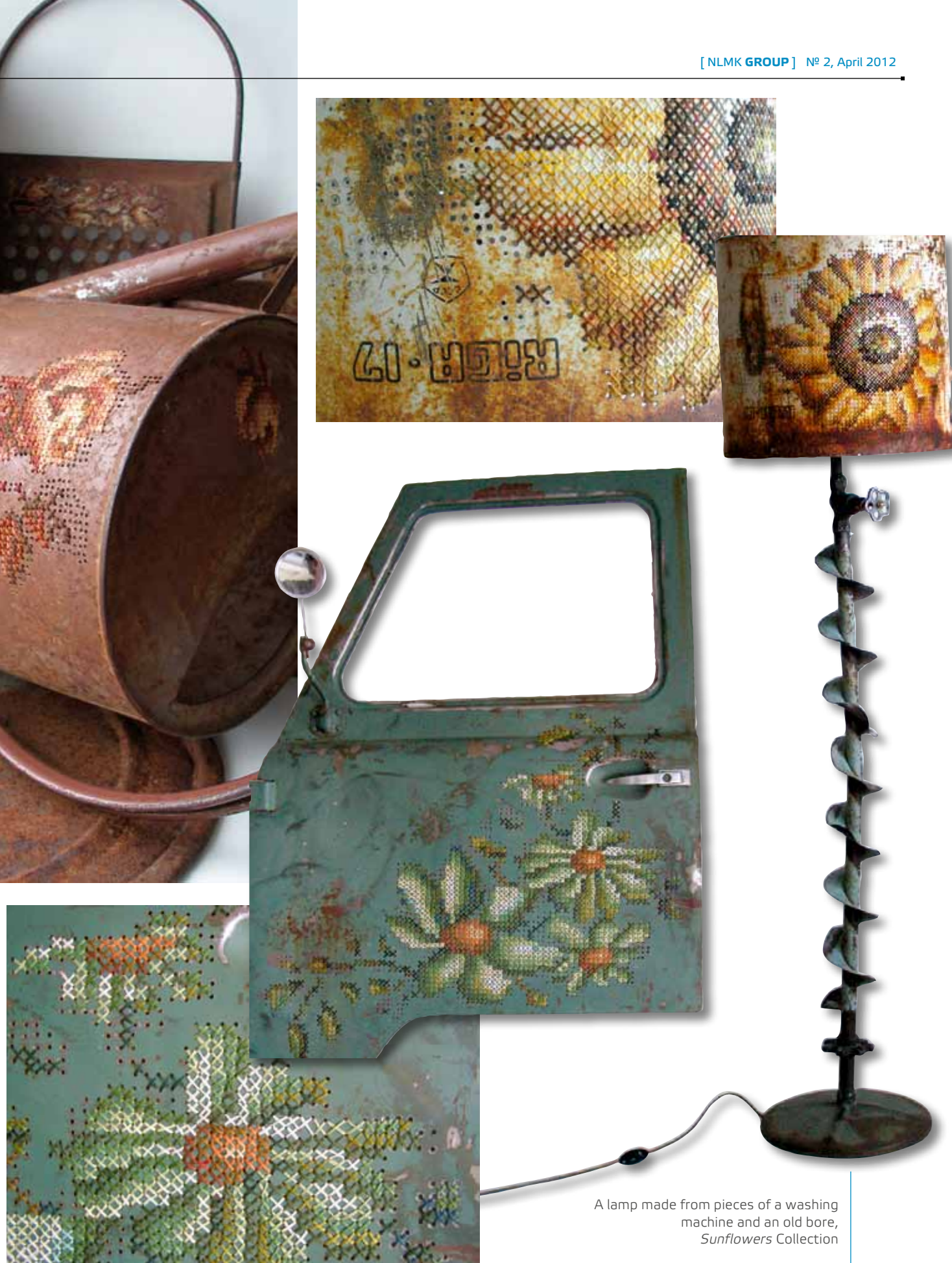
It's a Beautiful Life, 2005



*Autumn
Collection,
2007*



*In-Between City
and Country Life,
2008*



A lamp made from pieces of a washing machine and an old bore,
Sunflowers Collection

