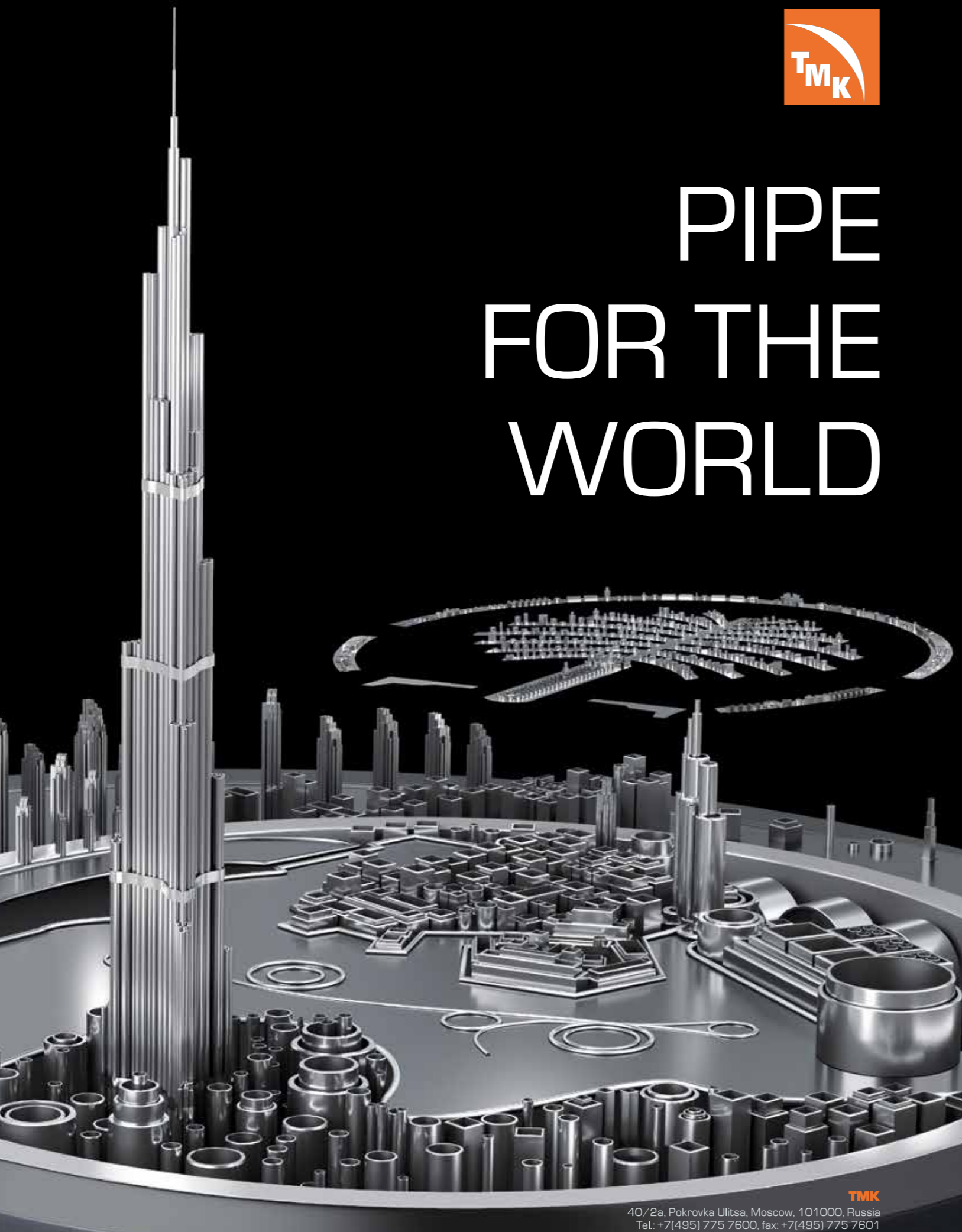




PIPE FOR THE WORLD



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YOURTUBE

TECHNOLOGY MOTION KNOWLEDGE



1 (37) 2021

TMK-YOURTUBE.RU

CORPORATE MAGAZINE

pipes
people
innovation
technology
growth
digitalization
science
partnerships

TMK
2001
2021

steel
quality testing
investment
research
sustainable
development

oil and gas
in-house training
transformation
cooperation
vocational
guidance
premium
connections
charity

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STRATEGY

AT THE CUTTING AGE OF TECHNOLOGY

Over the last 20 years, TMK has become a global supplier of steel solutions. It's been a story of rapid expansion, corporate transformation and technological innovation. Dmitry Pumpyanskiy, Chairman of TMK's Board of Directors, tells the story through a series of interviews over the years.

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TMK became the first company in Russia to test premium tubular oil and gas solutions to international standards.

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A PLACE OF BUSINESS, OR A SIGHTSEEING DESTINATION? BOTH!

Several of TMK's plants offer visitors something they can't get anywhere else in the world: from unique museum complex to the largest shop in Europe making large diameter pipes.

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YOURTUBE
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№1 (37) 2021

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TMK TO EXPAND THE SUPPLY OF ITS PRODUCTS FOR THE SAKHALIN-2 PROJECT

TMK will expand the range of its high-tech pipe and tubular products supplied to the Sakhalin-2 project. An agreement to that effect was signed with the project operator, Sakhalin Energy, at the Sakhalin Oil and Gas 2021 Far Eastern Energy Forum in September. The expanded range includes new sizes of casing pipes with TMK UP premium threaded connections approved for use in the Sakhalin-2 project.

The partners have been cooperating since 2014, when they signed a

memorandum of understanding and commenced joint efforts to certify TMK's premium pipe and tubular products to international standards. The first batches of TMK products for Sakhalin-2 were delivered in March 2017. Since 2018, when the first casing size was certified to international standards, the Company has been supplying premium casing with TMK UP PF threaded connections. TMK's Volzhsky Pipe Plant will produce the premium pipe and tubular products for Sakhalin Energy.



TMK AND GAZPROM NEFT TO JOINTLY DEVELOP TECHNOLOGY START-UPS



PRESS SERVICE OF GAZPROM NEFT

TMK and Gazprom Neft will jointly source and implement innovative solutions from start-ups in the oil & gas and pipe industries, including cross-sector solutions. The two companies signed an agreement on cooperation in delivering their accelerator programs. TMK launched its own accelerator program for start-ups in August 2021, looking for innovative ideas to address the business challenges faced by TMK's production units. TMK's R&D facility in Skolkovo is the program operator.

Under Gazprom Neft's accelerator program, upstream start-ups will be able to test prototypes of their developments both at Gazprom Neft and TMK's facilities. In turn, participants in TMK's corporate accelerator will have the opportunity to get involved in Gazprom Neft's projects.

Pipe supplies to UAE field

TMK supplied seamless steel pipe to the Sharjah National Oil Corporation (SNOC) (UAE) to transport gas from the Mahani new gas condensate field to the SNOC gas processing plant in Al Sajaa, Sharjah Emirate (UAE). The shipment exceeded 5 thousand tonnes.

The 406.4 mm pipe produced at Volzhsky Pipe Plant is intended for use in aggressive environments. The 3LPP coating pipe was used to construct a 22 km pipeline to feed hydrocarbons from the Mahani field to the gas processing plant. Under the integrated contract between the two companies, TMK also supplied SNOC with other structural and equipment components used in pipeline installation.



PNTZ ships new products to the EU

TMK's Pervouralsk Pipe Plant (PNTZ) shipped new high-tech pipe products to EU customers from the machine building, hydraulics, automotive and railcar industries. Seamless cold-deformed steel pipes are produced to EN 10305-1. A new type of high-precision pipes with a minimal OD and ID tolerance of +/-0.08 mm offers excellent surface quality, wide range of sizes, and guaranteed mechanical and process properties. To produce these pipes, PNTZ adjusted its pipe production technology as well as the technology for drawing equipment selection and manufacture. The plant also improved the technology used to apply anti-corrosion coating, protecting pipe surface against corrosion during transportation and storage. PNTZ plans to produce up to 200 tonnes of this pipe per year.

HIGHLY EFFICIENT GAS CLEANING

Chelyabinsk Pipe Plant (Chelpipe) completed phase one of a project to retrofit and upgrade gas cleaning equipment. The plant commissioned a new unit that can clean up to 6 million cubic meters of polluted air annually with an efficiency of 99.9%.

The gas-cleaning unit of plasma cutters for large diameter pipes features 32 membrane filter elements and cleans air of suspended particles, dust and gas-air mixtures affecting the environment.

State-of-the-art gas cleaning systems will be retrofitted to two more of Chelpipe's pipe rolling facilities by year-end 2022. A total of more than RUB 180 million will be invested in the project before 2024.





AT THE CUTTING AGE OF TECHNOLOGY

THE INTEGRATION OF THE RUSSIAN PIPE INDUSTRY STARTED BACK IN APRIL 2001 WITH THE CREATION OF TMK, THE FIRST RUSSIAN PIPE GROUP. THE 20-YEAR JOURNEY OF THE COMPANY, WHICH HAS BECOME A GLOBAL SUPPLIER OF STEEL SOLUTIONS, HAS BEEN A STORY OF CONTINUOUS GROWTH, AMBITIOUS MILESTONES, AND TREMENDOUS AMOUNTS OF EFFORT INVESTED INTO IMPROVING THE PRESENT AND THE FUTURE. BELOW IS A SUMMARY OF THIS JOURNEY AS QUOTED FROM INTERVIEWS WITH **DMITRY PUMPYANSKIY**, CHAIRMAN OF TMK'S BOARD OF DIRECTORS, TAKEN FROM OVER THE YEARS.

Over **20**
production sites in Russia,
Romania, the Czech
Republic, and Kazakhstan

Nº1
globally by shipments
of pipe and tubular
products

TMK supplies
its products to over
80 countries

A **top 3**
global manufacturer
of premium OCTG

TMK was established
in **2001**

You said that you wanted to turn TMK into a leader in the global pipe industry. How are you going to achieve this ambition?

There is no secret shortcut, TMK is going to do it the usual way. We have a wide range of assets that can produce all kinds of pipe, from capillary stainless steel tubing for syringe needles to large diameter pipes of up to 2.5 meters. These assets can produce over 4 million tonnes of pipe and over 3 million tonnes of steel per year. They need to be properly inventoried, with management, administrative, and operational decisions made to ensure good cooperation between them.

**Vedomosti,
July 2002**

"While in Soviet times sales activity at our enterprises was reduced to the purely technical function of shipping products to consumers, who actually bought them no matter what as they had no alternative, the market today offers a wide choice to the buyer and the role of salespeople has become pivotal. The seller's market has been replaced by a buyer's market."

**Vestnik TMK,
October 2003**

"After TMK's Board of Directors adopted a strategy to run a fundamental modernization of the Company's Russian pipe plants in 2005, we completed a large-scale upgrade of our facilities. Why did we do this? Continuing to operate our existing facilities as is would have allowed us to reap some solid rewards over the following 5 to 10 years, of course. However, considering that our consumers have become much more demanding, we would not have been able to meet these demands in the medium and longer term. Therefore, we were faced with either using these assets until the end of their useful lives within 5 to 10 years and leaving the market, or being mindful of the future and launching a large-scale upgrade project. We chose the second option."

**Rossiya 24,
April 2011**

TMK was the first Russian company to design and manufacture extra-tight premium threaded connections

“When our shareholders combined their assets to outline the company’s perimeter, they aimed to become a major player in this industry. We still have the same goal. In 2003, TMK became the world’s second-largest producer of steel pipe, but our ambition is to become No. 1. This is not as far-fetched as it might seem. <...> With a proper approach to the market, robust governance, and a smart investment policy, we could well grow into the largest global producer in two or three years’ time.”

Vedomosti, May 2004

You have already achieved your ambition to grow TMK into the world’s largest pipe producer. What is your next growth ambition?

Yes, our performance over the last three years shows that we have retained our leadership by pipe output. <...> A few years ago, when we stated our ambition to become the world’s largest producer of steel pipe, we did not mean to achieve certain levels in absolute terms and get complacent, but to build a platform for further growth as an effective tool to meet the needs of oil and gas companies – our core customer base. <...> Now we need to focus on speeding up payback on capital invested: almost USD 3 billion in retrofits and close to USD 2 billion in acquisitions. This will be our top priority – to improve TMK’s internal efficiency, margins and investability.

Vedomosti, January 2013

“Over the past 15 years, we realized something extremely important that is currently shaping all of our business processes and the company’s market positioning in general. It is absolutely necessary to be a modern company, have the latest production technology, and manufacture high-quality products, but this is not enough. To enjoy a confident market presence, we need above all to engage with our customers, keep up with them and anticipate their needs for today, tomorrow, and well into the future. When we do so, customers will rely on and incorporate our tubular solutions and materials into their projects. This is our goal, our new challenge.”

YourTube, November 2016

“Imports are no longer dominating the Russian market as was the case in the 1990s and early 2000s. The Russian pipe industry is capable of meeting the demand from the oil and gas industry as well as from other sectors. Russian consumers did not notice that some Western manufacturers left the Russian market two years ago, when economic sanctions were imposed on Russia. The minor amount of imports that remained in the market was promptly replaced with local goods. In our relations with consumers, we focus on what we call “proactive import substitution” as opposed to just “import substitution”.

Rossiya 24, December 2016

Over 100 thousand people have been trained online by the TMK2U Corporate University

“Some might say that there’s nothing special about pipe and tubular products, and even that they are downright boring. Quite the contrary! Conventional oil is running out, and it’s getting harder and harder to extract what’s left of it. Offshore production, deep drilling, or drilling in the Arctic, permafrost, or aggressive environments with high contents of H₂S or CO₂ are extremely challenging and call for innovative products. To cater to our consumers’ requirements, we have to engage in serious scientific research. One of our research centers, RUSNITI, is located in Chelyabinsk. The construction of our largest R&D center in the Skolkovo Innovation Center is underway.”

Rossiya 24, December 2016

“Today, we assume that equipment – our hardware – guarantees a certain quality, while the contribution from the digital economy – process digitization – helps us streamline and fine-tune these systems, resulting in further production cost cuts, improved quality, and product safety for the consumer throughout the product’s life cycle. In this respect, we are keeping abreast of our competitors in Russia and abroad, and even outperforming them in certain areas. <...> We started implementing advanced smart manufacturing methods, both rolling out our own solutions and engaging consultants.”

TASS, July 2017

“The pipe industry has been booming: TMK alone has invested over USD 5 billion in its operations over the last 10 years. We have actually overhauled them from the ground up. <...> Many people perceive a steel pipe as a stick with a hole in it, but we manufacture knowledge-intensive products resulting from a combination of in-depth research, materials science, and machining. High-strength pipes are not welded, but screwed together. Now, imagine this same threaded connection holding an entire pipe string that extends 2 or 3 kilometers downwards and 7 kilometers across. In this regard, premium connections are as important as the pipe itself. TMK is Russia’s only company that designs, manufactures, and uses them all in-house. We are the world’s third-largest company by size of own portfolio of connections.”

Russia-K TV channel, December 2019

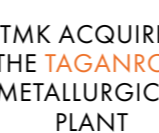
A new **300** ktpa heat treatment facility has been launched at Seversky Pipe Plant

TMK is Russia’s only producer of **13Cr** pipe and tubular products

16 thousand sq. m is the total area of TMK’s R&D facility in Skolkovo



KEY EVENTS IN TMK'S HISTORY (2001-2021)



TMK
FOUNDED

TMK OPENS
FIRST
REPRESENTATIVE
OFFICE
IN CHINA

IGOR KORYTKO,
TMK CEO

Over the last two decades, TMK has passed numerous scientific and industrial milestones.

The company successfully synergizes the best traditions of Russian metallurgy with the latest innovations of the global tubular industry. Its leading position in innovative pipe solutions on the Russian and global markets is a testimony to this fact.

We will reach new peaks of excellence. A focus on innovation and digital solutions, an expanding line of products developed together with our partners, higher efficiency, ecologically sound production and the latest technologies will allow us to achieve them. We're certain that demand for our most import product – high-tech pipe solutions – will continue to grow in the future.



ESB PROFESSIONAL/SHUTTERSTOCK/FOTODOM



TMK EXPANDS PRESENCE ON EU MARKET WITH ACQUISITION OF TMK-ARTROM AND TMK-RESITA IN ROMANIA



2001

TMK ACQUIRES SEVERSKY, SINARSKY AND VOLZHSKY PIPE PLANTS

TMK ACQUIRES THE TAGANROG METALLURGICAL PLANT

2005



TMK JOINS THE WORLD STEEL ASSOCIATION

2006

TMK IPOs ON THE LONDON STOCK EXCHANGE



ALL-RUSSIAN SCIENTIFIC AND RESEARCH INSTITUTE OF TUBE INDUSTRY (ROSNITI*) JOINS TMK



2007

COMPANY TMK PREMIUM SERVICE ESTABLISHED TO DEVELOP AND IMPLEMENT PREMIUM THREADED CONNECTIONS



*now RusNITI

2008



TMK IPSCO FOUNDED WITH ACQUISITION OF PRODUCTION ASSETS IN THE USA AND CANADA



2009

TMK BECOMES LARGEST STEEL PIPE PRODUCER IN THE WORLD AT 2.8 MILLION TONS ANNUALLY



2012

TMK JOINS THE INTERNATIONAL COMPLIANCE ASSOCIATION



SERGEY CHIKALOV, TMK Senior VP for Operations and Development

TMK combines a healthy conservative approach to business with the latest innovations. It's a major industrial player with a very human face, not frozen in time, but constantly moving ahead and developing new solutions.

Pipes will be in demand for a long time to come, but materials and technologies will change. Our clients will imagine a certain

likeness of what they want, and we will materialize it to their expectations and criteria. In the future, we'll be able to conduct most processes remotely, but we'll still meet in-person in comfortable, ecologically clean facilities far away from urban commotion. We'll get there almost instantaneously using Sinara Group's transportation systems inside TMK pipelines.



VLADIMIR OBORSKY,
VP for Marketing

I'm convinced that in 20 years TMK will be a responsible global supplier of safe and ecologically sound solutions for pipe consumers. It will be focused, just like today, on increasing shareholder value, improving people's lives in the regions where it operates and enhancing the safety and working conditions of its own employees.

TMK TAKES PART
IN **STEEL SAFETY DAY**
FOR THE FIRST TIME



TMK LAUNCHES ITS R&D CENTER
AT **SKOLKOVO**, WHICH GOES
ON TO WIN THE PRESTIGIOUS
LEED GOLD AWARD FROM THE
U.S. GREEN BUILDING COUNCIL



TMK ACQUIRES
CHELPIPE GROUP



2014



2016

2017



2018

2020

2021



TMK'S EMPLOYEES
COMPETE
AT **WORLDSKILLS**
FOR THE FIRST TIME

TMK LAUNCHES ITS
CORPORATE UNIVERSITY,
TMK2U

TMK SELLS
NORTH AMERICAN
ASSETS

TMK'S EUROPEAN DIVISION (ED) PASSED THE PANDEMIC WITH FLYING COLORS, MAINTAINING THE COMPANY'S POSITION IN THIS PIVOTAL MARKET. ADRIAN POPESCU, CEO OF THE EUROPEAN DIVISION, SPEAKS ABOUT THE DIVISION'S BUSINESS STRATEGY IN EUROPE, THE MODERNIZATION OF OPERATIONS, TECHNOLOGY INNOVATION, AND THE ANNIVERSARY OF TMK AND STEELMAKING IN ROMANIA.



STRATEGY IN EUROPE

Mr. Popescu, the European division was the first TMK unit to feel the negative impact of the COVID-19 pandemic. Can you tell us the story?

Indeed, Europe learned about COVID-19 way back in January 2020, when debate surrounding a potential response to the oncoming pandemic sparked in Italy. As early as late February, we began to closely monitor steps taken in Italy and apply them to our plants in Romania. With our COVID-19 measures already rolled out in advance, we were prepared for the introduction of restrictions in Romania. In particular, we were among the first to introduce a mask mandate across our offices and production sites. Our proactive approach helped us avoid interruptions and achieve one of the highest capacity utilization rates among our European industry peers.

Key European steel-consuming sectors went into a deep decline, especially the automotive industry. What was the toughest time?

The global crisis brought on by the pandemic has significantly reduced pipe consumption across our traditional markets of Europe and North America. In Europe, consumption fell 18% year-on-year. Coupled with overcapacity (as supply of steel pipe in Europe exceeds consumption by 40%), this provoked fierce competition in the rest of the market amid overall instability.

The toughest time for us was between April and June 2020, when most EU countries shut their borders. The Romanian government gave us permission to operate, but we could not ship products to Europe. It was easier for us to export pipe by sea to the United States. After a while, the inflow of industrial products to the EU recovered with the introduction of "green lanes". By then, however, most of our customers had suspended operations in line with local government guidelines.

Nevertheless, the European division managed to successfully overcome these challenges.

We managed to survive in part thanks to our high flexibility and our tailored approach to each of our more than 600 customers in Europe. We were able to keep our capacity utilization rate at 85% and our customer portfolio mostly intact. Overall, the European division posted a strong EBITDA, demonstrating that TMK's European assets are highly reliable.

Could you list the key operational highlights of the European division over the last five years?

We have invested significant time and effort into upgrading our facilities to meet our customers' most popular requests; this includes the new Workshop № 5 ACH, which produces semi-finished and finished components for the automotive industry. The heat treat facility located there is perhaps the most advanced facility of its kind in Europe; it is unique in that it is designed to heat treat large amounts of pipe with a wall thickness of up to 60 mm. With the launch of this



facility, TMK-ARTROM has become a premium partner for customers across high-tech industries in Europe and North America.

In 2020, we completed a comprehensive modernization of Workshop № 1 ASSEL. Two advanced cut-off machines by German Reika have been installed on the finishing line. The new equipment meets TMK-ARTROM's productivity requirements, covering its entire product size range with an option for extension.

We have also upgraded our rotary hearth furnace for billet heating in the rolling mill line, increasing its

TMK's European division demonstrates that TMK's European assets are highly reliable

capacity to treat larger size billets. The furnace now boasts a new gas combustion system, reducing gas consumption by 25%. Another project implemented at Workshop № 1 ASSEL includes the upgrade of piercing mill equipment. As a result, we are now able to produce something the market is calling out for – longer and thicker-walled pipe.

What progress has been made on digitalization?

The year 2020 gave an impetus to our digitalization efforts, both scheduled and in response to COVID. Due to the pandemic, we reduced all contact between employees during working hours, including via paper. Decision-making processes were automated and accelerated; one way of doing this was the introduction of a new electronic sign-off system. We have also taken the first steps to digitize our laboratory tests.

Our current focus is on digitizing production records to replace paper with digital documents that can be accessed by shop-floor employees in real time. This process is slated

We are constantly adapting to individual customer requirements, ready to face new challenges and handle any technical issue



for completion in 2021 and will spare us from printing over 500 thousand pages of documents annually.

What will be your focus areas going forward?

Our business structure targets specific market niches, which implies that we are constantly adapting to individual customer requirements, ready to face new challenges and handle any technical issue. This policy has enabled us to survive and overcome the shattering crises of the past two decades.

Our top priority is to identify new promising niches and sub-niches and adapt our technology accordingly, while others are still tentatively exploring the feasibility of R&D in these areas.

For example, in response to the EU's climate change requirements, we immediately started looking into the potential of producing pipe for hydrogen transportation, as we see strong upside in this niche. Today, TMK-ARTROM is one of the first European plants to already offer this type of pipe to the market.

What is the north star at TMK, a company that celebrates its 20th anniversary this year?

TMK is a multicultural community, bringing together different languages and cultures, business experiences and practices, which complement each other to drive synergy across all processes. However, the key thing that I have felt for all these 20 years is that I am part not only of a company, but of a "corporate home" where everyone shares the same values and feels as if they were one big family.

In my time at TMK, we have experienced a number of milestone events, including the very eventful years of 2005 and 2006 for the company's European business. During this period, we joined TMK as Sinara Group in Europe, acquired our current TMK-RESITA plant and installed a CPE mill at TMK-ARTROM to ramp up its pipe production capacity to 200 ktpa. This step marked the beginning of our journey towards our current strong and sustainable market presence in Europe.

This year is also the 250th anniversary of steel making in Romania. The first steelworks in the country were set up in Resita; at a site now known as TMK-RESITA. How do you view this milestone event?

Romania, like Russia, is home to some of the oldest steelmaking plants in Europe. Resita's first blast furnace was commissioned with the support of the Austrian imperial family in 1771, and it was similar to the one that appeared at the same time in the town of Polevskoy in the Urals. Later, in the late 19th century, another ironworks was built near Resita in Hunedoara. Until the 1990s, the Resita plant remained the flagship of the Romanian steel industry, breaking multiple production and technology records.

This anniversary is a major milestone for both TMK and the city, and, as such, we will celebrate it together. We will organize a series of events linking the two anniversaries: 250 years of the steelworks in Resita and 20 prosperous years of TMK being present in Romania. We are proud to be heirs to the great legacy of the Industrial Revolution in Europe. **YT**

018

TMK'S TOP 11 INNOVATIONS

1



LOW-ALLOY STEEL LINE PIPE

A high-performance product used in pipelines with an operating pressure of 0.8-32 MPa for transportation of media containing hydrogen sulfide (H₂S) and carbon dioxide (CO₂). The product is also fit for operation at low temperatures.

TMK UP CENTUM PREMIUM THREADED CONNECTION

The latest generation of gas-tight premium threaded connections for tubing and casing with high compression, tension and internal and external pressure resistance.

2



3

H₂S RESISTANT DRILL PIPE

Pipe with unique corrosion resistance properties designed for drilling and workover of gas, gas condensate and oil wells.



5

LARGE DIAMETER PIPE WITH SPECIAL EXTERNAL THREE-LAYER POLYETHYLENE ANTI-CORROSION COATING AND CONCRETE WEIGHT COATING

The combination of the product's geometry and high resistance to ductile fracture makes it suitable for subsea offshore pipelines.



4

13CR TUBING

This product is available in both standard and cold-resistant designs. Its chemical composition and manufacturing technology make it possible to use this tubing in the fields with a high content of carbon dioxide (CO₂) even at low temperatures.



**SPECIAL GREENWELL COATING FOR
THREADED CONNECTIONS**

Dope-free composite coating with a polymer matrix featuring high anti-friction, anti-galling and corrosion-resistance properties. The advantage of the new solution is reliability, efficiency and compliance with the most stringent environmental safety requirements.

6



022

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**HOT- AND COLD-WORKED PIPES
MADE FROM AUSTENITIC AND
PEARLITIC STEEL GRADES**

The first batch of these pipes was produced in 2020 at Volzhsky Pipe Plant, Sinarsky Pipe Plant and TMK-INOX (all part of TMK Group) for nuclear power plants with a specified service life of up to 60 years. The pipes were manufactured in accordance with the requirements for the manufacture of equipment and pipelines for nuclear power plants with a pressurized water reactor.

7



8

**LONG CORROSION-RESISTANT
PIPE FOR LEAD-COOLED FAST
REACTORS**

Due to its chemical composition, this 32 m long pipe provides the reactor plant with natural radiation safety and long-term fuel supply, while ensuring environmentally friendly power generation and waste disposal and boosting economic competitiveness.

**DRILL PIPE WITH HIGH-TORQUE
DOUBLE-SHOULDER TMK
PREMIUM CONNECTIONS**

Designed for drilling vertical, horizontal and directional oil, gas and exploration wells, the connection's innovative design reduces thread wear when the pin is engaged with the box during assembly of the drill string and subsequent make-up.

9



10

TUBING MADE FROM TMK-C HIGH-CORROSION-RESISTANT ALLOY

The technology intensive structure of the tubing material owed to the manufacturing process and the alloy's unique chemical composition makes it possible to use this product in gas condensate fields with high partial pressure of H₂S (hydrogen sulfide) and CO₂ (carbon dioxide).

11

**SEAMLESS PIPE WITH EXTERNAL
THREE-LAYER POLYETHYLENE
ANTI-CORROSION COATING**

This product for offshore pipelines offers the benefits of high-quality external and internal surface, improved anti-corrosion and mechanical properties, and precise geometric parameters. The pipe provides high reliability and safety of the pipeline with due regard for underwater laying specifics, environmental requirements, construction and operation climatic conditions and hydrogen sulfide content in the transported medium, while fully meeting the requirements of the Russian Maritime Register of Shipping.



026

PIPE TECHNOLOGIES OF THE FUTURE

TMK RECENTLY BECAME THE FIRST COMPANY IN RUSSIA TO TEST PREMIUM TUBULAR OIL AND GAS SOLUTIONS ACCORDING TO INTERNATIONAL STANDARDS. THIS WAS DONE AT THE COMPANY'S R&D FACILITY IN THE SKOLKOVO INNOVATION CENTER USING THE ONLY SET OF TEST BENCHES FOR FULL-SCALE TESTING OF OCTG IN THE COUNTRY.

TMK

UP CENTUM quick-assembly threaded connection was tested in a laboratory environment to the international standard ISO/PAS 12835:2013(E)

Qualification of Casing Connections for Thermal Wells. This "exam" is required to verify that a product can be used in the recovery of hard-to-recover reserves with overheated steam fed into the well to activate oil formations and lift heavy high-viscosity oil.

The TMK UP CENTUM threaded connection was tested under combined loads, in laboratory settings simulating the in-well conditions during hydrocarbon production. The sample was kept at 290 °C for 120 hours and subjected to thermal cycle tests within the range from 40 °C to 290 °C while applying internal pressure exceeding



70 bars with the pipe under axial compression. Throughout the testing program, which lasted for more than a month, the tightness of the threaded connection was the key property tested. The test results confirmed the unique set of the TMK UP CENTUM connection's operational properties and its ability to be used at elevated temperatures.

The successful testing of the premium thread proved that sophisticated comprehensive tests of OCTG can now also be carried out in Russia, which is good news meaning new opportunities not only for TMK, but also for the industry in general.

In the future, TMK's R&D facility will invite other Russian manufacturers to submit their pipe solutions for testing. Once fully ramped up, the facility will be able to test up to 20 new developments per year, meeting both internal needs and the demands of its partners.

R&D-INTENSIVE APPROACH

By consistently driving advances in applied science within the Company, TMK has provided a strong impetus for further expansion of its high-tech product offering. Tubular solutions for



The TMK UP CENTUM threaded connection was tested under combined loads



In the current market landscape, R&D capabilities are becoming a key source of competitive advantage for industrial manufacturers

TMK's key customers – oil and gas companies – become increasingly sophisticated, reflecting the growing complexity of hydrocarbon production projects and the adoption of new upstream technologies. For unconventional reserves, aggressive environments, permafrost, onshore and offshore production, the Company offers special high-strength, low-temperature and corrosion-resistant pipe, continuously expanding its ranges. To achieve desired properties, new steel grades are constantly being developed and improved. In recent years, TMK has successfully launched the production of high-purity steel grades with the required chemical composition – a key enabler for manufacturing high-tech pipe. Due to low impurity concentrations, these steel grades are both strong and ductile while offering good forming and corrosion performance.

TMK's premium threaded connections (www.tmkup.ru/en) are its signature product, offering 100% tightness of pipe strings. TMK-Premium Service operates as a pure play and has been focusing on threads since 2007. In the last few

TMK's R&D facility in Skolkovo has two test benches: one to test the tensile or compression strength of a sample pipe with diameters of up to 762 mm and a load capacity of 3,000 tonnes, and the other to test samples with diameters up to 406 mm and a load capacity of 1,800 tonnes. During tests, pipe temperatures can reach 350 °C at the maximum internal and external pressure of more than 2,000 bars, exceeding all existing requirements for oil and gas tubular products by a wide margin. The test benches also support bending tests, with the maximum bending angle of 20 degrees for a 30 meter long sample.

years, our TMK UP signature product family has been expanded to include latest generation connections with an optimized design offering a new level of reliability. GREENWELL is another unique solution offered by TMK. It is a composite coating for casing and tubing connections that successfully combines the benefits of both dry lubricant and corrosion protection.

TMK focuses primarily on products for the oil and gas industry but also targets customers in other pipe-consuming industries – nuclear, energy, machine building and construction. The Company has developed and continues to expand its range of special pipes, which are complex technology-intensive engineering products further down the value chain.

PIPE SOLUTIONS AHEAD OF THE CURVE

The Company identifies its future R&D directions and technology innovation focus areas based on the current needs of its key customers. It is equally important to not just meet consumers' present-day expectations but also anticipate what they might need in the future – and be the first in the market to offer it.

To look for promising solutions relevant to consumers, TMK is fully leveraging its R&D collaborations it has launched with all key partners, such as Gazprom, Rosneft, NOVATEK, Rosatom, and others.

"We are targeting a 50 percent plus increase in the share of R&D-intensive products in our shipments," said Sergey Chikalov, TMK Senior VP for Operations and Development. "This ambitious goal is aligned with the needs of key economy sectors, which, in turn, have to address ever new challenges as they seek to unlock growth opportunities in a highly competitive global market. To meet our customers' needs in high-tech next-generation pipe and tubular products, we have built up a powerful R&D unit with unique capabilities that offer a glimpse into the future of pipe technology." **YT**

A PLACE OF BUSINESS, OR A SIGHTSEEING DESTINATION? BOTH!

OIL REFINERIES, SHIPYARDS AND NUCLEAR POWER PLANTS – TOURISM AROUND THE WORLD HAS DEFINITELY TAKEN A TURN FOR THE EXTREME AND UNUSUAL. WHAT WAS ONCE CONSIDERED FUNCTIONALLY NECESSARY BUT GENERALLY OFF-LIMITS TO THE PUBLIC IS BECOMING INCREASINGLY COMPETITIVE IN THE MARKETPLACE OF EXPERIENCES THAT DEFINES THE MODERN TOURISM INDUSTRY. TMK IS NO OUTSIDER IN THE FIELD OF INDUSTRIAL TOURISM, AND SEVERAL OF ITS PLANTS OFFER VISITORS SOMETHING THEY CAN'T GET ANYWHERE ELSE IN THE WORLD.



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he history of visiting production sites for leisure emerged at least as early as the 17th century, when the British nobility included stops at flower gardens, wineries and cheese factories as part of its Grand Tour of mainland Europe. American distiller Jack Daniels is credited with being the first modern producer to open its doors to the public in 1866. Today the global industrial tourism market, which encompasses everything from Belgian chocolate factories to Japanese car plants, is estimated in the billions of dollars and is expected to grow rapidly in the coming decade (COVID regardless).

While the Soviet Tourism travel agency published pamphlets in the 1930s on exploring industrial

sites related to silk production, mining and other sectors, the trend didn't really take off in Russia until recently. Companies are increasingly incorporating transparency and openness into their corporate values, and TMK has been a leader in this field long before it became mainstream.

BLAST FROM THE PAST

The Company's most famous tourist attraction is located in Russia's Ural Mountains, which form the geographical divide between

Severskaya Domna – TMK's most famous tourist attraction – is located in Russia's Ural Mountains

Factory specialists at Volzhsky Pipe Plant have been trained in guiding the tours

Europe and Asia. "Big changes began the moment Seversky Pipe Plant was acquired by TMK in 2002," recalls Anna Trepalova, Director of the adjacent Severskaya Domna museum complex. The plant is TMK's oldest and its history dates back to the 1730s when rich deposits of iron ore were discovered around Polevskoy village.

TMK modernized production facilities, replacing the factory's open hearth furnace with a more efficient and environmentally friendly electric arc furnace (which is used today to make steel from scrap metal). But the Company valued Seversky Pipe Plant's rich history, and per the personal decision of Chairman of the Board of Directors Dmitry Pumpyanskiy, decided to convert one of the factories from 1842 with a furnace from 1860 into a modern museum.

"In 2009 we introduced a new system of receiving guests at the plant, and the museum became one of the highlights. Visitors love being able to walk from our glorious past into the present. Active production sites are still off limits for ordinary guests, but the museum is open to the public. We've had over 100 thousand visitors," explains Trepalova. The museum's most famous guest may have been former Russian President and Prime Minister Dmitry Medvedev, who visited the complex as part of his tour of Seversky Pipe Plant in 2014.

"I want to know how it works!" is the most common response we get from tourists," says Trepalova. "But it's not just about showing off what we do. Being open and transparent about production builds trust in the final product. Our museum is also important for attracting new talent: many students choosing a future career pass through."





making large diameter pipes (Vysota 239), the Company got more than just a few major steel plants. Today it offers tours of Vysota 239 that give an overview of the factory's history and a chance to meet with engineers on the ground. Visitors don white safety robes and begin the tour with a mandatory eight-minute safety video that resembles an 8-bit computer game (like Super Mario Bros.). The factory was so successful in attracting tourists that it's hosted more than 200 thousand visitors over the last 10 years and has become a regular attraction for visiting delegations in Chelyabinsk.

While COVID has inevitably had an effect on tourism at the Company's plants in the short term, TMK is looking forward to the coming rebound in the global vacation industry. "Industrial tourism has become an important component of a region's socioeconomic development and an effective way to achieve business goals for companies working across a broad range of sectors," said Russian Industry and Trade Minister Denis Manturov. "Developing industrial tourism helps regions promote local brands and products and makes them more attractive for investors. By opening their doors and engaging in a dialogue with consumers, companies get to show off their accomplishments, technologies, product quality and care for the environment. They help form the new image of modern Russian industry." **YT**

Trepalova has big plans for the future of Severskaya Domna. "We have a complicated task: we want to open up our current production sites to the public. We're also renovating an adjoining room that also dates back to the 19th century, but is not currently in use. We'll save all the aesthetic elements of its industrial design, but convert the space into an exhibition and conference hall complete with catering. We'll be able to use it for large meetings, seminars, lectures and conferences."

BUT IS IT ART?

While Severskaya Domna may be TMK's oldest museum complex, it's far from the only one. This year nearby Sinarsky Pipe Plant unveiled the world's first pipe museum, TubeHiTech, which offers exhibits of tubular production from all over the world. "The pipe exhibits are complemented by works of art crafted from metal by the factory's employees. In total we have over 150 objects on display," explains Svetlana Russkikh, Head of Sinarsky Pipe Plant's PR and GR.

TMK's youngest factory, Volzhsky Pipe Plant in the Volgograd Region, celebrated its 50th anniversary last year. The company used the occasion to launch factory tours for the public,

Industrial tourism has become an important component of a region's socioeconomic development

Vysota 239 includes the largest shop making large diameter pipes

which include production facilities for welded and hot rolled pipes, the factory's interactive Steel Safety Room, the environmentally focused Eco House TMK, the factory's church and the Stalingrad Circle WWII memorial complex. Factory specialists have been trained in guiding the tours, but recently the plant adopted a more hi-tech approach: visitors can scan a QR code to download a map and audio guide.

NO MORE 'BUSINESS AS USUAL'

When TMK completed a deal earlier this year to acquire ChelPipe, which includes the largest shop in Europe

