

ŠTOREQSTEEL

Internal information magazine, nr. 1 - 12



Award of the Slovenia Chamber of Commerce for exemplary business and entrepreneurial achievements in the year 2011



The selection commission for the Award of the Chamber of Commerce of Slovenia for exemplary business and entrepreneurial achievements in last four years has chosen the winners for the year 2011. The award was given on March 6. 2012 during an award ceremony at the Cankarjev dom in Ljubljana and among the winners was also the General Director of the company Štore Steel Mr. Marjan Ma košek.

"I have taken over this award in the name of the company Štore Steel as I think that in this way are here rewarded past and actual efforts of all our employees at achieving of the company's actual position in Slovenia and in the global market.

On this occasion I would like to thank to my co-workers and to all the employed in the company for their contribution and their job done well which is not unnoticed in the business sphere.

This high recognition is also a responsibility for maintaining of the actual position of the company providing in this way jobs for future generations."

Marjan Ma košek

Štore, March 7. 2012

Photos:

The cover sheet: The 36 MVA electric arc furnace transformer placed as an exhibit in front of the Steelworks building;

Above: The winners together with the President of the Republic of Slovenia dr. Danilo Türk, the President of the Chamber of Commerce of Slovenia Mr. Samo Hribar – Mili and the chairman of the award's giving commission Mr. Janez Škrabec;

Right: The statue of the award;





Photo above: The awards were given to the prizewinners by some popular Slovenian personalities. A well-known Slovenian poet and a holder of the prestigious title Slovenian Woman of the year 2008 Neža Maurer presented the award to Marjan Ma košek;
 Photo below: Congratulation of dr. Danilo Türk, President of the Republic of Slovenia;

New heads of departments

Andreja Lucija Gril, a graduate engineer of chemical engineering, was on September 01. 2011 appointed head of the Production planning department. On the same day was dr. Miha Kova i , a graduate mechanical engineer, appointed head of the Quality assuring department. Metod Marolt, a graduate metallurgical engineer was on April 01. 2012 appointed head of the Steelworks.



Andreja Lucija Gril

Andreja Lucija Gril employed in our company on April 01. 2000, after graduating at Fakulteta za kemijo in kemijsko tehnologijo (the Faculty of Chemistry and Chemical Technology) at University of Maribor. Soon after completing of her traineeship in the year 2001 she started working as a technologist at the Production planning department.

In that year started also an extensive renewal of our information system. Just the production process part of this system where the Production planning department was most intensively cooperating with the renewal contractors has been proven as the most demanding part. Development of the system has been performing until today and the latest, the third version of the production information system, is shortly before its implementation.

»In the year 2001 was the old production information system METALIS replaced with a new one - SRS (Steel Rolling Solutions), which was developed in cooperation with a company called AIOSS. The main reason was an inability of development and a need about establishing of linking between the production information system and the business system. During introducing of the new SRS system was there a lot of work as the system was upgrading while all company's operations were on. But after some months of hard work it was there noticed a clear progress at processing of orders, planning, making of production worksheets as well as at different order tables and reviews.

For some months have been there preparing variety of data (code lists of steel grades and operations, technological procedures, rates, calculations) for the new information system called SRS 3.0, which should be fully launched in the second half of this year.

The company Aioss presented us in April a test module and operating of the SRS 3.0 programme. We have been focused on creating of order acknowledgements– confirmations (basic data input, steel casting prescriptions, production process technologies), ordering of billets in the Steelworks as well as on micro-planning.

The new information system will enable us an easier planning, a better control over the production processes – and thus in the process from receiving of an order to final dispatch of material, taking here into account all customer's requirements, an easier handling of the SAP-formed orders and a more accurate pricing of products, taking into account fixed and variable costs.«

Miha Kova i started working with us on November 01. After completing of his doctorate at Fakulteta za strojništvo (the Faculty of Mechanical Engineering) at University of Maribor, where he was employed as a junior researcher since the year 2000. Till appointing as head of the Quality assuring department he was working as a researcher in the Technical development department of the company.

In addition to his work is he also active at teaching. He currently teaches at Visoka šola za tehnologije in sisteme (the College of Technologies and Systems) in Novo Mesto, at Visoka gospodarska šola (High Business and Production School) in Celje and at Poslovno tehniška falulteta (School of Engineering and Business) in Nova Gorica.

He also participated in a workshop called »Innovation and creativity for young people«, organized by the Štore Educational Centre and is intended for students in primary and secondary schools.

»Children in the workshop, regardless of their interest, experience, knowledge, computer literacy, gender and acquaintances - they effectively solve current, real tough practical problems of our company in the field of metallurgy, mechanical engineering, chemistry, electrical engineering, logistics and ecology.

It has been proved that a good and creative atmosphere is the most important resource needed for beginning of a problem solving. Certainly, it must be provided by us – the organizers, by sponsors, by working environment - even meals are important, and after all - by children themselves.«

The workshop has received a bronze award for best innovation in the year 2010 in the Celje region. In two years were there executed 8 workshops.



Miha Kovačič

Mr. Marolt employed in the company on June 1. 1998, after receiving of his BS at Naravoslovno tehniška fakulteta (the Faculty of Natural Sciences and Engineering), University of Ljubljana. After completing of his traineeship was he in the year 1999 appointed head of the Steelmaking department. In this department were there during his leadership because of retirement replaced more than one half of the employees, and among them were five of them promoted to foreman positions. Therefore is he well experienced in working with people - selection of candidates, introduction into working process, transfer of knowledge, experience and skills, estimating of working prosperity.

»Selection of co-workers is vital for a successful operating and development of a company. And to this task is given a special attention by us. In the selection process of a candidate are there checked candidates' qualifications for a particular working place. In interviews we talk about education, knowledge, skills and work experiences as well as also about general characteristics of the candidate (matching on the »same wave length« with future colleagues). An important part of treating with the employees is also introductory information on work, a successful reception into organization and working process as well as introducing to co-workers.

Mentoring as a process of training and giving information about working process being held in the working place – and thus not autocratic but open and democratic – has proved to be the most successful. However, to avoid loss of effectiveness and diversity it is important that processes of introduction, transfer of knowledge and skills do not last too long. Success largely depends on working efficiency of employees, their creativity and innovation. All this is reflected in working efficiency - estimating of which is very difficult as well as its rewarding. Wages are very important, but not the only thing that counts. Important factors are also satisfaction at work, locating of workers onto optimal working places, promotion, education ... »

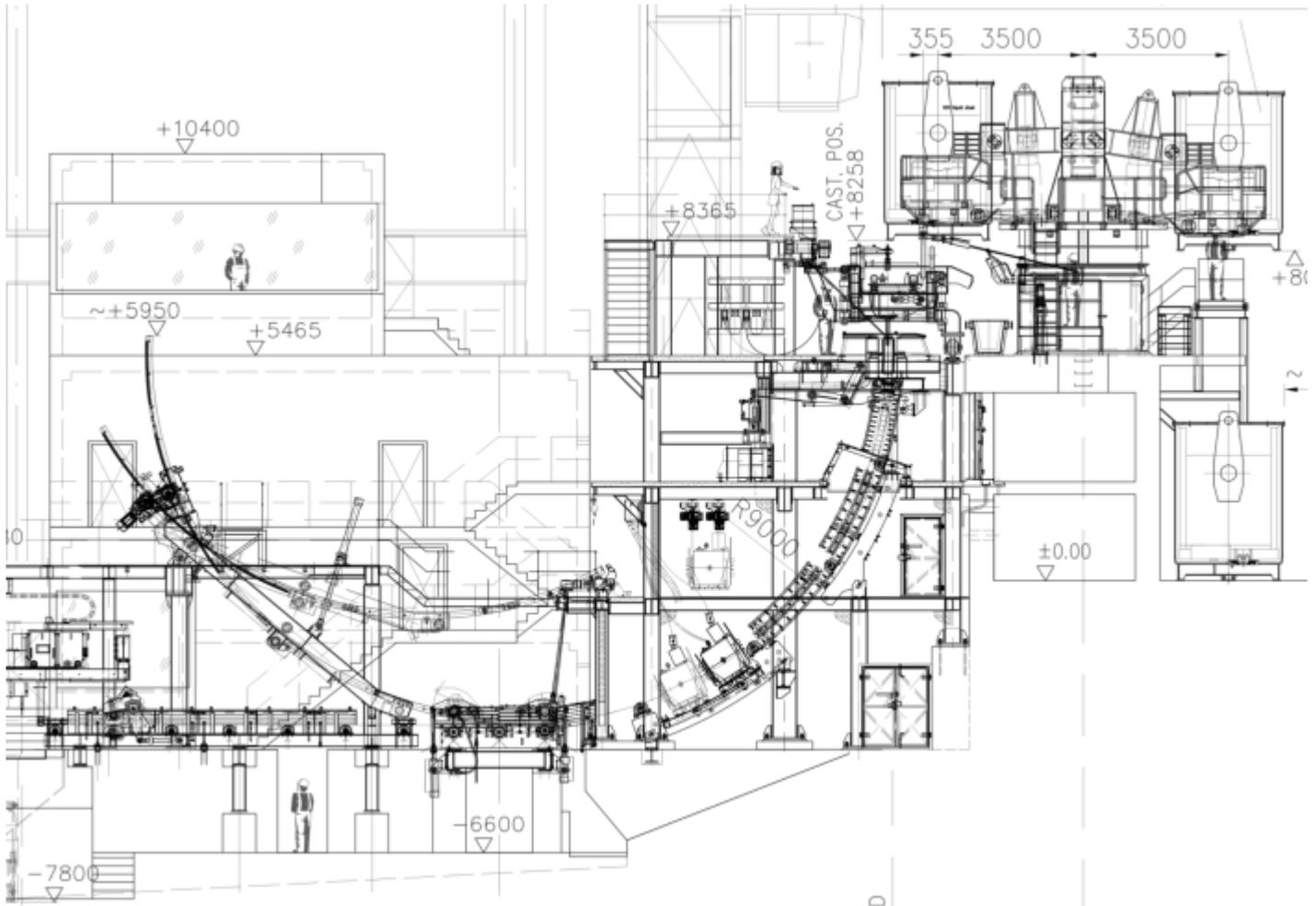
Gorazd Tratnik, Assistant MD



Metod Marolt

Revamp of the Steelworks

Change of our actual production program in terms of increasing of volume of products intended for automotive industry requests also an improvement of quality level of our billets. But this is not completely possible to be reached on the existing equipment. In this way is the above mentioned project of modernizing of the Steelworks a courageously defined developmental vision that will ensure a continuation of steel production in Štore.



Drawing: for the new continuous caster have already been clarified all the technical elements.

After change of the ownership structure in the year 2003 started in the Steelworks a very intensive investment cycle which requested two conditions to be fulfilled: preliminary – on base of priorities prepared conceptual projects which have been carefully planned by the Steelworks' leadership for longer time and secondly – an awareness of the owners about necessity of investing. Some previous renovations have been performed in all departments of the Steelworks and thus in such time periods that production has never been disturbed. The pace of changes has been escalating each year up to a final decision that here is needed a further, a complete modernizing of the Steelworks. To this end was there by the management in January 2007 opened a project called "Development of the Steelworks". It was later due to the crisis stopped. But the ideas were not forgotten and after revitalizing of

the market and a substantial change of our production program was there once again expressed an urgency of modernization and construction of additional aggregates. To this end on February 3.2012 the company's management reopened the project "Revamp of the Steelworks" with a priority to establish a new continuous caster in the first phase. There was defined also a 15-member project team. This project will be implemented in more phases. On the place of the existing VOD device there will be installed a new continuous caster which will substitute the old one that cannot meet with the new requirements anymore. In next phases will there follow construction of a new vacuum degassing device together with an extension of the existing dedusting capacities. As the last one will be there executed a reconstruction of the existing ladle furnace or – if necessary – installing of a new one.

As the revamp's concept was discussed in the narrow circle and the principle decision was made already in autumn 2011 was there soon realized the removal of the VOD and the space is practically ready for start of construction work.

We have also established contacts with two well-known suppliers of steelworks equipment in the meantime. The team members are harmonized in their expectations from the new device and that are: better quality of interior and surface of billets, increased yields, easier maintenance, higher level of automation and an improved traceability. For better exploitation of the limited space together with assuring of conditions for further modernizations we decided to install the device as much as southern. We also took into account that during the vacuuming process it will be there necessary to increase the free volume above the melt in the casting ladle if we want to work with similar weights of melt as today and this will "tomorrow" require many changes again. But the main thing here is logistics, both, during the construction when the Steelworks will be operating, and later when the revamp will be finished. It was decided that the startup of the new caster will be organized in such a way that during operating on the old caster – built in the year 1986 and inadequate anymore for our program – there will be initially created all conditions for operating on the new continuous caster. And only when these conditions are ensured we will start with removing of the old device.

The following are the most important changes in comparison with the existing caster. The new one will have two strands with radius of 9 m. The billets' format will be square 180 mm

with a possibility of its increasing on square 200 mm.

The crystallizer with a continuous hydraulic oscillation will be of Cartridge type with a possibility of quick change. There will be built-in an electromagnetic stirrer and a mould with length of 900 mm which will enable higher casting speeds and longer metallurgical lengths.

On the front position of the space, there will be placed a turning tower with two depositing sites and weighing devices for casting ladles. Flow of slag from the casting ladle into the tundish will be prevented by a slag detector. The tundish will be larger in order to stabilize and homogenize the melt. There will be no changes (except the source of beaming) at casting regulation, but the novelties will be a rigid dummy bar, the improved running under the crystallizer and an updated, longer secondary cooling system. There will also be space for final magnetic stirrers in case that they will be requested by the future program. A billet will travel on distance about 3.5 m along a defined 0 line after straightening. After that it will be lifted by an elevator on the walking cooling bed which will accept billets in lengths up to 6 m from both strands. There will be also a device for marking of billets. The whole process will be automated and controlled by the Level 2 system. Cooling systems require water of better quality. Only the electromagnetic stirrers will have their own closed system. All water from the open system will be pumped into the existing siphon.

Florjan Gol man, head of the project Revamping of the Steelworks



Photo: Pouring of steel from the ladle into the tundish on the existing continuous caster.

Steel for cold forging

Hot forging is well known procedure of steel forming, but we can also form steel into final products without any prior heating.



Hot forming of steel (steel for hot forging) is a process where is steel before forging heated to the forging temperature and after that – using certain tools - formed into predetermined shapes. To achieve the desired shape of a product are there necessary some phases of forging. Such a product is called a forged piece and is hardly ever a final product. Forgings are usually also machined (turning, boring, milling) to get their final shape.

Steel for cold forging is – as the name suggests - formed into final products without any prior heating. The final form of a product is also here obtained after some phases of cold forging. Cold forging is a cold working process where material is under high power squeezed into a die and the finished parts assume the shape of the die. To obtain the final shape of a product it is necessary to perform this process three or four times.

But steel can withstand such a pressure without any previous heating executed only under a condition that it is well prepared for cold forging procedures. This is mainly done already in ironworks where it is in annealing furnaces spheroidized annealed

Due to cold material forming under high pressures are there not allowed any surface defects on steel. To this end is steel supplied in peeled condition – so that all surface cracks from as rolled material are removed. Steel prepared in this way is now ready for cold forging procedures.

When are there processed more exacting products is annealing process performed also during particular phases of cold forging as this forging creates hardening of the whole surface of a forged piece. In order to keep clean surface, without any scaling, is annealing performed in a neutral atmosphere. To facilitate easier forming are there semi-products before each phase of forming lubricated – phosphated.

An advantage of cold forging comparing with hot forging is that there is almost no scrap as the volume of steel is almost entirely transformed into a product. Certain forgings require little mechanical treatment to obtain the final form. More demanding products can be also heat treated.

In the company Štore Steel has started production of steel for cold forging some years ago. The first quantities of such steel were delivered to a domestic buyer called Iskra-Avtoelektrika from Sempeter.

In our company exists a great interest in further developings of this product area.

Now, after completed investing into the new rolling mill, we have a possibility to increase our market share in this segment of steel production. All options for this are now available. It is also interesting that there are included in production of this steel all plants: the Steelworks, the Rolling mill, heat treatment, the Cold processing plant.

At the moment are there performed discussions about concluding of a contract about supply of additional capacities for spheroidized annealing which is a bottleneck for the time being. The company has got also all necessary control devices to ensure the agreed quality level.

We supply our customers with many quality grades of steel suitable for cold forging as follows: 16MnCrS5, 20MnCrS5, 45M5, 28MnCrB5/7, 15CrNi6, S20A, 20MoC4, 34Cr4, 100Cr6, 17Cr3;

For developing of other quality grades has been there on the company's level created a team for cold forging where are grouped all our experts for both, for process optimizing and for technical assistance to our customers.

Miran Prezelj, Sales Manager

Photo: forging parts of Iskra - Avtoelektrika

Investments into infrastructure of the Štore 2

The company Petrol Energetika d.o.o. as a part of the Petrol Group spends a lot of effort to ensure to customers of the Štore 2 industrial zone a favorable supply of all types of energy media and services. It's known that companies' progress depends on good cooperation between all sides involved and to this end we try to carry out as much as possible harmonized investing into systems providing a reliable and qualitative energy supply to customers.



On base of the previously confirmed developmental strategy and due to increasing needs of customers were during the last years performed the following major investments:

In the year 2006 was there made reconstruction of the scale pit for the rolling process, installation of dryers and a compressor needed for compressed air production as well as installation of a submersible pump for the steel production process at the site of SIIa pumping station;

In the year 2007 was there made a construction of the Lipa transformer station including also belonging control equipment, reconstruction of the scale pit system being required at the steelmaking process and setting up of a cooling tower on the high reservoir of the SIIa system for the needs of the steelmaking process;

In the year 2008 was there built a 5 kV energetic corridor on route CTP-MO-Kovis, the 1. phase of the SIII pumping station renewal, replacement of medium-voltage circuit breakers in the central transformer station, replacement of the 35 kV cables at the Lipa CTS- mainly for the needs of the steelmaking process and restoration of the high-voltage and medium-voltage equipment;

In the year 2009 was there executed reconstruction of high-voltage and medium-voltage equipment and preparation of project documentation;

In the year 2010 we carried out installation of a new TR RT 40 MVA 110/36, 75 kV transformer, ensured parallel operating of transformers as well as remote monitoring and managing of the Lipa CTS systems, carried out the renovation and construction of the SII system for the needs of the new rolling mill, executed dehydration of sludge, performed construction of a new 5 kV energetic corridor on the CTP - MO - Kovis route, proceeded together with the company Petrol d.d. the 1. phase of modernization of the liquefied petroleum gas decanting station. There was also made establishing of a central control system for

control and managing of all appliances in the area of the Štore industrial zone, restoration of high-voltage and medium-voltage equipment, renewal of some other systems;

In the year 2011 was there performed the first phase of the decarbonization system restoration, renewal of underpressure supplying pipelines on route from the 2 pumping station toward the SI and SIII rolling mill building systems, the second phase of renovation of the SIII pumping station. We took part at renovation of the factory railway track for the needs of the warehouse, performed maintenance respectively cleaning of fresh water intake channel at the Opoka water catchment basin and established a portal for monitoring of current information about events in the area and use of energy;

In the year 2012 we have already enabled cooling of systems in the Cold processing plant to be made through the SIII system of industrial water and plan also completing of construction of the new 35 kV cable line on route CTP-Adut-Yulon-the Cold processing plant -Kovintrade, replacing of the exploited compressor unit for production of compressed air, preparations for recovery of the Kotlarna transformer station and the central transformer station as well as for the second phase of reconstruction of decarbonization and the SI pumping system.

Among more difficult tasks that lie ahead can be ranged providing of an adequate quantity and quality of energy for new appliances in the steelmaking as well as reconstruction of all remaining industrial water distribution lines.

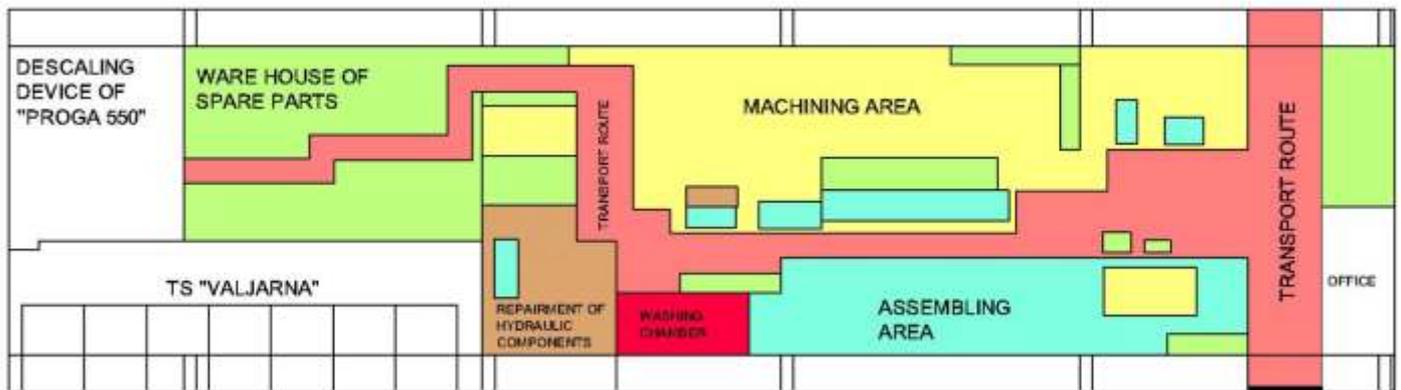
We are sure that we will be able, together with the Štore Steel professional staff, environmental experts and general public, to provide a favourable, responsive and environmentally friendly supply of energy.

Bojan Strašek, Director of Business Unit Štore

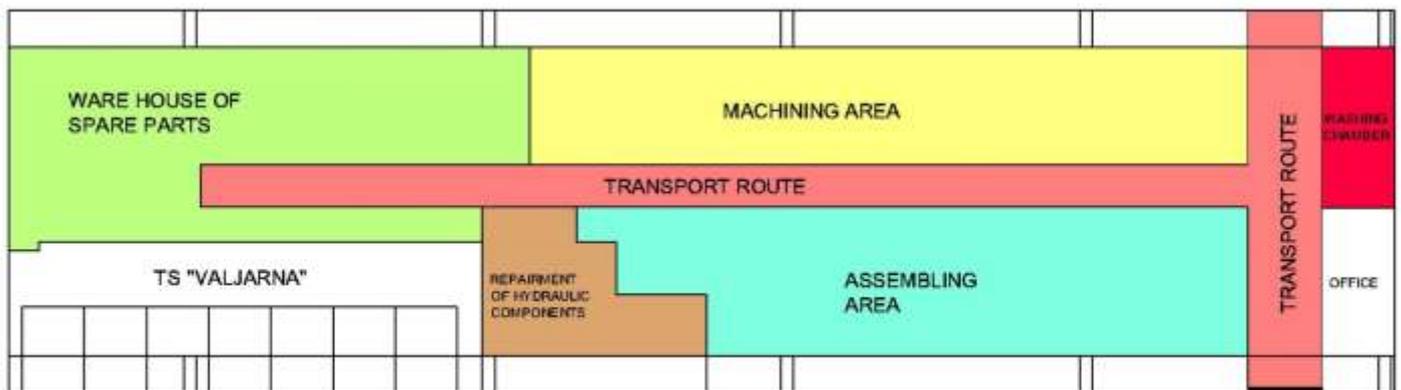
Photos: The new transformer at Lipa (left); Compressor station (right)

Renewal of the mechanical workshop

In order to achieve objectives related to availability of production facilities it is important to be good organized, to have a high responsiveness and an optimal infrastructure.



SHEMATIC VIEW OF EXISTING WORKSHOP ARRANGEMENT



SHEMATIC VIEW OF NEW WORKSHOP ARRANGEMENT

Maintenance is as a supportive process mainly focused on maintenance of production facilities in plants and on optimization of equipment. In order to assure an effective providing of these services it is necessary to look also behind the scenes of the process.

Central activities of information and material flows of the maintenance process are performed at the mechanical workshop of the maintenance and are in this way a potential for improvements in maintenance. Logistics is one of key aspects of each process. The planned reorganization of the workshop is based on transparency, on optimization of transport routes and on purposely disposed parts of the workshop.

In order to increase functionality as well as to shorten routes and manipulation time during particular working steps are there defined three main parts of the workshop space connected through a line transport way:

- A place for mechanical processing with basic

processing machines

- An installation part with more assembling cells
- A renovated nearby stock of spare parts and other materials for the workshop

The workshop's renovation begins with installation of a new crane produced by SRM Metalna and will be performed gradually depending on available resources. In the mechanical processing place, there will be some machines removed (the metal sheet bending machine, the press) and replaced with more usable devices (a saw, a lathe). The installation part is composed of some assembling cells equipped with assembling tables where can be simultaneously carried out repairing of several assemblies - with a separate preparation of their construction parts. With removal of the laundry to the place near the workshop's entrance will be there possible pre-preparation of mechanical assemblies and maintaining of cleanliness and orderliness of the whole workshop.

Drawing: a schematic review of renewal of the mechanical workshop, Urban Rožej

Beside base facilities and materials are increasingly in use also some accessories ready for shortening of intervention and repairing time (beforehand ready specific tools, mobile service trolleys with equipment), designed on basis of innovative ideas of individual workers and with support of the entire maintenance team.

The increasing number of automated devices will in the future require also renewal of the electrical workshop, which would allow an upgrade in the field of process automation and establishing of a separate workshop for the team handling with lifting devices – together with a nearby storage place for spare parts to be built-in frequently.

In this way would the central part of the southern extension of the Rolling mill building serve as functionally complete unit of technical support to production.

Matej Ka , Head of the Maintenance



Photos: A trial operating of the new crane (right above); stock of spare parts (below)

Round material cutting (sawing) line

In the Cold processing plant has been over the last twelve years invested in cutting equipment (saws) for round and flat profiles a sum of about 1.8 million Å.



In this way we were able to follow the customers' requirements about cut-to-length flat material as well as to meet with requirements of buyers of round profiles for half-shafts. In addition, we used some of these facilities also for preparing of material for peeling (cutting of bar ends, halving of bars). Beside saws was there used for peeling - preparing of material also a cutting-off wheel – manufactured in the year 1984.

New customers and the new rolling line expressed during the last two years a growing need for cutting of material before peeling. Namely, together with an intention to reach higher productivity on the new rolling line there exist also an aim to reach as long as possible lengths of rolled pieces. But on the other hand, it is now important for customers executing material processing on automates to have shorter length (3m) as it is actually rolled (6m).

This results in an increasing need of material halving in. Beside this they want also steel being delivered with smooth and rectangular cuts. All these facts had led to a searching how to ensure the most productive cutting of material, especially, when it was found out that the cutting-off wheel which causes hardened ends - and is also environmentally controversial (wearing out of cutting wheels), is not an adequate solution.

In this way we started in the year 2011 inquiring about purchase of a sufficiently productive and automated line for cutting (sawing) of material which would also allow a simultaneous cutting of bar ends and halving of bars. We received three offers and decided for a known supplier of this type of equipment – for the company SAS from Suelo in Italy. In July 2011 was there signed the contract about the line's purchase and in March this year the line was completely delivered to us.

Photo: The line with the feeding unit



The complete installation and thus the investment into the line for cutting (sawing) of round steel was finished in April. The value of the investment was Å 400.000. The cutting line is fully automated and consists of a feeding unit, three circular saw units (one fixed and two adjustable) and of a discharging unit with a storage pocket. For sawing are there used circular saws with blades of rd 360 mm. On the line it is possible to cut round steel from Ø 18mm to Ø 100 mm and in lengths ranging from 6 to 8.5 m. It is there possible halving of steel bars and cutting of bar ends at the same time. The minimal length of a steel bar after cutting is 3m. Productivity of the line is 30 t / shift, respectively 2000 to / month reached at three-shift operation depending on diameter of steel bars. The line's productivity increases especially - compared with the current method of cutting - when both operations – halving and cutting of bar ends are performed simultaneously.

Beside higher productivity are there noted also the

following benefits of the new cutting line for round steel:

- due to elimination respectively dismantling of the old cutting-off wheel from the production process are there improved the company's ecological conditions (eliminated are releases into the atmosphere and use of ecologically controversial blades)

- costs of cutting (sawing) are reduced

- due to sawing of bars ends will be there improved quality of the peeling process and reduced its costs as lifetime of peeling knives will be longer;

- an increase of cutting (sawing) capacity of material for new customers;

Considering all these advantages brought by the line, will be the investment - if operating with the planed quantities – returned in less than two years. Thus has been in the Cold processing plant obtained another very useful, automated and productive device.

Alojz Gajšek, Head of Cold processing plant



Photos: stock of finished material behind the line (above); cut bars (below)

Renewal of computer server equipment

Owing to production expansion in last years which managing was possible only with a considerably increased number of executed information services and users of the information system (IS) was there seen a need for reorganization and renewal of the existing computer server equipment.



Beside internal users can access to the IS also some external users and various maintenance companies what results in problems with access to information resources (data) and in low speed response times.

In the year 2006 was there made a reorganization of the internal network. There were created a business network SteelNET and a technological network TehNET.

The first one is designed for connecting and access to business and production applications of the Štore Steel users via workstations which are set in accordance with rules of security policy. The second network is more open and is intended for external users who need an access to the Štore Steel IS enabling them execution of different services needed to be done on the company's control devices as well as for printing of various documents – by systemic and local printers. The networks have becoming more and more burdened what is evident from progressively longer response times when working on business and production applications of the actual IS.

For the year 2012 was there made a project for renovation of the existing computer server equipment and its infrastructure. The project defines that there would remain both, the SteelNET network for internal users of Štore Steel (workstation) and the TehNET network for external users (outside access and laptop computers). But the project itself also plans that there would be created a new network intended for printing jobs (systemic and local computers) as well as a wireless network designed for servicing of all devices without use of connecting cables.

Due to an increasing of number of services being carried out by the existing information system (introduction of the new production SRS 3.0 IS on a completely new software platform) was there determined also a need for reorganizing of the server equipment. The classical server structure composed of 2 x 7 servers – due to security

reasons is one group of them placed in the computer room of the Cold processing plant and the second group in the computer room of the Rolling mill - was replaced with servers operating according to a virtualization system (virtual servers).

The new hardware is consisted of 6 servers needed for creating of virtualized circumstances, of 4 servers responsible for databases, of 2 disk arrays for data storage and of 2 systems of uninterrupted electric power supply. Due to higher security and operating reliability in case of a failure of any of the servers will be the above mentioned equipment placed in two separate places (computer rooms in the Cold processing plant and in the Rolling mill).

The system is so formulated that there will be configured two virtual servers which will serve as domain servers. On these computers are defined all main settings of the system called Activ Directory. Similarly will be there configured also another two servers needed for storage of users' data and for getting of data from the system. For installing of databases is intended a special physical server as there are required fast accesses and response times to data from the business and production IS. Also for access and use of electronic mails and web servers (Internet and Intranet) will be there used the system of virtual servers. Finally will be there configured also firewall servers (protection from unauthorized entries into the system) and two servers for data backuping.

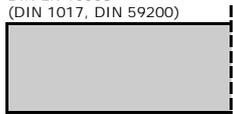
The replacing of the servers has already started and will be carried out gradually - then when the production process is on a smaller level. In spite of all that it can be expected that during the renovation some short-term disturbances in operating of the IS will occur.

Vladimir KIRN, IT service manager

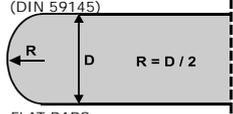
Photo: new hardware

CROSS-SECTION SHAPES

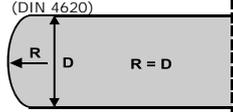
FLAT BARS WITH SHARP EDGES
DIN EN 10058
(DIN 1017, DIN 59200)



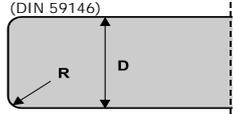
FLAT BARS
DIN EN 10092-1-A
(DIN 59145)



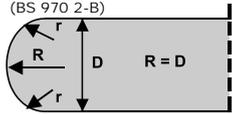
FLAT BARS
DIN EN 10092-1-B
(DIN 4620)



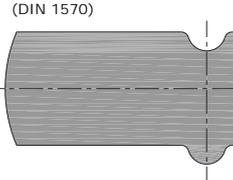
FLAT BARS
DIN EN 10092-1-C
(DIN 59146)



FLAT BARS
BS EN 10089
(BS 970 2-B)



FLAT BARS
DIN EN 10092-2
(DIN 1570)



SPRING STEEL:

EN 10089: 51CrV4, 52CrMoV4, 56Si7, 61SiCr7, 55Cr3

ENGINEERING STEEL:

Forging steel:

EN 10025-2: S355J2, S235JR

EN 10083-2: od C22R do 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 EN ISO 4957: 31CrV3, 51CrV4

Carbon steel - case - hardening:

EN 10084: C10E, C15E, C10R, C15R

Carbon steel - hardening and tempering:

EN 10083-2: C22E, C35E, C45E, C55E, C50E, C60E

Structural steel:

EN 10025-2: S235JR, S275JR, S355J2, E295, E335, E360,

Steel for welded chains:

DIN 17115: 27MnSi5, 20NiCrMo2, 23MnNiMoCr54

Steel for cold forging:

DIN 1654: QSt32-3, 15CrNi6, 36CrNiMo4, 21NiCrMo2, 30CrNiMo8, 34CrNiMo6,

38Cr2, 34Cr4, 37Cr4, 41Cr4, 16MnCr5, 20MnCr5, 25CrMo4, 34CrMo4, 41CrMo4,

Alloyed steel:

WNr.: 1.5231: 38Cr4

EN 10083-3: 30CrNiMo8, 34CrNiMo6, 34Cr4, 37Cr4, 41Cr4, 25CrMo4, 34CrMo4,

42CrMo4, 50CrMo4, 51CrV4

EN 10085

31CrMoV9

Structural steel for housings of bearings:

DIN EN ISO 683-17: 100Cr6

Steel for heavy duty automotive parts:

WNr.: 1.5231: 38MnVS5

VW-TL 1427: 27MnSiVS6, 27MnSiVS6+Ti, 30MnSiVS6

VW-500-30: 36MnVS4, 70MnVS4

EXEM STEEL WITH IMPROVED MACHINABILITY:

po WNr.: 20MnV6 EX, 38MnVS6 EX, 30MnB4+Ti EX

EN 10084: C15E EX, 16MnCr(S)5 EX, 20NiCrMo2-2 EX, 20MnCr(S)5 EX,

EN 10084 in UNI 7846: 16CrNi4 EX,

EN 10025-2: S235JR EX, S355J2 EX,

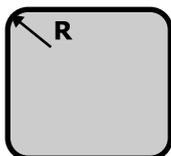
EN 10083-2: C22R EX, C35R EX, C40R EX, C45R EX, 42CrMo(S)4 EX

UNI 7845: 39NiCrMo3 EX,

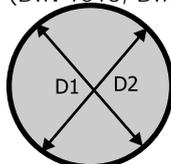
UNI 7846: 18NiCrMo5 EX,



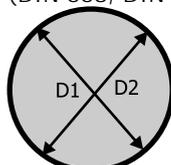
SQUARE BARS WITH ROUND EDGES
DIN EN 10059 (DIN 1014)



ROUND BARS
DIN EN 10060
(DIN 1013, DIN 2077)



BRIGHT ROUND BARS
DIN EN 10278
(DIN 668, DIN 671)



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	Dimension mm
DIN EN 10058 (DIN 1017)	65-120 x 40-55
DIN EN 10058 (DIN 1017)	50-150 x 7-40
DIN EN 10058 (DIN 59200)	150-200 x 7-25
DIN EN 10092-1-A (DIN 59145)	50-120 x 8-35
DIN EN 10092-1-B (DIN 4620)	50-200 x 7-30
DIN EN 10092-1-C (DIN 59146)	60-120 x 16-62
DIN EN 10092-2 (DIN 1570)	120 x 12-20
BS EN 10089 (BS 970 2-B)	60-120 x 27-36, 40-42

ROUND	
Standard	Diameter/Process
DIN EN 10060 (DIN 1013)	20-68, 70, 72, 73, 75, 77, 78, 80, 82, 83, 85, 90, 95, 100, 105 mm / rolled
DIN EN 10060 (DIN 2077)	20-68, 70, 72, 73, 75, 77, 78, 80 mm / rolled
DIN EN 10278 (DIN 668)	18-50 mm / drawn
DIN EN 10278 (DIN 671)	18-95 mm / peeled



ISO 9001
ISO 14001
OHSAS 18001
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Certification



ISO/TS 16949
BUREAU VERITAS
Certification



extreme
machinability

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