ŠTORE Q STEEL

Internal information magazine, No. 1 - 14

The review company in the last ten years

Few days ago I was surprised to see, that over the last ten years we have employed 322 new employees, which represents 61 % of the today's employees.

In the photo: a group of employees who were accepting and guiding the visitors to the Open Day on 7 June

We have selected them carefully, we trust them and we believe they are the potential of further development of our company. Today we have 12,7 % highly educated employees which have VII. level of education. Ten years ago the share of highly educated employees was 6,3%. The generations of our present employment structure are also more unified. Since we are aware of the diversity of the generations, we are trying to bind different views and respect them. Within the last ten years we have invested 70 mio eur in production equipment. We have developed a series of new steels.

Ten years ago our sales were 118 thousand tons of steel per year. After the year 2004 there were a few years of growth in demand, but afterwards we were affected by a huge crisis. Today the sale is increasing again above 125 thousand tons per year.

We export 71% of our products today, ten years ago the export was 57%. We have increased the sale of engineering steels from 45% to 56% and the sale of Exem steel from 5% to 7%. There is also an increasing share of final products in our company. The sale of steel products which are also reformed after the rolling process is over 35 thousand tons per year.

Marjan Mačkošek, Managing Director

On the cover: a look at the company from an airplane

Open Day - 7 June 2014

Production increase and new products at Cold Finishing Plant

The vision of the Štore Steel company is to achieve a higher degree of finishing and therefore increasing added value, which along with the market and the Drawing Plant's production program are continuously encouraging us to develop new products.

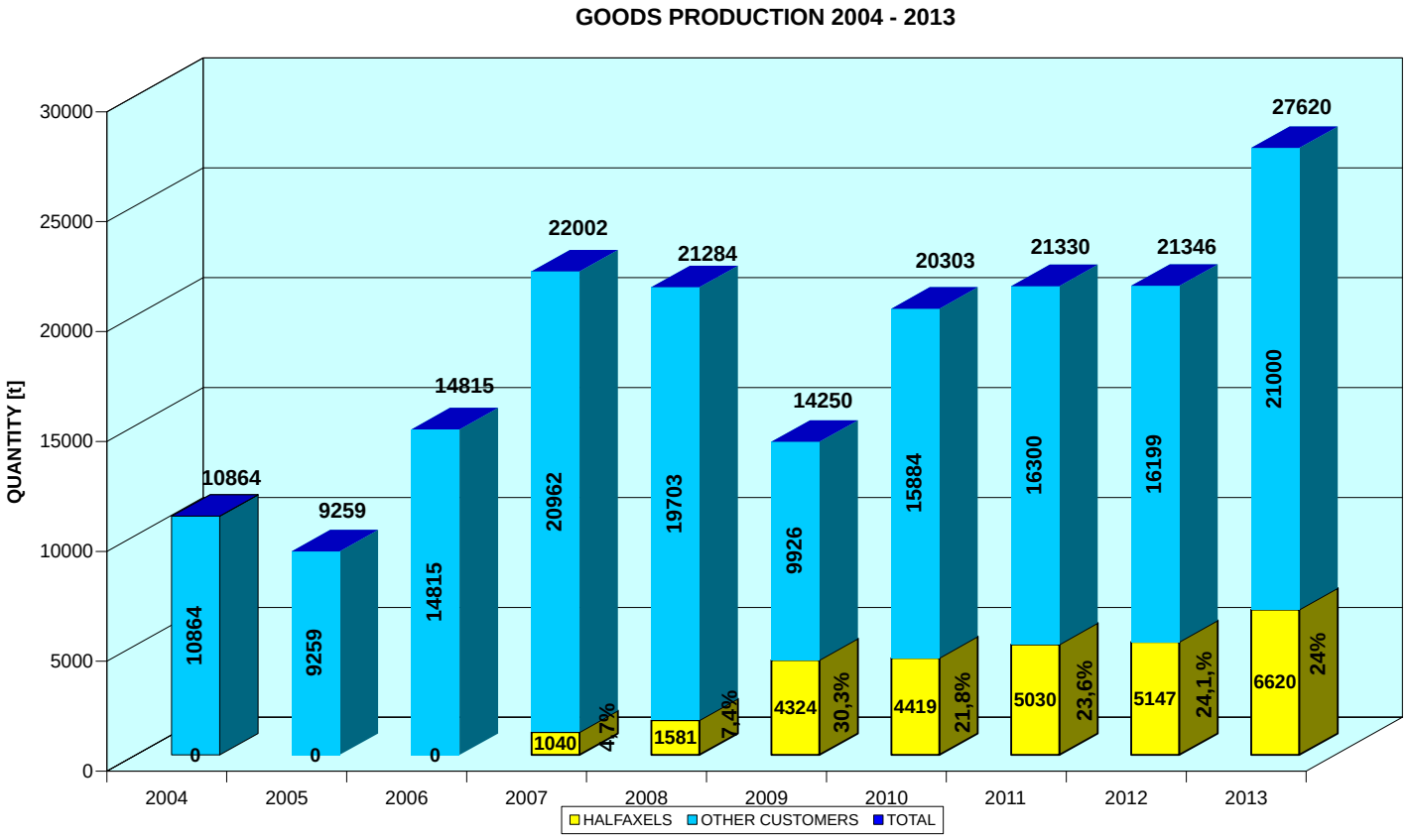


Chart 1: Production quantities in the last ten years.

Besides increasing the production we have development of peeled steel finishing on the one hand and finishing of rolled steel on the other hand.

The production program in the Cold Finishing Plant (Steel Drawing Plant in the past) has practically changed completely since the beginning of the plant. The basic products of the production program in the '80s and '90s were drawn steel (standard and special profiles) and ground steel (spring steel), but today peeled steel is the main product. Until last year drawn steel was produced in small quantities besides peeled steel. Due to increasingly smaller demand in the market and outdated equipment (competitiveness problem) the management decided to stop the production and sales of drawn steel.
The equipment is disinvested, which enables spatial possibilities for the expansion of peeled steel production and finishing. Orders for peeled steel namely increased heavily in 2013 – for almost 30% compared to 2012.

The 2013 production of almost 28,000 t (27,620) was the highest in the history of the plant (until now it was 22,002 t in 2007). The trend when compared to 2013 is continuing in this year too.
The production from 2006 to 2013 is shown in chart 1. The chart also shows the production increase for half-axle steel from 1,060 t in 2007 to 6,620 t in 2013, which means that last year 3,300,000 half-axles were produced and delivered in approximately 6,620 containers.

PEELED STEEL FINISHING

The production of peeled steel for car half-axle production is namely the motor of further development of peeled steel finishing. Years ago we started marketing a small part of half-axles with center bores (additional processing), but now there are new challenges ahead of us.

In March we manufactured a test run of 1,200 pieces of half-axles, which are shown in the image1. The axle finishing was outsourced. In the second half of the year regular production in quantities of 1,000 pieces/month is being planned. A decision for a new investment in equipment for finishing these axles in our plant depends on further orders.
An even bigger challenge is a potential of complete half-axle manufacturing (machining and thermal treatment), image 2. Half-axles, manufactured this way, are already prepared to be installed into automobiles.
Talks with the buyer are already in progress, but there are investments of approximately Ä2 million necessary. Production of 5 million half-axles would be feasible in the years 2015 to 2020 – approximately 1 million a year. 10,000t of peeled steel would be used and turnover of Ä31 million made.

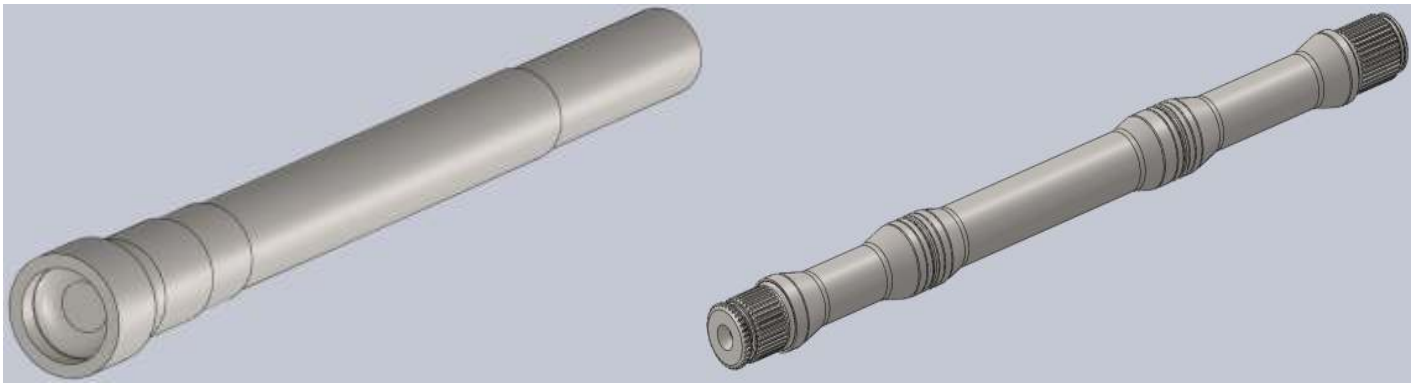


Image 1: Turned axle, a test run of 1,200 pieces has already been manufactured. Image 2: Final half-axle

It can be seen from the table below how to enrich (higher selling price) peeled steel by additional processing. The base is peeled steel 6m in length for half-axle manufacturing.

Product	Peeled steel	Cut steel – half-axles	Half-axles + centre bores	Cut + processed Image1	Finished axle Image 2
Selling price	830 EUR/t	900 EUR/t	1.150 EUR/t	1.600 EUR/t	3.100 EUR/t

Another way of creating added value is, besides finishing half-axles, manufacturing of cut pieces from peeled steel for cold forging, which we have also started manufacturing. If length tolerance in tenths of mm is essential at the half-axle cutting, then weight tolerance in grams is essential at cut pieces for cold forging. We have namely bought a circular saw for cutting pieces for cold forging from our customer UNIOR through a leasing contract. We have upgraded it with automatic weighing. From now we will manufacture for them 800t of cut pieces per year. The rest of the capacity will be filled up by other customers. Logistics is done by containers too.

ROLLED STEEL FINISHING

In addition to finishing peeled steel there is a certain amount of rolled steel finishing in the Cold Finishing Plant too. Here circular saws are mainly used for cutting flat spring steel. When the recession began and industrial activities plummeted in 2008, the sales of cut flat spring steel in our company decreased from 30,000t in 2008 to only 10,000t in the next years. That is why we tried to fill up the free capacity, particularly on one saw, by cutting round rolled steel. By innovative approach we managed to enable one saw for this kind of cutting, where the cut pieces are collected in containers. At present we are cutting approximately 60t of round rolled steel per month in lengths from 50 to 300mm for various customers.
Cutting and processing of half-axles as well as cutting of rolled steel to containers present a major logistic process. It includes everybody from the Sales and Production Planning and Control Departments, Rolling Plant, Cold Finishing Plant and Storage and Transport Centre. Number of pieces is more important than weight in this case. With this production we develop logistic processes based on orders in number of pieces and container logistics (labelling, storage and transport).

That is our way of following the demands of the customers and our joint goals with the objective to enrich our steel by additional processing and to create a higher added value i.e. profit. That is also the case with the delivery of cut flat spring steel for the Muellas customer, who want to have besides cut steel, bores done on each piece. The first quantities have already been delivered and now approximately 4,000 pieces (120 t) are being ordered each month. The boring is at present being done by ISI, company for the handicapped. There is a solution ready to perform the bores at our plant. It is planned to do the boring in the autumn ourselves. The annual demands of the customer are approximately 4,000t.

Alojz Gajšek, Head of Cold Finishing Plant

Renovation of the chemical laboratory

The chemistry laboratory has been located in the hall of Štore Steel since September 1995. It moved there from the location in Lipa, where it occupied together with the metallurgic laboratory the whole ground and first floor of the building.

In the then laboratory in Lipa there were 39 workers employed in average. The laboratory conducted analyses for the steelworks, two foundries, drawing plant, energetics department, and a few years before for the electro furnace.

After the disintegration of Štore Ironworks both foundries purchased equipment and started conducting analyses alone. Five employees moved to the area in the hall of the steelworks where in an area of 35m2 a new process laboratory for the needs of the steelworks was formed. This laboratory had three areas, sample reception and preparation area, where there were a small workbench with a vice, a drill press, three grinding machines and a cutting machine; a bathroom and an area, where there were the new optical emission spectrometer, the moved optical emission spectrometer and a carbon and sulphur analyser. The employees had hardly room to move because of all the instruments and equipment. Daylight came to the room only through a dusty diffused window with a double mesh, which was behind the analyser. There was no inflow of fresh air.

Soon a part of the classical chemistry laboratory with one employee joined the process laboratory and was located in the decarbonisation building, in Petrol Energetika. Sample preparation for wet chemical analysis was formed on the ground floor next to the container for waste calcium carbonate from decarbonisation. On the first floor, which can be accessed only through a narrow curved staircase, the classical, wet chemistry laboratory was formed, which was used for the analysis of steel slag, industrial and waste water, machine emulsions, lime, coke and carburized agent, ferrous alloys as well as for wet analyses of steel and ferrous alloys.

The number of employees in the new chemistry laboratory varied in the years 1995 to 2013 between 5 and 6, depending on the speed with which the retired co-workers were replaced. After 2013 the laboratory got two more co-workers.

The chemistry laboratory is equipped for analysing steel production batches. This is made possible by an analysing instrument called optical emission spectrometer or quantometer, which can simultaneously analyse 30 elements in a steel or ferrous alloy sample. The first datum is available 50 seconds from the beginning of the analysis. Steelworkers deliver the steel samples to the laboratory in a glowing condition. These samples have to be cooled in water to room temperature before preparation. The sample preparation for analysis consists of boring and grinding. The sample, ready for analysis, is simultaneously analysed in the optical emission spectrometer and CS (carbon – sulphur) analyser. The time from the receipt of the glowing sample to delivery of results is up to 5 minutes.

In 2000 the laboratory gained another 20 m2 and we were able to purchase an instrument for analysis of hydrogen and oxygen content in steel. In 2011 we also placed into this room a gamma ray spectrometer for testing radioactive contamination of steel after melting scrap iron.

Photo above: The new part of the chemistry laboratory dedicated to wet , classical chemical analysis.

The personnel of the chemistry laboratory have always taken care for the quality of work done and quality analysis results. That is why we soon after the move in 1996 provided that all the analysis instruments were connected by computers and enabled computer processing, storage and distribution of analysis results. Systematic and statistical control of analysis equipment maintenance and setting were made possible too. We were among the first to implement the ISO 17025/1999 international standard, soon after it had been published, which was possible due to the computer data processing system that had been introduced. Without the system it would be impossible to master around 500,000 analysis pieces of data, which are produced annually in the chemistry laboratory.

It is of utmost importance to ensure the quality of chemical analyses in the chemistry laboratory by traceability of analysis results according to national and international physical and chemical standards. Traceability is ensured by calibrating all the measuring instruments by a set of certified, referential samples. We are not satisfied by the settings done by the analysis equipment suppliers, and we perform our own analysis methods (programmes) for the analysis scope that is needed by Štore Steel d.o.o. in their production program.

Since 2005 we have twice a year taken part in the international scheme of inter-laboratory comparative analyses, which are organized by the American Society for Testing and Materials International (ASTM), to validate the quality of the analysis work in the field of steel chemical analysis. More than 100 industrial chemistry laboratories and institutes from all continents take part in this scheme. We are always placed in the top third of the laboratories taking part according to results. We also take part in the international scheme of inter-laboratory comparative analyses, which is organized twice a year by the Institute of Chemistry in Ljubljana for the field of waste water. We are very successful here too.

Separation of the laboratory in two locations proved to be the greatest disadvantage besides occasional personnel deficiency. It prevented better work organisation, connection between individual segments of chemical analysis work, better use of laboratory equipment and cooperation between the employees. Last year there was a major improvement in this segment, when we managed to expand the chemistry laboratory for 45 m2. It gave us the chance to move the preparation of classical chemical samples and the wet chemistry laboratory to the new area, which was built in October 2013, next to the old process laboratory area. This enabled us together with the transfer of the laboratory entrance and transfer of the gas station from the steelworks hall to the road side a better protection of the chemistry laboratory area from dust coming from the steelworks hall and which affects the measuring equipment badly.

Lately there has been great pressure on the chemistry laboratory to increase the number of sample analyses of side products in steel manufacturing and analyses of materials, which are added to steel to regulate its chemical and mechanical properties. With the present equipment it is impossible to follow the demands. These analyses are namely executed by slow, wet chemical procedures with high workload. A purchase of a new analysis instrument is being prepared, which will be capable of fulfilling these demands. According to the opinion of an expert team the Laser-Induced Breakdown Spectroscopy (LIBS) system is the most appropriate. When compared to an X-ray fluorescence system it is capable of determination of elements from the upper periods of the periodic table. It is distinguished by simple sample preparation and speed of analysis. It doesn't require any chemicals and is therefore environmentally friendly. Of course sample preparation equipment that will be fast enough for the new instrument will have to be purchased too. The chemistry laboratory equipped in this way will not only fulfil the demands of their clients but will cover demands for analyses in the near future too. This will be made possible by space, equipment and the experienced personnel, employed in the chemistry laboratory.

Jože Hebar, Head of the Chemical Laboratory

Above left: Entrance from outside to the chemical laboratory. Above right: room with the spectrometer.

Finalization and Automation in the Cold Finishing Plant

In the Cold Working Plant we have in this year managed to acquire a new automatic packaging line and a circular saw for automatic cutting and weighing, intended mainly for cold forging products.

The first acquisition enables higher productivity at the control line and adjusting and improvement in work humanization without increasing the number of employees. The control line and adjusting are namely bottlenecks in case of a very increased production coming from the two peeling lines. The second acquisition presents a higher level of finalization and at the same time a larger added value of our products.

Automatic packaging and weighing line

The manufacturer of the whole packaging line is the SAS firm from Italy. The main installed packaging part comes from the renowned SIGNODE firm. The whole investment totaled Ä233,000.
The line comprises a loading part, main packaging unit and output part with weighing scales and a depot for finished packed and weighed bundles. It enables weighing of bundles between 500 and 3000kg and 3 to 8m in length.
The workflow on the automatic packaging line:
The bundle is transported from the control line or other manufacturing facilities to the input part, where it is dropped to the form pocket, which later enables easier forming of the final round bundle. The worker activates an automatic cycle and starts the automatic packaging cycle. The bundle is moved forward to the output line, hydraulic claws compress the front part of the bundle into a round shape. At the main part of the machine are then all the needed steel bands with or without the supporting paper set and the bundle is being moved forward simultaneously. After the last band is set, the bundle is transported and placed onto the scales. Weighing is performed automatically on the scales and the bundle is then transported to the depot bench. Its capacity is from three to six bundles – depending on length. The whole procedure, from the start of the automatic cycle to weighing can be executed automatically; the worker is during this time free to prepare the next bundle – on the control line or directly from the production. The worker has to place the already printed labels to the bundles at the depot or during the operation.
By acquisition of this machine we have made a lot of manual packaging with the hand wrapper redundant. We have reduced the packaging time, the number of crane operations, which partly eliminates the problem of crane congestion, because it is no longer necessary to carry every bundle to the scales, the packed bundles are collected at the depot and can be several at a time carried to the sales warehouse.

Photo: trial operation of automatic packaging line

Circular saw with automatic weighing for cutting pieces

The circular saw was manufactured in 2010 by the renowned world manufacturer AMADA from Japan, but it is in a very good condition. It was used to cut short pieces for cold forging in Unior and they offered it to us. Now we can deliver them cut material, we used to deliver peeled material in long bars in the past. We used this occasion to upgrade it with automatic weighing and sorting of cut pieces. The total cost of the project was Ä93,400 and will be paid by deliveries of cut products for cold forging to Unior in the next five years.

The machine consists now of the saw with loading bench, output sorting transporter and precise scales (max. accuracy 1 gram) for weighing the cut pieces. The complete procedure of cutting, weighing and sorting is completely automated. The worker only sets the long bundle to the loading bench, turns on and sets the saw and the scales and can start the automatic mode.

The saw with the sorting and weighing unit enables automatic removal of front and end waste pieces and sorting to three groups – good products and the ones that are too easy and too heavy. The pieces that are too heavy can be namely redone and used as a good product. The whole machine is computer guided and programmed to automatically stop in case of interruptions at the saw or scales. The machine also stops in case of several bad pieces in succession. In doing so a larger number of bad pieces cannot be cut. Occasionally the length has to be corrected considering the change in the input bar diameter, which enables us to stay within the set weight.

The advantage of complete automation is in the fact that it enables the workers to monitor and operate the machine from the adjacent circular saws for half-axle cutting.

This circular saw will be used to perform cutting for other customers as well. The saw with automatic weighing enables cutting of diameter 20 to 100mm in shorter lengths with a weight limit of 3 kg per piece.

Štefan Zidar, Head of Processing, Cold Finishing Plant

Photo: data from the display on the circular saw are clearly visible even from afar

Intergenerational cooperation in Štore Steel

Our company has employed a great deal of younger coworkers in the past few years. The young people keep on bringing new knowledge and ideas to the company and the mature generation possesses valuable expert and managing experiences and values that have contributed to the existence of the company through various periods.

It is up to us to adequately combine and use this new knowledge and ideas on the one hand with experiences and values on the other hand.

We at Štore Steel are aware that the success of the company depends on everybody, but first of all on a good cooperation between generations. And that is why we have decided to take a systematic approach to connecting our employees and to perform trainings with the aim to achieve better intergenerational cooperation and to encourage the younger generation to increase the sense of belonging to the company.

In May we organized three workshops on the theme of intergenerational cooperation, which were attended by employees of all generations. The main goals of the training were: 1. to find synergies of intergenerational cooperation, 2. to transfer knowledge and experiences, 3. education of successors and 4. to increase the sense of belonging of the young generation.

There are coworkers of three generation periods in the company (the period definitions may vary by a few years):

- Baby boomers, born between 1945 – 1965,
- generation X, born between 1965 – 1980 and
- generation Y, born between 1980 – 2000.

Each generation is defined by certain values, but there are differences among individuals within the same generation. The differences are influenced by different surroundings and conditions in which it grew up. The differences among generations are big and affect the work of the individual in the company. Generations differ according to the style and way of communicating, way of work, style of management, attitude toward authority, way of work in a team, different separation of private and professional and have different views on motivation and awards. It is important to know that no generation is better or worse when compared to the other two. Each has its own characteristics, values, advantages and disadvantages.

How is the company to unite these seemingly different approaches and ways of work and achieve a good intergenerational cooperation?

Workshops were based on teams, which were occasionally composed of mixed generations and occasionally of a single generation. The teams introduced their views openly, positive and negative ones, and tried to find a way to improve the integrated work.

The main emphases of the team work were as follows:

- definition of positive characteristics of each generation,
- to define which characteristics the other two generations miss with a certain generation,
- definition of goals and mission of each individual generation at Štore Steel,
- to name the ways how to realize these goals,
- to define how to fulfill other generations' expectations in the company and
- how to ensure the sense of belonging of the young generation at Štore Steel.

Photo: Workshop on intergenerational cooperation

In the last and essential part of the training we were trying to find out which knowledge should be reasonably transferred from the older coworkers to the younger ones (and vice versa) and how to effectively raise successors. We have confirmed to ourselves that we want to learn from each other, because it is fact that we will cooperate in our working lifetime with members of older and younger generations and it is up to us to understand expectations we have toward each other.

The younger generations will try to continue the successful work on the jointly set up route. By accepting the knowledge of our older coworkers and joining actively in the problem solving we will gather knowledge which is essential for the realization of common goals. By adequate cooperation and trust we will increase the sense of belonging to the company.

There may be some other essential conclusions that we confirmed at the training:

- it is necessary for success and long-term development of the company to coexist with the local community and to connect with our surroundings in good and bad times,

- we have to respect and preserve our industrial and cultural heritage,

- it is important to integrate and connect, because all the links in the chain are equally important for the final result,

- we have to be open to the younger and older generation when transferring knowledge and experiences,

- at work we have to aim for efficiency and innovativeness, but should not forget to act responsibly and in a cooperating manner.

The reactions of our employees to our workshops were positive. They particularly emphasized full cooperation and good communication of all the participants. They were mostly impressed by the active team work, practical examples and motivation of the participants for work and the relaxed atmosphere of them all.

We believe that we have gained a lot with these workshops, mostly due to our readiness for cooperation. We have proven that all three generations in the company are connected and that we are aware of the expectations we have toward other generations. To put it simply - we work together well and are a good team.

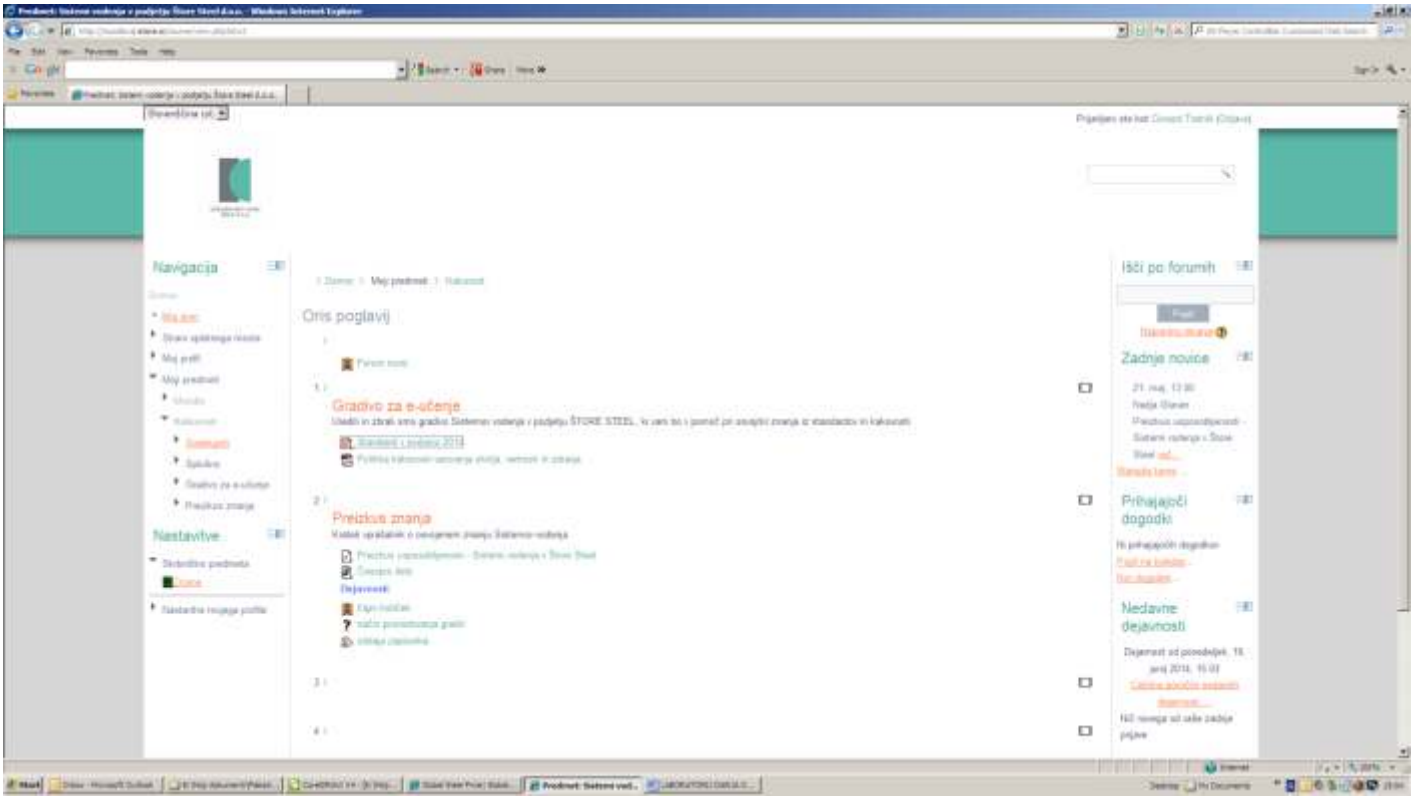
Maybe just one more remark – the lecturer mentioned to us during the preparation of the workshop's contents that we are one of few companies, which are in these difficult times thinking so systematically and long-term oriented about education of successors and is taking care of connecting the employees to encourage the sense of belonging of the young to the company.

Marija Lukež, Human Resources

Photo: Workshop on intergenerational cooperation

Introduction of e-learning

At the beginning of this year we started gradually introducing eLearning, which will supplement and modernize the educational system and training of the employees in the company.



The decision for the introduction of eLearning has been accepted as an answer to fast and continuous changes, which demand quick adaptation by the employees and which is connected with permanent learning. The development of information technology doesn't change only the need for knowledge but learning habits too. eLearning represents education, training and upgrading by means of modern information and telecommunication technology. The transfer of learning materials is fast and simple, because it is interactive. It is more user-friendly from the standpoint of learning participants, because each individual can decide when to educate himself/herself and can adapt these activities to the work process. The main advantage of eLearning is the fact that enables the company to educate the employees in a fast, simple and efficient way in different fields (e.g. ensuring quality standards, basic metallurgic knowledge, personal data protection, internal rule books, expert procedures etc.). The contents, communication and all the other educational activities between participants and coordinators of eLearning are in electronic forms.

We have prepared starting points in cooperation with the Educational Center Štore to introduce eLearning and decided to create a Moodle based web classroom, which will allow access to every employee with an email address. The link to the Web classrooms of the Educational Center Štore is located on our Infonet.

Already in January we qualified as a pilot project the first group of employees in the company – 43 internal judges, who were among the first to access the educational material through the web portal, which will serve them for preparation before the judgments of quality standards. The first performed eTraining was entitled Management systems in the Štore Steel company, the participants were after the training bound for the final exam, which was also performed over the web in na e –form.

In the next step we invited all the employees from the Quality Assurance Department and other non-production employees, who have a company email address to attend training in the field of quality standards. They also tested their acquired knowledge through the final questionnaire, which they filled out through the web. At present there are 135 employees in the company qualified to use web classrooms, which represents one quarter of all the employees in the company.

Photo: display of the online classroom

In the second half of the year we are planning to carry out a training program in an e-form on the subject of Basic Metallurgic Knowledge, which will be intended for the newly employed and workers without metallurgic and metalworking education. The goal of the training is to eliminate the lack of knowledge and skills in production processes and achieving expected competence for performing individual work tasks. The program will be set up rather widely and will include topics like metallurgy and material basics, steel forming, heating and heat treatment of steel, material examination, introduction to maintenance, knowledge on information communication technology for production control and demands in the field of quality, occupational health and environmental care.

The program will cover a theoretical part, which will be gone over by the expected participants in an e-form and a practical part, which will run in the production under control of practical training instructors. The Basic Metallurgic Knowledge program will enable us to perform a test of combined training, where the theoretical knowledge gained in an e-form, is upgraded by practical training.

We give great emphasis in the company to the programs of periodical internal training. These are trainings for efficient and quality performing of work in the process of production. That is why we are in this field henceforth planning to carry out a part of education in an e-form. The eLearning system will be gradually developed and upgraded and the visitors of eClassrooms will be offered different trainings with varied educational contents.

We believe that eLearning will prove its advantages because of flexibility, which will enable the performance of education, when the working process allows it.

eLearning will become as an educational form an important element of our internal educational system. Education in a classic form in a classroom with a lecturer of course remains – perhaps only supplemented with e-contents. The company's goal in this beginning stage is mainly to establish an adequate surrounding to combine and supplement the classical learning with eLearning of our employees.

You can access the web classroom of the Štore Educational Center on our Infonet or at the web address: http://moodle.ic-store.si/

Marija Lukež, Human Resources

Slavica Glavan, director of the Educational Center

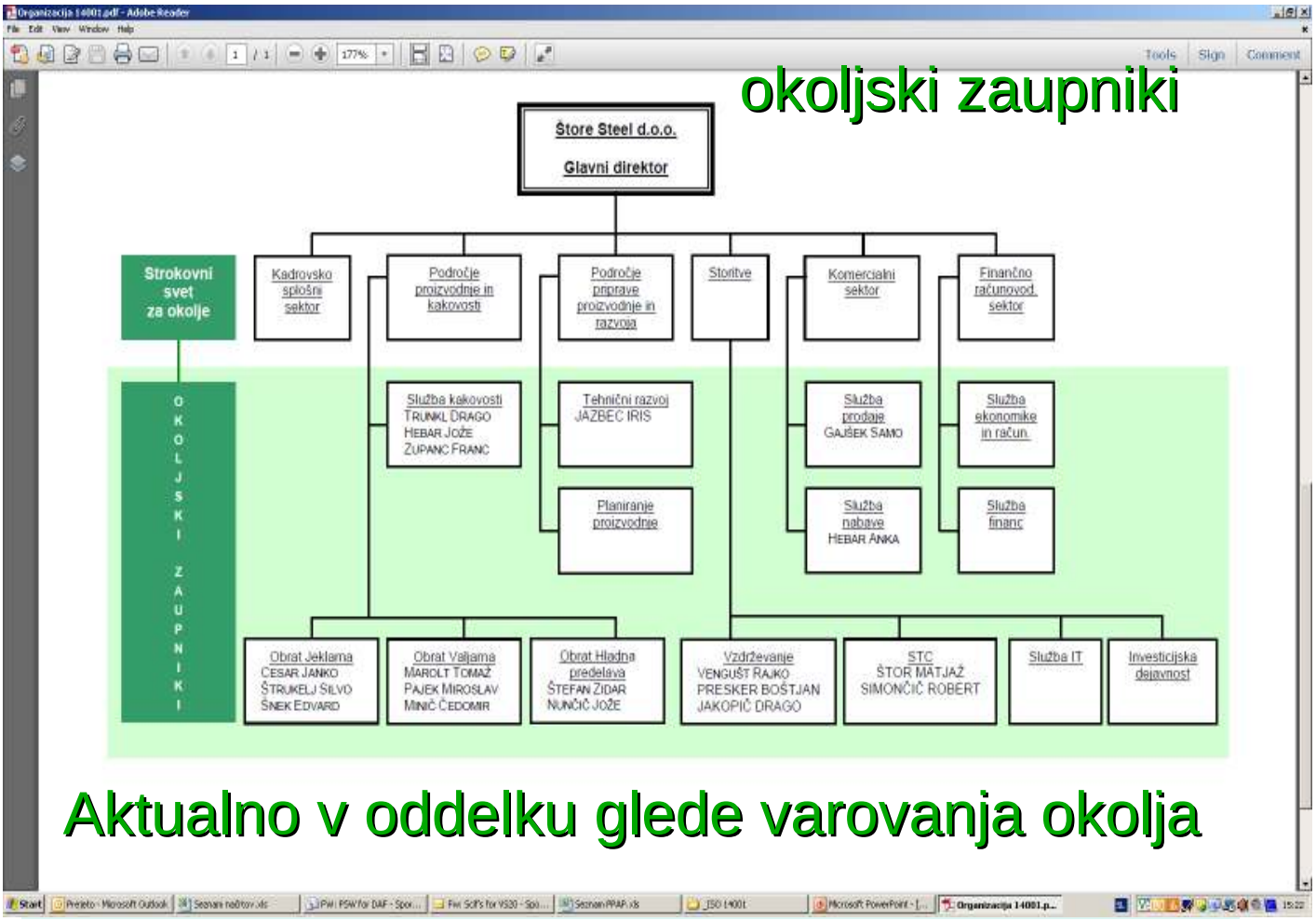


Photo: material for first implementation of the learning and testing in the online classroom

Renovation of the Metallurgical Laboratory

There are two units in the metallurgical laboratory, which are functionally separated: metallographic and mechanical laboratory.

The metallographic part executes:
- Sample cut and preparation,
- Preparation of billet samples for the Baumann print and their macro etching,
- Macro examinations of billet slices (Baumann print and evaluation of etching plates) according to ISO 4968, ISO 4969 and ASTM E 381,
- Heat treatment,
- Heat treatment for the mechanical part of the laboratory,
- Determination of decarburization according to ISO 3887,
- Determination of non-ferrous inclusions according to ASTM E 45, DIN 50602, ISO 4967 and NF 04-106,
- Determination of grain size according to ASTM E 112, ISO 103 and EN 103
- Determination of carbide sizes according to SEP 1520,
- Determination of banding grades according to GOST 5640,
- Determination of blue fracture according to ISO 3763 and
- Microstructure examination.

The metallographic part of the laboratory has 3 microscopes, 1 micro-hardness tester, 3 ovens, 2 saws, a CNC lathe, milling machine, grinder, sample pouring and processing machine and a digester for macro pickling of billets, which was completely renovated in 2013.

The mechanical part executes the following examinations:
- Machinability testing according to ISO 3685,
- Tensile testing according to ISO 6892,
- Hardness testing according to ISO 6506 (HB), ISO 6508 (HRc) and ISO 6507 (HV),
- Charpy pendulum impact test according to ISO 148 and
- Jominy test according to ISO 642.

There are 2 hardness testers, 2 tensile testers and Charpy impact testing apparatus. This year we have also got a hydraulic press, which will after the renovation be used for determination of ductility (ability to withstand plastic deformation).

In 2013 we purchased a new Nikon MA100 microscope, which is of inverted type i.e. enables viewing from the bottom side and not from the top side as we used to do in the past and which makes the preparation of samples easier. In 2013 we also decided to renovate the metallurgic laboratory. Besides the main area, the sample storage and preparation areas will be included in the renovation too. We managed to renovate the major part of the laboratory in the last December days of 2013. A lot of voluntary work was done to achieve that. The walls of the main area were covered with drywalls, smoothened and painted. In January we continued the renovation by replacing the floor and workbenches. In the sample storage area we dismantled and removed the darkroom, used for Baumann print testing, and installed cupboards.

The renovation of the laboratory was done by: Robert Turnšek, Jani Jurkošek, Andreja Verdev, Darja Ocvirk, ART DECOR 2000 and Vinko Šanc Carpentry and Transport.

The renovation made the area brighter, larger and therefore easier to use and more adequate for efficient and quality testing of serial production as well as demanding scientific researches.

Darja Ocvirk, Head of the Metallurgical Laboratory

Photo: renovated rooms are bright and pleasant

CROSS-SECTION SHAPES

FLAT BARS WITH SHARP EDGES
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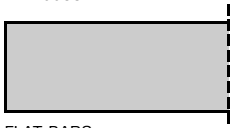

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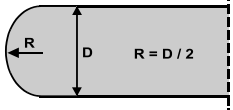

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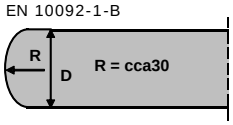

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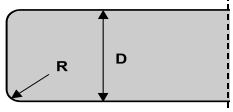

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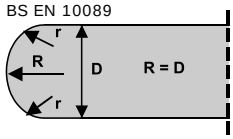
FLAT BARS
BS EN 10089

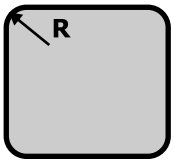


SPRING STEEL:
EN 10089: 51CrV4, 52CrMoV4, 56SiCr7, 56Si7, 61SiCr7, 55Cr3
WNr.:1.5025: 51Si7
WNr.:1.7792: 58CrMoV4

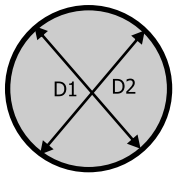
ENGINEERING STEEL:
Forging steel:
EN 10025-2: S355J2, S235JR
EN 10083-2:od C22R, C35R, C40R, C45R, C50R, C55R, C60R
EN 10084: 16MnCr(S)5, 20MoCr(S)5, 20MnCr(S)5
EN 10083-3: 30MnB5, 25CrMo(S)4, 34CrMo(S)4, 42CrMo(S)4,
DIN 17350: 31CrV3, 51CrV4
Carbon steel – for case – hardening:
EN 10084: C10E, C15E, 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,

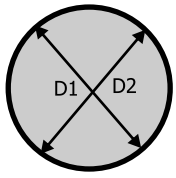
SQUARE BARS
WITH ROUND EDGES
EN 10059



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

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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