ŠTORE STEEL

165 let

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Another step forward

165 years have passed since the beginning of an industrial iron company in Štore. The anniversary was celebrated with new developments.

Photo: Marjan Mačkošek

PIn 1851, there was according to the document of a court settlement “land in Štore covering some 3 orals, where a puddling plant, rolling plant and a residential house are located. There is a completely new bridge across the Voglajna River that is 78 feet long and 15 feet wide and prepared to connect the coalmine and factory railway line to the state railway line.”
The document lists the following equipment: high-pressure horizontal steam engine with at least 50 HP at half charge, three puddling furnaces and two annealing furnaces, each with a 50-foot-chimney, a rolling line with pinions and a frame for sheet metal rolling, a rolling line for heavy profiles with pinions, rolling line for fine profiles with 21 hard cylinders, one planishing furnace with a straightening hammer and two impact plates, inventory tools, instruments, accessories, devices for mining, ironworks, a house in Štore and an office in Celje.
How many generations of families have earned their daily bread by working in the ironworks in these 165 years? Descendants of many are still in the company even on leading positions. The ironworks is still standing after all ups and downs and by starting a new continuous steel caster in this year we made another step toward an advanced factory.

Managing Director
Marjan Mačkošek

On the cover: view of the industrial zone Štore 2 with Celje in the background

Presentation of new continuous caster to business partners

At the time of 165th anniversary of iron industry in Štore, the company concluded one of the largest investments in the last decades – a new continuous steel caster. This is the third caster of a kind in the Štore history located at the same location as the first one in 1973.

The Štore Steel company dedicates a special attention to the product development and investments in modernisation with a goal to react promptly to the needs of the industry sectors manufacturing for the automobile industry.

Based on many years of experience in casting steel, we determined technical demands for the new caster and chose the most up-to-date equipment now available on the market of such equipment.

The new equipment for continuous casting of steel will enable us to provide special high quality steels for the most demanding products for the automobile industry. We expect an improved surface quality and core of the billets.

The new continuous steel caster performance is now adapted to the technical capabilities of other equipment in the steelworks. Automation will have a positive effect on humanization of work – it will make feeding and maintenance easier.

Photo - left: casting platform; photo - right: lower part of the continuous caster

We have decided to use the end of the investment and the 165th anniversary to introduce our latest acquisition to our most important customers. The continuous caster is one of our most important pieces of machinery and the new caster with the up-to-date steel casting technology presents one of the turning points in the activity of our company. The caster is also very important for the quality of our steel and that is why we wanted to introduce its advantages to the customers. We also wanted to show the possibilities for the quality improvement and expansion of the product range.

For easier organisation, we divided the event into two parts; separated for foreign and domestic partners.

The presentation for foreign partners and viewing of the new continuous caster was prepared for May 11 and 12. Unfortunately, not all the invited guests were able to come. The 20 partners who could attend the event were extremely positive about the idea and execution of the event.

For domestic customers and also representatives of the banks which enabled the execution of the investment by financing, the presentation and viewing of the caster were organised on June 16. The response was very good, which shows that our partners are aware of the importance of this investment. The new continuous caster enables answering and fulfilling the growing market demands and future development of the company.

We received many compliments from the partners, even though we organised both events ourselves.
We have to express gratitude to Mr. Peter Bračun, Mr. Metod Marold and Mr. Miha Kovačič for introducing the history of iron industry in Štore, configuration of the new continuous caster and its influence on the billet quality.

Commercial Director
Ivan Jurkošek

Photo - above: domestic partners at the entrance to the company; photo - below: foreign partners on the viewing of the caster

Changes in the management

In 2016, the Štore Steel company made a few changes in the management of individual areas.
Long-time members of the management and directors Branka Šket and Peter Bračun are completing their business careers and are going to be involved as counsellors in the fields they have covered so far, until they leave the company.
At the annual meeting, the associates of the company appointed Ivan Jurkošek chief commercial officer and member of the board and Boris Kumer technical director. Ivan Jurkošek and Boris Kumer took up their functions on May 1, 2016 and are beside the managing director of the company Marjan Mačkošek entered in the register.

Alfred Šarlah was appointed assistant financial director. The organisational units for technical development and quality were merged into Quality and Research Services, run by head of quality Dr. Brigita Koklič (laboratory and quality control) and head of development Dr. Miha Kovačič (complaints and development).

Branka Šket

She started work at the ironworks as a bookkeeper after her internship. Soon, she became an autonomous bookkeeper, she did bookkeeping in the field of catering and for the canteen, worked as a financial analyst and soon became head of accounting for various non-production departments.

Accounting in a big company like ironworks was comprehensive and complex and tasks were highly specialised. General ledger, stock monitoring, recording business services, bookkeeping of organisational units and expense bookkeeping are only a few fields she met in her professional career. After the ironworks had been split into independent companies in 1991, she continued her career in the company ITRO as the head of finance and accounting.

According to her words, the times between 1991 and 1995 were the hardest in her business career due to the collapse of Yugoslav market and beginning of information technology, which both made jobs and markets disappear overnight. The ITRO team did not only take care of its own company but was also a coordinator for all the newly companies at the Štore Ironworks location. Books of account had to be taken care of, equity and accounts put into a positive state, estate put in order and history had to be also taken care of. That period was much more difficult than the 2009 crises. Her motto was not to wait for external help but to focus on problem solving and situation improvement when the company is doing badly.

She was invited to the management team of a newly founded company Jeklo Štore. The team successfully positioned the company among more important entities in Slovenia. In the last period of her career, she was a member of the management in charge of the finance sector and was finally appointed finance executive director.

Peter Bračun

He started his professional career as a foreman at the electric arc furnace. In one of Štore Steel Magazines he wrote in an article: »Year 1975 was a very important one in my life. I graduated on Wednesday, February 5, I started work in the Steelworks II on Monday, February 10 and in 1975 I started a family«.

He was soon appointed head of project for building Electric Arc Furnace II and corresponding power plant facilities. To achieve the goals of the investment plan,

Photo: Peter Bračun (second from left) and Branka Šket (fourth from left) on the management meeting

he had to plan all other equipment necessary to increase steel production. The crane line had to be extended at the charge preparation and an additional crane, number of basket carriages and baskets for transporting charges into the steelworks had to be increased. Two more cranes had to be purchased at the steelworks. A 100-ton-one for transport of ladles with melt to the continuous caster and a 35-ton-one for transport of empty ladles. Alloy bunkers and non-metallic additives with automatic feeding of the furnace and ladle were also planned but were realised only 25 years later.
After finishing the investments, he returned to the steelworks, where he worked for some time as a technologist and where was later appointed head of the plant. When the production of steel within ironworks restructured into an independent company Jeklo d.o.o., he was appointed managing director.
Companies in the iron industry were nationalised in the hard crises that followed the loss of the Yugoslav market and the management was centralised in Slovenske železarne (Slovenian Ironworks). Mr. Bračun was among the leading managers who were transferred to Ljubljana. He started work in the commercial field of the long programme as was in Slovenske železarne named a planned merger of the companies Jeklo and Metal.
»With help of present MD Marjan Mačkošek we fought a battle for survival of the company within Metal Ravne. June 30, 1997 was a bad day in the history of Štore Ironworks since Metal Ravne closed down the production plants in Štore. That was the time when we came up with an idea of a completely new company for production and processing of steel at the Štore location«.
Peter Bračun was a member of the management who started the company and won recognition in the markets at home, in Europe and worldwide. Peter Bračun was in the years since 1994 a member of management as Chief Commercial Officer.
Mr. Bračun, as he says, played an important role at privatisation (INEXA, UNIOR) and development of the company and products for market demands. The company has become an important supplier of flat spring steel in Europe.
»We were known for expertise in steel industry, knowledge of the markets and exemplary work with business partners, which have helped us many times to solve problems that had arisen at sales of our products. All the time, I took care that our customers kept a lot of faith in the Štore Steel company and my colleagues in different fields in the company.
He usually says: »All the efforts, time, sacrifices, family support and help of colleagues have helped the company to survive. The fact that Štore Steel still produces steel, invests in modernisation and new equipment and develops is the greatest reward for all of us who have been part of this process. We have fulfilled our hopes, wishes and care for people and environment in which we produce«.

Ivan (Jani) Jurkošek

He started work at the ironworks after his study as their scholarship holder and continued the family tradition of many generations of ironworkers.
Already during his study at the Faculty of Mechanical Engineering, Production systems in Ljubljana, he worked in the company and chose for his degree paper the subject about planning researches in the Quality Control Department.

After a short internship, he started work as a technologist in the Quality Control and soon became head of the department.
In the newly founded company Jeklo Štore, he was appointed head of Quality Control. In 2003, he was appointed assistant MD of production and quality of products.
He worked in the company on introduction of quality standards and is the lead auditor of the ISO 9001 standard. He carries out employee training in the field of quality standards, research and control methods as well as process management.
He is a representative of the company in the Automotive Cluster of Slovenia (ACS) and a member of the management board of the Association for metallic and non-metallic materials at the Chamber of Commerce and Industry of Slovenia. In one of the terms, he was the supervising board chairman of the company Železar Štore.

As a local of Štore, he was actively involved in the town's life. He was an active sportsman and member of handball and football teams.
For one term, he was a municipal councillor in Štore and has been deputy mayor for several terms.
He is active in his local community in the humanitarian field (chairman of Red Cross Society) and in culture where he is the organiser of Pihalni orkester štorskih železarjev (Štore Ironworkers Wind Orchestra).

Boris Kumer

He graduated from the Faculty of Natural Sciences and Engineering, Department of Mining Engineering in metallurgy and materials and started internship in the Štore Rolling Mill. During the internship, the company Jeklo was merged with the company Metal. He received assignments in the field of rolling technologies, monitoring and analysing of production quality parameters and taking measures in case of anomalies.

Already in his second year of employment, he took over the Line department. Together with his colleagues, he introduced a new system of rolling in monthly cycles, which is still in use.

Soon after the start of the new company, he was appointed head of the rolling mill with lines, finishing and annealing as well as the armature workshop. Together with his colleagues, he set down a long-term vision of the rolling mill development – by developing technologies, mastering new products and modernising equipment.

Besides running the rolling mill, he took over the management of an important EUR 22 million investment in a new rolling line. The team who prepared the basic concept of the new rolling line had to solve the problem of building the line without disturbing production and fulfilling orders.

By successfully completing the investment, the rolling mill became a modern and flexible plant with an excellent start for future development. Due to the new rolling line, the rolling productivity increased by 35% in the years 2010-2016 and yield by 2%.

We wish him at his work what he wrote in his introduction when chosen for the new function: » Whatever I do, I try to keep balance. «

Alfred Šarlah

He has graduated in Business Finance and Banking from the Faculty of Economics and Business in Maribor. After internship in the company Slovenske železarne ITRO he got a job at NLB Outlet Celje, in the Department of Financial Management and Coordination.

He was invited to our company then called Jeklo Štore, by a member of the finance management, who saw in him a promising financier. He was appointed Head of Finance.
His decision for a career in iron industry was influenced by family tradition of working in ironworks, where his father also worked.
As he says, “Work in finance is dynamic and full of changes. That is for me a challenge I want to take. The roll of a financier in a company is a key function, where my colleagues and I from the finance and accounting service and economics evaluate ideas, projects and long-term vision of the company from the financial view, while providing financial risk and company's solvency control.“
Mr. Šarlah has performed a training for membership in supervisory or management boards of companies. He was a member of the RTV Slovenija and company Železar Štore supervisory boards, where he has later taken over the function of the Supervisory Board Chairman.

In his local environment, he is active as a member of the Vrbno local community board and the Drobinsko Sports Club.He has been for years a member of the Celje Lions Club and their chairman and a member of the Štore Steel Photo Club.

Brigita Koklič

She came to our company from Cinkarna Celje, where she worked as head of metallurgic laboratory and coordination of Quality control laboratories. In Cinkarna, she set a quality system according to SIST EN ISO/IEC 17025 and was responsible for getting accreditation for the six laboratories of the Quality control and Environmental department.
She studied at the Faculty of Chemistry and Chemical Technology in Ljubljana where she obtained a PhD in the field of analysis chemistry and completed Teacher Education Programme at the University of Maribor, Faculty of Education.
After coming to our company, she took care of the management systems and was responsible for setting the system and acquiring certificates according to OHSAS 18001, ISO 14001 in ISO/TS 16949. In management systems, she is a member of the management for safety and health at work. She is also the lead auditor for the ISO 9001 and OHSAS 18001 standards.
Her work in the field of employee training according to all standards established in the company and transfer of other technical knowledge is of great importance for the company. She collaborated with the Educational Center Štore in introducing e-learning and in the field of education she collaborated with Ljudska univerza Žalec and SGS Slovenia.
In her free time, she likes to take photographs and is a chairperson of the Štore Steel Photo Club. In her community, she is active as a chairperson of the parents' board and member of the school board at Grammar School Celje – Center (Gimnazija Center Celje).
In February 2016, she was appointed Head of Quality Control. She says that working with people fulfils her. Improving Quality control, which supports other organisational units in the company, presents her a challenge, which she will be happy to accept.

Miha Kovačič

He studied at the University in Maribor, Faculty of Mechanical Engineering, from where he graduated in Production Engineering. As a young researcher, he continued his study in mechanical engineering. For his PhD, he chose a doctoral dissertation titled Programming of NC-machines by Evolutionary Computation. For the dissertation, he received a research award for the best doctoral dissertation by the company TRIMO TREBNJE.

After his study, he worked in Štore Steel as a researcher and at the same time also worked in the Production Planning Department. Since 2011, he has been in charge of Quality Control and was responsible for dealing with complaints. In the company, he led or took part in many important research projects, projects of improvements and investments. Among them, we can mention the following: “Calculation of necessary capacities after process for sales of 200,000 t”, “Future of finalising in the Rolling Mill”, “Bundle position detection and control system”, and infamous “Prevention of ductile cracks”. He also worked on nine projects co-financed by ARRS (Slovenian Research Agency) and two program groups. He is among the top five innovators in the company.

He is extremely active in teaching his entire career. His work on occupational guidance of the youth is very important for the company. That is why he conducts workshops “Creativity and innovativeness for the youth” at Educational Centre Štore.
He was habilitated at the University of Maribor until 2012 as an assistant professor in Processing technology and systems and after 2012 at the University of Nova Gorica in Mechanical Engineering, where he also lectures. He is a lecturer at the College of Industrial Engineering in Celje.
His scientific research is mainly in the field of mechanical engineering (machine processing, operating and programming of NC-machines), metallurgy, medicine and computer science (system modelling and optimising by methods of artificial intelligence – genetic programming and genetic algorithms). He is ranked 14th among 9080 scientists in the »Genetic Programming Bibliography index page«.
His bibliography according to COBISS consists of 163 units. He is author of 50 original scientific articles in peer-reviewed journals, 33 of them are original scientific articles in journals with a JCR impact factor. He has been cited 350 times.

Numerical Models in Štore Steel

Numerical models are being used increasingly in industry for process optimisation where they help us a lot with settings of process parameters without interfering with the manufacturing process.

Understanding of the process we want to simulate is of utmost importance for development of a numerical model. We have to find out what physical phenomena appear in the process in advance.

With today's computer equipment, we can simulate processes that include various complex phenomena simultaneously and are interconnected.

In our company, we have successfully implemented a numerical model of continuous steel casting, which was developed by the University of Nova Gorica for an older caster (KN2). It includes only one physical phenomenon - heat transfer in the direction of casting. It enables us to calculate the thickness of the cladding and the temperature on various spots of the billet depending on several process parameters (casting speed, casting temperature, melt level, steel composition, flow, temperature difference in the mould and secondary cooling).

The simulator was verified based on the temperature measurement of the billet surface and cladding thickness. The exactly same numerical model was used to develop a simulator of a new continuous caster (KN3) within the ARRS project “Simulation of Solidification in Industrial Processes under the Influence of Electromagnetic Fields”.

The simulator has been developed. It has to be calibrated by measuring the surface temperature before use. The measurements are being taken at the moment. Within this project, we also started with development of a more complex model of casting which includes calculations of fluid dynamics (Fig. 1. left and centre) and electromagnetic mixer influence (Fig. 1, right).

The model will enable us to study additional process parameters such as immersion and position of the charge and mixer parameters. It will be later used for simulation of inclusions in the mould.

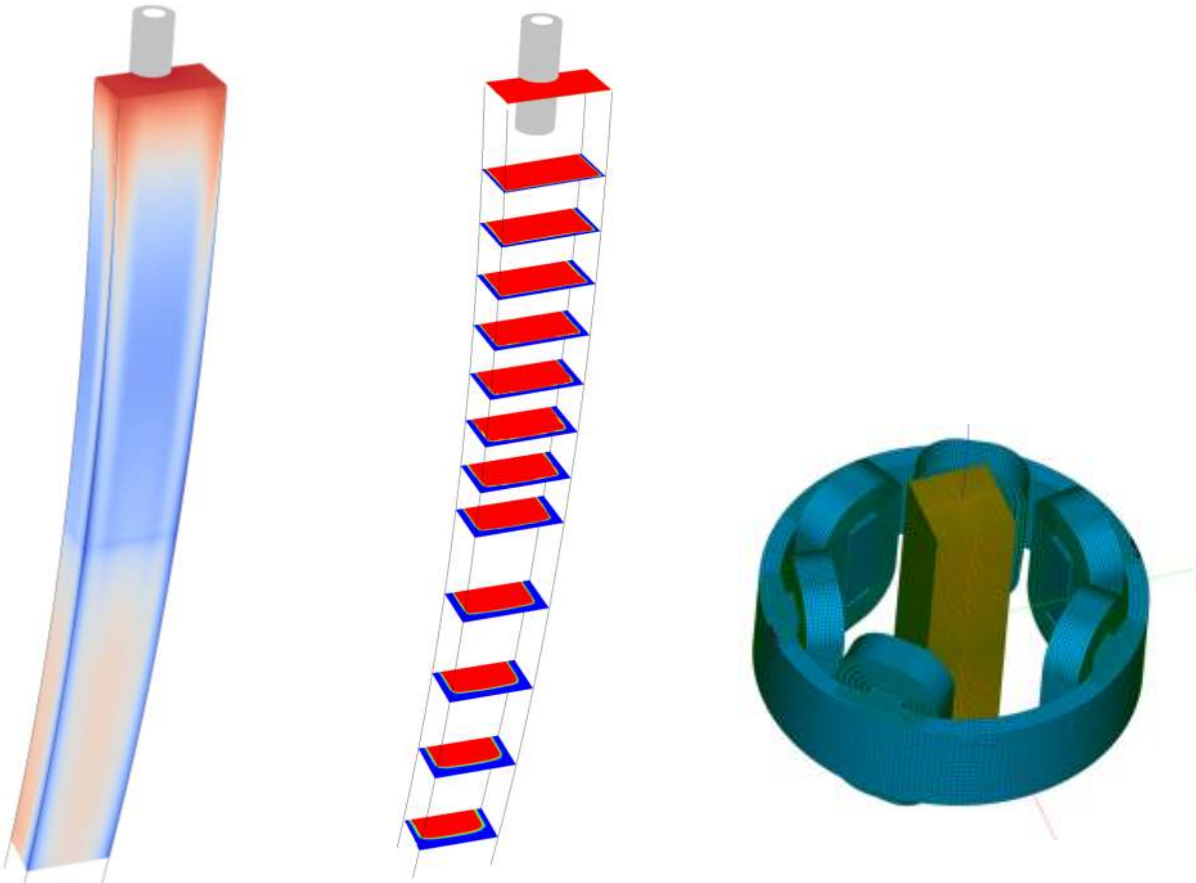


Fig. 1: Example of 3D casting simulation for the new KN3 continuous caster. Left: Temperature field on the billet surface. Centre: Cladding growth dynamics on different spots of the billet. Right: Geometry and Computational mesh of the electromagnetic mixer.

With help of a numerical model, we simulated velocity field of liquid steel in the tundish with impact trough for the new KN3 continuous caster (Fig. 2). This was done within the internal investment project "Optimisation of Flow Conditions and Implementation of Impact Trough in the KN3 Tundish". The main goal of the project is to develop a geometry of an impact trough that will enable creation of such velocity conditions in the tundish, which will keep the melt in the tundish as long as possible. The inclusions will so have enough time to surface. It is also the goal to reduce the mass of the impact trough to reduce the production costs.

A simulator of rolling for the continuous line, which was developed within the project: "Development of a Hot Rolling Simulation System for Industrial Use" at the Institute of Metals and Technology, is also in its final stage. It will enable simulation of flat and round profile rolling according to rolling plans and considering the actual geometry of the passes. The simulator is intended to calculate the deformation and stress field in the rolling stock and further optimisation of rolling plans. It includes an advanced graphical interface that enables simple and quick way of changing the rolling plans and process parameters. (Fig. 3)

dr. Robert Vertnik, researcher

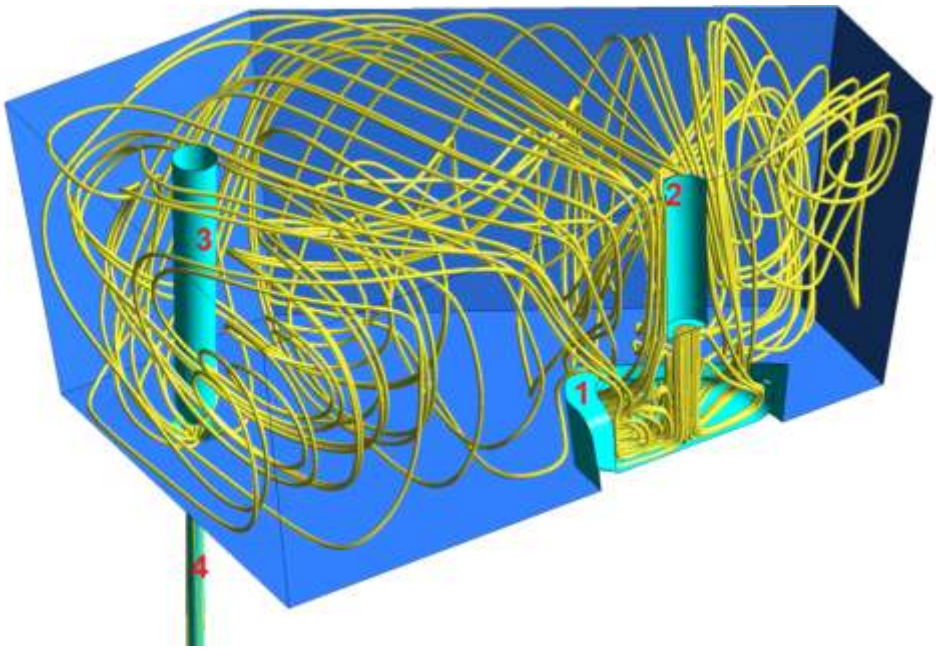


Fig. 2: Calculation result of steel flow in the KN3 tundish with an impact trough "prototype 4". The geometry of the tundish includes: 1-impact trough, 2-shroud, 3-monoblock in 4-discharge. The yellow line presents calculated flow line of steel.

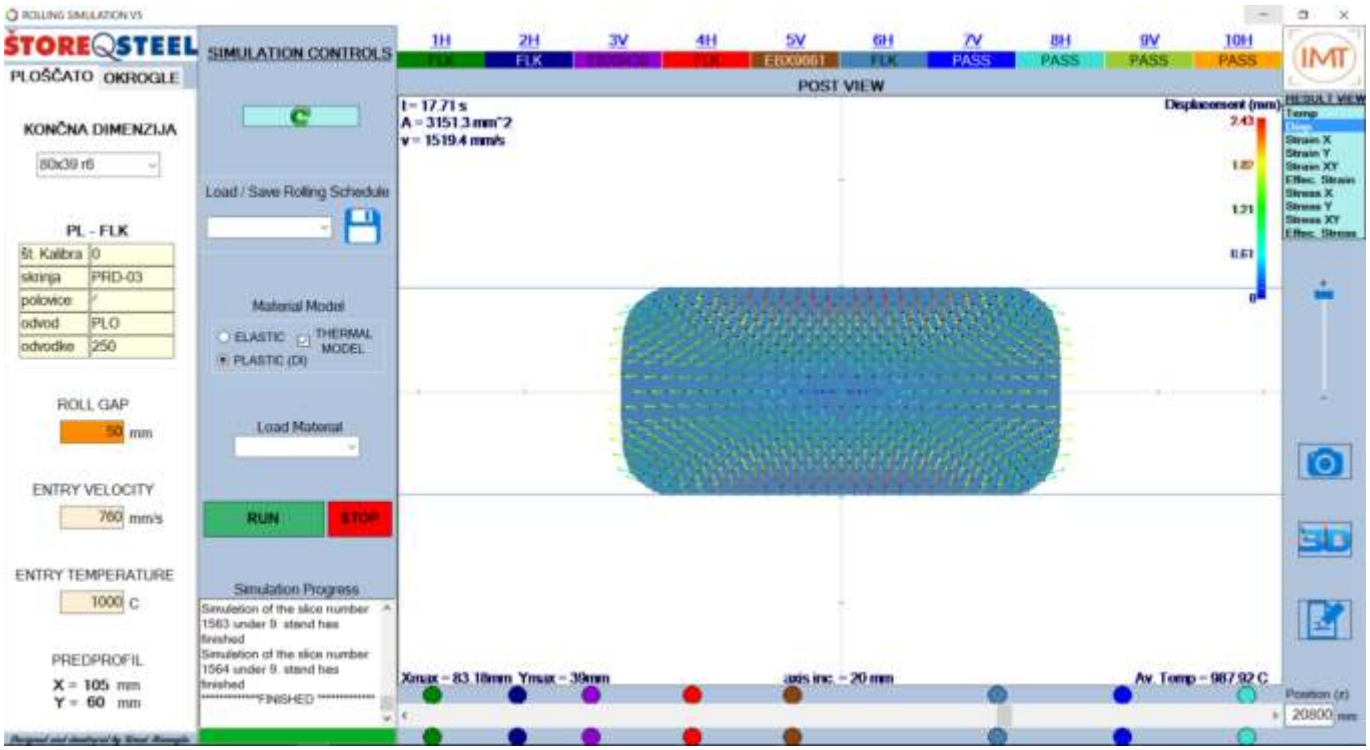


Fig. 3: Graphical interface and simulation example of flat profile rolling.

Replacement of the Stand 650 Electric Motor

The 650 rolling stand installed in 2006 was a pre-line of the 550 line. After shut down of the 550 line, it was moved to a location behind the 800 line and before the new continuous rolling line.

The 650 rolling line was driven by a direct current ASI ROBICON type DH 710 M46 DD4 electric motor with the following data:
1600kW; 632-700V; 2681-2411A; 600-1200min-1
Specified current under load is 2681A but the motor has been already since the start limited to a value 1.6 times larger than the specified current. The current limitation was raised to double the specified value for short-term operation due to more demanding rolling programmes.
The need of higher torque during rolling will keep on increasing according to temperature, quality and processing stage of the rolling stock.
The VOITH SAFESET safety clutch was replaced first due to needed higher torque during rolling. The original one, which could withstand a torque of 56 kNm, was replaced with a stronger one by the same manufacturer that could withstand higher torque (65 kNm).
During the operation time since 2006, there have been two major malfunctions removed. They were due to insulating material deterioration because of constantly raised temperature of the coil and connection fracture between the collector and rotor bars because of mechanical overload. The main problem lies in current surges in the rotor bars and large mechanical load when the rolling stock enters the frame.
The electro motor current limitation was lowered to 1.8 times the specified current after the second malfunction had been repaired. This was done to prevent overheating of the motor coil but resulted in a lower production of more demanding programmes.
Immediately after the first serious malfunction, we started looking for a new motor. Current and torque measurements under load were performed which showed that the existing motor was overloaded. The choice of the new motor was based on these measurements. The choice was also influenced by the existing regulator with its limitations and the existing reducing gear.
A new direct current ASI NIDEC type DH800 M55 ED4 electric motor with the following data was chosen:
2000kW, 670-700V, 3010-3150A, 600-1200min-1
Operation in case of the 800 line electric motor malfunction was also considered when choosing the new motor.
A concept was made to install the new motor together with its reducing gear in the position of the 800 line motor. The existing 1600 kW electric motor drives the 650 line, as was the case until now.
A new 2,000kw electric motor was purchased first. The VOITH SAFESET safety clutch with a specified torque of 80kNm was replaced. The foundation was also adapted to accept the new motor.
The rolling stand of the 650 line has been operating with the new 2000kW electric motor since May 5, 2016 with new regulator settings and limitation of the specified current to a 1.5 times value. With this setting, the new motor gives satisfactory results.
The investment has resulted in steadier run, no coil overheating, the production does not suffer and the reliability of operation has improved.

Rajko Vengušt, maintenance technologist

Photo: Domestic partners in the company - in front of 650 rolling line

Staff Education According to Needs of Employers – Occupational Orientation

Choice of profession is for a child an important decision when they become adult. It is assumed in our society that occupational orientation for primary and secondary school students has already been systematically solved and regulated.

However, it appears to be rather inefficient and unsuccessful which can be seen from discrepancy between labour supply and needs in economy. The situation is generally the same in the EU, where only 17 out of 100 students study in the fields of mathematics, information science, natural sciences and engineering (Gunnar Heinsohn, Sobotna priloga Dela, February 13, 2016). The situation in Slovenia is even worse even though the number of graduates in mathematics, natural sciences and engineering increases. Knowledge and qualification of people in these fields on all levels from vocational schools to doctorates are essential for the development of the economy of a particular society.
The International Council of Academies of Engineering and Technological Sciences (CAETS) believes that engineers are of key importance for an efficient development and management of technologies, innovations and social welfare of the humankind. All major challenges of humankind - sustainable development, energy, food, raw materials, information and communication - demand technological solutions worldwide. Engineers connect natural sciences and technology that is why they have to be educated in comprehensive thinking (Analysis of University Education in Slovenia - Analiza visokošolskega izobraževanja v Sloveniji, prof. dr. Peter Glavič, Natalija Čurič and Anja Dragojlovič, Maribor, August 2014).
Only informing is used as a minimal standard of counselling in occupational orientation in practice. There is detailed data on many various professions at the Nacionalni center za informiranje in poklicno svetovanje (NCIPS) - Vocational Information and Counselling Centre (VICC) and Employment Service of Slovenia. On local level, at regional and local offices, to where we are linked from NCIPS, there are no persons by their name. Telephone number and office hours only.
Besides CIPSs and Career Centres at regional offices there are CIPSs at local evening and secondary schools but they are mostly used to attract candidates for their own programmes without a clear common social strategy. At primary schools, there are professionals carrying out occupational orientation but they are not always trained for occupational counselling to children.

In short, data on number of students entering secondary schools and universities alone show that such systematic regulation does not give wanted results.

Photo: Students of the Department of Materials and Metallurgy achieved at world competitions Steeluniversity Challenge excellent results

For a successful occupational orientation, we have to use ways that work. To really get to know a profession one would have to execute the tasks typical of that profession. That means to get to know the work, solving problems, searching for solutions etc. in real environment or its simulation. The participants should get to know themselves, their skills and talents. The occupational orientation counsellor should encourage development of skills, talents and personal affirmation of the individual. Talents of children have to be mostly developed since their early age. That is how societies that are oriented in development and technologically developed do.

All this won't help us much if we don't integrate these experts into work and creative processes immediately after or already during their education. Let us hope that Slovenia will not become a “country of tied wings”, as was written in Delo newspaper in an article by doc. dr. Julija Hmeljak on June 1, 2016: ”I hope that people in power and society in general will find out that investing in people does not mean anything if these people get their wings tied up at the moment of truth, when they should emancipate and start to be productive and push them in the state of painful vulnerability”.

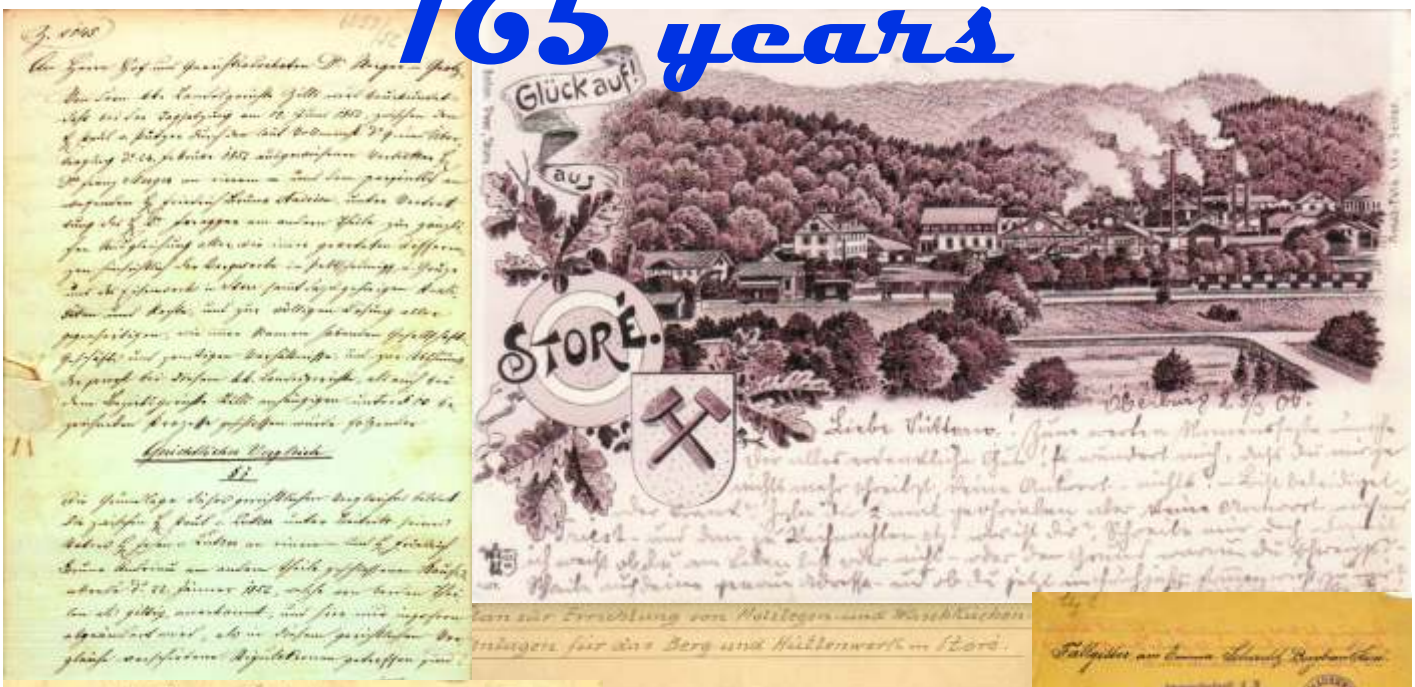
Economy has to play an important role in the process of occupational orientation too. Companies have to take part at all levels of occupational orientation from kindergartens, primary and secondary schools to under- and postgraduate studies. Because of deficiency of applicants with adequate education in the past, our company employed people with non-technical education. We have developed procedures of introduction and training as well as selections. Many an applicant managed to develop skills and talents, for which they had no chance before, because they had chosen a wrong school. INTERACTIVE CREATIVE WORKSHOPS were created as a special form of work with the youth. This workshop represents a form of youth motivation for creative studies and professions in the field of natural sciences, engineering and metallurgy of course. There are cases of work with the youth that we have been executing since 2010 together with Educational Center Štore. With the workshop programme, we join in the research project “The Youth for Celje”.

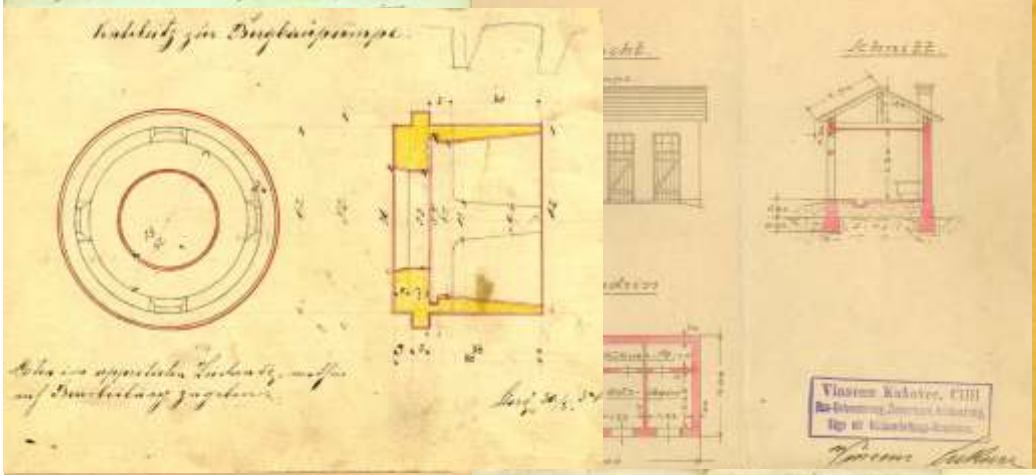
The society has to use different forms of developing talents and qualification in the fields of mathematics, information science, natural sciences and engineering. With such highly qualified people, we will be able to compete in the fields of market niches of economy as is expected in the “Industrial Policy Manifesto” prepared by the Chamber of Commerce and Industry of Slovenia. We have to add that this knowledge is developed systematically from the childhood to adulthood. Unfortunately, they cannot be replaced in adulthood if they were omitted in childhood. Something will have to be done with the so-called lost generations even though it will probably not be possible to train them for demanding fields that will be the most important in the post-industrial society, as every responsible educator would tell.

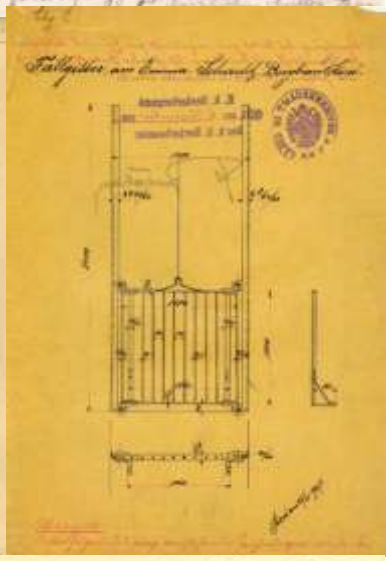
Slavica Glavan, Director of the Educational Centre Štore

Photo: Participants interactive creative workshop of Educational Centre Štore

165 years


Glück auf!
aus
STORÉ.





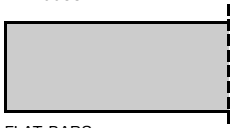

PREIS-COURANT
Berg- und Hüttenwerkes
STORÉ


RUDNIK IN ŽELEZARNA ŠTORE
Delovna karta

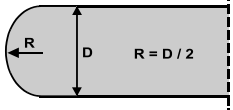

MARTINARNA 93,1%
VALJARNA 110%
LIVARNA 101,9%
SKUPNI OBRAT 99,4%

CROSS-SECTION SHAPES

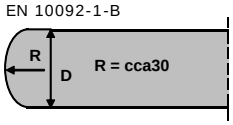
FLAT BARS WITH SHARP EDGES
EN 10058



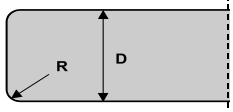
FLAT BARS
EN 10092-1-A



FLAT BARS
EN 10092-1-B

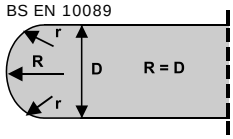


FLAT BARS
EN 10092-1-C



FLAT BARS
EN 10092-2

FLAT BARS
BS EN 10089

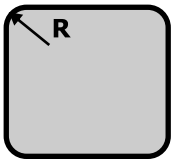


SPRING STEEL:
EN 10089: 51CrV4, 52CrMoV4, 56SiCr7, 56Si7, 61SiCr7, 55Cr3
WNr.:1.5025: 51Si7
WNr.:1.7792: 58CrMoV4

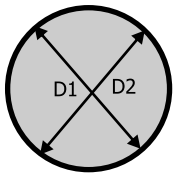
ENGINEERING STEEL:
Forging steel:
EN 10025-2: S355J2, S235JR
EN 10083-2:od C22R, C35R, C40R, C45R, C50R, C55R, C60R
EN 10084: 16MnCr(S)5, 20MoCr(S)5, 20MnCr(S)5
EN 10083-3: 30MnB5, 25CrMo(S)4, 34CrMo(S)4, 42CrMo(S)4,
DIN 17350: 31CrV3, 51CrV4
Carbon steel – for case – hardening:
EN 10084: C10E, C15E, C10R, C15R
Alloyed steel - for case – hardening:
EN 10084: 17Cr3, 16MnCr5, 20MnCr5, 18CrMo4, 20MoCr4, 17CrNi6-6, 20NiCrMo2-2, 18CrNiMo7-6
Carbon steel – for hardening and tempering:
EN 10083-2: C22E, C35E, C45E, C55E, C50E, C60E
Alloyed steel - for hardening and tempering:
EN 10083-3: 30CrNiMo8, 34CrNiMo6, 34Cr4, 41Cr4, 25CrMo4, 34CrMo4, 42CrMo4, 50CrMo4, 51CrV4
Structural steel:
EN 10025-2: S235JR, S275JR, S355J2, E295, E335, E360,
Steel for welded chains:
DIN 17115: 27MnSi5, 20NiCrMo2, 23MnNiMoCr54
Steel for cold forging:
EN 10263: C4C, 17Cr3, 17CrNi6-6, 18CrMoS4, 34CrNiMo4, 20NiCrMoS2-2,
38Cr2, 34Cr4, 37Cr4, 41Cr4, 16MnCrS5, 20MnCrS5, 25CrMo4, 34CrMo4, 22B2
Alloyed steel:
WNr.:1.5231: 38Cr4
EN 10083-3: 30CrNiMo8, 34CrNiMo6, 34CrS4, 37CrS4, 41CrS4, 25CrMoS4, 34CrMoS4, 42CrMoS4, 50CrMo4, 51CrV4
EN 10085: 31CrMoV9
Structural steel for housings of bearings:
DIN EN ISO 683-17: 100Cr6, 100CrMnSi6-4
Steel for heavy duty automotive parts:
WNr.:1.5231: 38MnVS5
VW-TL 1427: 27MnSiVS6, 27MnSiVS6+Ti, 30MnSiVS6
VW-500-30: 36MnVS4, 70MnVS4, 46MnVS5

EXEM STEEL WITH IMPROVED MACHINABILITY:
po WNr.: 20MnV6 EX, 38MnVS6 EX, 30MnB4+Ti EX
EN 10084: C15R EX, 16MnCrS5 EX, 20NiCrMoS2-2 EX, 20MnCrS5 EX,
EN 10084 in UNI 7846:16CrNi4 EX,
EN 10025-2: S235JR EX, S355J2 EX,
EN 10083-2: C22R EX, C35R EX, C40R EX, C45R EX,
EN 10083-3: 25CrMo4 EX, 41CrS4 EX, 42CrMoS4 EX
UNI 7845: 39NiCrMo3 EX,
UNI 7846: 18NiCrMo5 EX,

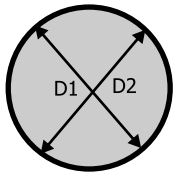
SQUARE BARS
WITH ROUND EDGES
EN 10059



ROUND BARS
EN 10060



BRIGHT ROUND BARS
EN 10278



SQUARE

Dimension mm	Radius mm
40 x 40	6
45 x 45	6
50 x 50	6
55 x 55	8
60 x 60	10
65 x 65	10
70 x 70	10

FLAT

Standard	Dimensions mm
EN 10058	50-200 x 8-62
EN 10092-1-A	60-150 x 8-36
EN 10092-1-B	50-200 x 8-35
EN 10092-1-C	60-120 x 14-67
EN 10092-2	120 x 12-20
BS EN 10089	60-120 x 27-42

ISO 9001
ISO 14001
OHSAS 18001
BUREAU VERITAS
Certification
N° 214241 / N° 221243 / N° 224323

ISO/TS 16949
BUREAU VERITAS
Certification
N° SLO - 16561/TS

ROUND

Standard	Diameter / Process
EN 10060	20–68, 70, 72, 73, 75, 77, 78, 80, 82, 83, 85, 90, 95, 100, 105 mm / rolled
EN 10278 (h11)	18–105 mm / peeled
EN 10278 (h9)	18–100 mm / peeled

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