ŠTORE STEEL

Internal information magazine, nr. 2 - 11

Flexibility and a quick reaction will be important

Soon will come the end of the year for which was typical optimism and a lively demand in the first half but also uncertainty and decrease of orders in the second half. Nevertheless, we estimate that the year 2011 was relatively successful, although we did not realize all the planned goals.

We are pleased that the new continuous rolling line – in a combination with two older stands – after some initial difficulties operates stable. There has been already produced a volume of more than 100.000 tons of steel bars in various shapes and sizes. Developing of ways of rolling of remaining dimensions is being quickly executed as there exist some free capacities due to decreasing of the orders' volume.

Shareholders of the company have confirmed the company's strategy until the year 2015.

Preparations for modernization of the Steelworks which is expected to be executed within next five years are intensively performed. To this end has there already been appointed by the management a project team that will produce an investment elaborate.

As there due to overall known financial and economic problems still exists an uncertainty – anticipates our plan for the year 2012 only a slight increase in comparison with the year 2011. With the new products being in the process of developing we will try to attract new customers. We will listen with a close attention to all wishes and needs of our business partners and there will be given more attention to our technical support to customers.

To all our business partners and of course also to us we wish a lot of business success in the year 2012.

It is the most important that we are flexible and ready for a quick response as clear and firm long-term forecasts are over.

Marjan Mačkošek, General Director

Above: Managing director in conversation with representatives of SID bank, Sibil Svilan, CEO and Sašo Keleman

EXEM steel

History of production of EXEM steel dates back to the year 1999 when the then company called Jeklo Štore became an integral part of the Inexa Group.

One part of this group was also a steel producing company in Lulea (Sweden) where its steel making process based on a concentrated iron ore excavated in a mine being 400 km away (towards north) from the Swedish city Lulea.
The Swedish company produced at that time also steel being known for its extremely good machinability – extreme machinability steel.
Our knowledge and technology – in cooperation with experts from Sweden - resulted in a fact that steel with an extremely machinability - extreme machinability steel – was produced also from steel scrap in the Štore steelworks.
Since then have been there produced and developed over 30 different types of steel having an extremely machinability. All extreme machinablity steel grades developed in our factory are protected under brand name EXEM steel.
Beside round profiles are some of our buyers interested also in flat profiles of EXEM steel.
A good example is a product of a Slovenian company which produces the carrying set of a hunting gun for a German buyer. With converting from conventional to EXEM type of steel decreased wearing out of expensive cutting tool by more than three times and the machine operates much more smoothly and quietly. Processing parameters are independent from a current heat. They are always the same as the company Štore Steel quarantees the lowest limit of machinability. This is achieved by machinability testing of each heat before a delivery of material produced from it.

Current efforts for ecological preservation of our planet, including lower CO2 emissions into the atmosphere, increasing of share of recycled material in all branches of industry as well as reducing of use of hazardous substances and heavy metals (lead, mercury ...), have a positive impact into possibility of increasing of our market share of EXEM steel as it does not contain any dangerous additives (lead for example) which are used by other steel producers in order to achieve better machinability.
With an actual development of modern machining centers having machines with larger drive power and an ability to increase processing speed is there no more any machinability difference between lead-treated and our EXEM types of steel. In the past had steel types alloyed with lead better working characteristics, especially at lower speeds of processing.

One of the best EXEM steel characteristics is also its ability to keep good machinability even when steel is hot forged before mechanical processing.
Quite recently we have some customers where is a basic design of their final products obtained by hot forging but the final form is defined by grinding and drilling. Some products are after these operations also heat treated.
The company Štore Steel tries to follow the developmental needs of automotive industry, both, with introducing of new steel quality grades and also with changes in the company's organization and this all with the goal to have a "satisfied customer".

Miran Prezelj, Sales Manager

Left above: a product of the EXEM flat steel; Right above: an example of forged and machined product made from EXEM steel

100.000 tons of steel produced on new rolling line

Market conditions at the end of the year 2010 and the first half of the year 2011 dictated a renewed increase of production on Štore Steel rolling mill facilities. This fact slightly changed our plans about converting of production of rolled flat profiles onto the new continuous rolling mill line.

Instead of the primary goal anticipating transferring of all dimensions by the end of the first quarter of the year 2011 we decided to rise as quick as possible our productivity to the levels reached in the year 2007 and 2008, what can represent a good basis for further capacity increase in accordance with our project objectives.

Thus, in the first months of the line's trial operating - i.e. during a period from June 2010- to January 2011, we were reducing – according to the agreed dynamics of transferring of dimensions – a proportion of operating hours of the existing rd 550 rolling line and at the same time increasing the proportion of operating hours executed on the new continuous rolling line. By the end of January 2011 was there transferred to the new line rolling of round profiles as well as rolling of wide-sized and heavy flat profiles.

Since then has the proportion of products rolled on this line reached a part up to 90% respectively between 8.000 and 11.000 tons per month. Further developing of new dimensions somewhat stagnated due to already mentioned reasons at that time. In the rest of this year were there our efforts more focused into raising of productivity and ensuring of stability of operating of the new line.

After fifteen months of the rolling line's operating was there on September 29., in early morning hours, rolled out the 100.000. ton of rolled profiles. This honour was paid to a round, diameter 50 mm, profile in quality grade 20MnCr5 intended for our customer Unior - what can be – regarding our long-term relationship - one type of symbolism.

Here it is necessary to stress an extraordinary enthusiasm of all employees in the Rolling mill as well as efforts of maintenance staff being noted during this period which contributed – in cooperation with suppliers of equipment Siderimpes (Italy) and Russula (Spain) – to overcoming of initial difficulties.

Efforts of our workers resulted in a successful changing of one part of the 1000-ton shears' (intended for cold shearing of rolled pieces) equipment and in modifying of the conversion station for changing of blades what was all made during over our regular yearly overhaul. In this way was there increased the operating reliability of the shears, improved quality of cuts and reduced the blade changing time. On base of our recommendations made there Russula in November a large- scale modification of the rolling line's control system which increased material flow through the cutting facilities and consequently raised productivity of rolling.

Operators also played a big role at preparing of proposals for modification of the rd 800 rolling line's software package. Many operations are now performed faster, there are enabled interventions of operators during the automatic mode of operation - and all together allows a faster passing of rolled pieces through stands as well as a greater flexibility at solving of unexpected situations.

Above: the cooling bed of the continuous rolling line

Notwithstanding all these activities executed in the past year and a half we are aware of the fact that there is still much work to be done to reach the desired annual production level amounting between 200.000 and 220.000 tons of steel.
There still exist many ideas and plans how to ensure - despite ever wider production programme - in the last four years the number of dimensions increased by 50% - and hence the growing number of technological changes - further increasing of productivity and quality of rolled products.
We will continue with introduction of an accelerated operating of the pre-heating furnace (75 seconds instead of the current 90) which will allow a greater frequency of rolling process at programs that make this possible. Together with the Spanish supplier we are developing a possibility of so-called partial change of a dimension what will shorten the time of technological set-backs. On the rd 800 rolling line stand there will be introduced some additional measures for speeding up of the rolling process. There is also planned establishing of a new diagnostics-based monitoring system which will shorten time needed for elimination of standstill causes. In addition, we also prepare a control system for operating of impulse encoders which control the roller gap of rolling line stands which will ensure repeatability of achieving of a desired dimension and use of stored recipes. Tracking will allow a significant reduction of number of trial billets and consequently of time needed for setting of a dimension.
In any case will be there reached the highest productivity of the rolling process in the moment when rolling of all sizes will be transferred to the continuous rolling line. On the old one, the rd 550 rolling line, are with an exception of flat spring profiles thicker as 21 mm rolled only low productive programs such as special profiles and thin flat profiles.
As this rolling process is limited by a billet weight is productivity of such programs at this time between 40 and 50% lower than productivity reached on the continuous rolling line.
Further transfer of dimensions from the old to the new rolling line will be done in accordance with our sales department and the production planning department and is expected to be fully executed by the end of June 2012. Dynamics of the transfer will depend on level of occupancy of production capacities with regular orders as transfer of each dimension requires between 30 and 60 minutes on average.
The rolling line itself provides – as it was expected - rolling tolerance of 1/3 DIN standard for round profiles and a tolerance of ½ of DIN standard for flat profiles. Some occasional deviations as for example a local ovality of round profiles or an inadequate width of flat profiles are rare and occur due to some human factors and line operating problems. It is entirely realistic to expect that together with an increasing expertise of operators and stability of production such types of deviations will be reduced to a minimum.
Encouraging was also the first rolling of thin flat profiles which noted a hardness that was by 50 HB lower than that reached on the rd 550 - old technology - rolling line. This is possible due to controlling of the rolled pieces' temperature during the rolling process and due to a package- formed stacking of rolled pieces in a combination with an insulating coating.
It is especially gratifying that the new equipment considerably improved safety at work. For comparison let us have a look at the number of work accidents in the period from July 2011 until today, when were both the old rd 550 rolling line and the new one operating alternately. Despite the fact that both lines were the same time – that is 5.500 hours - in operation – were there noted by 3-times less working accidents on the new line than on the old one.
Further growth of production volume of the company Štore Steel will - beside effectiveness of the planned measures for raising of the productivity level – depend also on economic developments in Europe and worldwide.
However, everything will be mostly on us, on quality level of our products, on stability and cost effectiveness of our production.
The new continuous rolling line is one of the guarantees that the defined goals will be achieved.

Boris Kumer, head of the Rolling mill

Above: cardans of vertical stands

A new Mair II peeling machine

The new peeling machine was bought as a replacement for the old, worn out Kiesserling peeling machine and with the aim to increase our bright steel producing capacities. And all this is also a contribution to a higher added value of our products.

95 % of the Cold processing plant's production volume is based on peeled steel. The rest is drawn steel. It is therefore essential that our peeling capacities are not only kept but that they also gradually increase. The old Kieserrling peeling machine was completely worn out (about 35 years old). It was bought from second hand in the year 1997. It was not precise enough for reaching of h9 and h10 diameter tolerances and there was lastly very hardly to reach even diameter tolerance h11. There was no sense to invest in it anymore.

At deciding for a supplier of a new peeling machine was there favoured the company Mair from Italy and thus mainly because we already have a peeling machine of this manufacturer. It is reasonable from maintenance and service assuring viewpoint. And also the first Mair peeling machine has been relatively well operating.

The second peeling machine was manufactured under SMS license what means that there exist a number of improvements in comparison with the first one (tilt of inserting rolls at an angle, an easier access to the peeling , a possibility of use of outlet guides in sliding and rolling execution, a cassette system of knife clamping, etc. . SMS is a German company which some years ago finished with production of peeling machines. Beside these advantages it was also found out that some sets of the machine are heavier dimensioned as it was on the old machine.

A peeling machine is a machine that is designed for peeling of rolled pieces in such a way that there is removed a part of surface. With this are productively removed surface defects and is there achieved a bright surface with narrow diameter tolerances (such as h9, h10, h11, etc.). This means that a diameter can deviates only by a few hundredths or tenths of a millimetre. Due to such characteristics are our peeled products, which are after peeling also straightened and polished, mainly used for making of various parts for automotive industry. Peeled profiles can also be processed on different cutting machines (very high productive automates), hot or cold forged, squeezed etc.

Above: the outlet part of the peeling machine

A peeling machine consists of a feeding part, inserting rolls, an inlet guide, a peeling head, an outlet guide, a pulling trolley as well as of an output bench with a loading table.The peeling procedure is fully automated. Only rolled pieces have to be put on the inlet bench and the finished bundles are transported away – all other operations are made automatically.

The process of peeling proceeds on such a way that bars are automatically loaded and pass through insert rolls, guiding rolls, rotating peeling head, outlet guides and at the end are bars with help of a trolley pulled through the outlet part of the machine onto the outlet bench where are than collected in a loading bench.

It is very important that a bar is as much precise and as much strongly guided to avoid any vibrations during the peeling operation. In this way is there achieved a better surface and a longer operating life of knives. Peeling process causes torsion of bars what is prevented by a strong grip of inserting discs and outlet trolley. A bar is during the peeling operation guided by inlet and outlet guides. In the process of peeling are produced also a lot of chippings which are by a transporter brought into a container. The MAIR II peeling machine is designed for peeling of sizes from rd 18 and rd 105mm having lengths from 3 to 8.5 m. At smaller dimensions, as for example from rd18 mm up to rd25 mm, is a precise guiding of bars even more important as bars of such diameters are less rigid and it is harder to equalize them during peeling. The small diameter bars are during the peeling process also exposed to additional bending. In order to its minimizing has the new peeling machine a possibility to set the inlet discs at an angle. The machine has also an option of using of double outlet guides. One is the rolling and the second the sliding one. Just at smaller diameters of bars and at highly sensitive materials can be used the sliding guides as an alternative.

Finally, I would like to point out that peeling machines are manufactured in a small –scale production – and there is also very few producers of them. Due to various additional wishes given by customers execute there manufacturers many different changes on each machine. In this way is each produced machine practically unique. For that reason take also operating starts of such machines more time.

To proceed a qualitative and productive peeling process are there beside a top-quality peeling machine necessary also adequately shaped rolled pieces. They have to meet with defined requirements about diameter, ovality, straightness and execution of bar ends. Too big ovality has a negative effect on a final product and bad bar ends can cause a shorter operating life of knives or even their fracture.

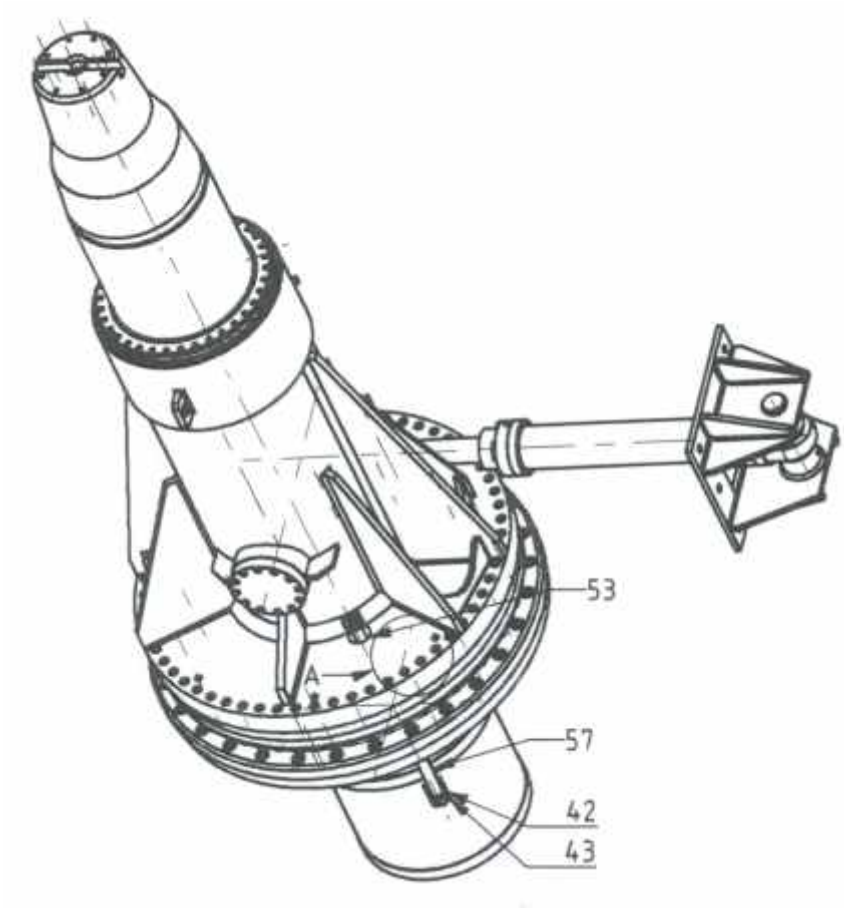
With investing into the new peeling machine, that is placed in line with the existing polishing machine, we obtained a highly productive peeling – polishing line. This line will effectively replace the old Kiesserling peeling machine and will enable an increasing of capacities for steel peeling.

Štefan Zidar, head of processing Cold finishing plant

Above: testing of the peeling machine operating

Reronstruction of the lifting system of EAF's arch

Taking into account the wearing out of the lifting system (cylinder) of the EAF's arch as well as assuring of further reliable operation of the EAF decided the management of Štore Steel to open a project called Reconstruction of the lifting system of the EAF's arch.



In this way was there appointed a team constituted of the following team members: Metod Marolt (team leader), Milan Levec (member) and Radovan Bofulin (member). The team was given the task to carry out the investment during the factory's regular annual overhaul of the year 2011.

On base of analyses made and measurements of loads the device for opening of the covering of the 60-ton melting furnace is exposed to - the team obtained some offers to execute the investment in accordance with certain technical requirements.

To avoid problems with the old system (plunger) we decided for installation and fixing of the entire device for opening of the furnace's lid (a lifting cylinder) on the double- row axial roller bearing which beside carrying of the anticipated load enables also rotation of the device together with all components that are fixed on the lid of the furnace.

There were determined technical requirements needed for the device for opening of the EAF's arch as they are: the maximal useful load on the device (weight), the maximal bending moment on the device, the working hydraulic pressure, the own weight of the device for opening of the arch, the distance from the center of the lifting to the resultant, the time needed for opening of the arch, the frequency of the arch's opening, the angle of turning, the maximal running at lifting and the acceptable dimensions of the device.

The device for opening of the 60-ton electric arc melting furnace's arch serves to open the arch of the furnace when it is going to be filled with scrap. Sketch shows main components of the arch's opening device. The guide of the device is inserted into the housing and is controlled by the upper and lower guide bushings. In the device's guide is on the lower side placed an hydraulic plunger which is guided by a guide brushing and is hydraulic sealed. The plunger is through a hole drilled in the middle of the guide fed with pressurized hydraulic oil – so that the hydraulic connection is mounted on the top of the guide. Hydraulic pressure acts so upon the plunger and squeezes it out of the guide. The plunger itself leans on the bottom' wall which is with screw joints firmly fitted on the body of the device and in this way causes lifting of the guide. The guide is dropped under an influence of the load weight and its own weight.

Left above: a sketch of the lifting system of the EAF's arch; Right above: during the setting up of the lifting system

Above: a lift and a move of the EAF's arch before loading of the furnace with scrap

The guide wedges during its lifting with help of a cone placed on the upper side into a holder (a casting) which is an integral part of the furnace's arch and the platform. The arch of the furnace rises together with the guide. On the arch are there fixed also the following components: a device for regulation of electrodes, electrodes, an electrode holder, water-cooled cables, holders and landings. All here mentioned components are during opening of the furnace a constituent part of the arch and in this way raise and rotate with the furnace arch. The arch, including all the before mentioned devices, raises to such a level that cones, which enable centering of the lid come from their beds. After that the entire composition rotates by at least 85 °- so that the furnace opens all over its cross-section.

The device for opening of the furnace's arch is fitted with a flange through an axial double-row roller bearing on a concrete ground. The axial bearing allows that the complete lifting device and all components that are lifted together with the furnace's arch rotate by 85 °. Rotation is possible due to an additional lateral hydraulic cylinder and a small handle mounted on the housing of the opening device.

A lateral hydraulic cylinder for rotation leans on an existing concrete platform and is regulated with help of the existing hydraulic aggregate and regulations.

To ensure rotation of the housing of the device together with the guide are there in the housing built - in two special elements which obviate a relative rotation between the housing and the guide.

These two elements are inserted into a purposeful made slot on the guide having such a laxity that lifting of the guide runs smoothly. The running length and the distortion angle are controlled by some non-contact switches.

The device for opening of the arch on the melting furnace is designed to meet all the before stated requirements - and thus with respect to its operating as well as with its maintenance.

All materials used are of top-quality and there were used only standardized and typified components that are compatible with the latest technology and standards to ensure a qualitative and a long-term operating of the device for opening of the electric arch melting furnace's arch. The device is designed in accordance with the actual law for building of objects and all valid technical standards as well as with all rules and regulations on safety at work.

Metod Marolt, head of the steel producing department in the Steelworks

Overhaul of the furnace OFU

Koračna peč OFU je bila postavljena, skupaj s progo 800, v letu 1989. V vsem času obratovanja je bila redno vzdrževana, večji posegi pa so bili opravljeni le na dnu peči.

Above: operators and supervisors of the works

Last check of the furnace showed a need for a serious sanitation of refractory furnace ceiling linings in the third and partly in the second heating zone as well as of the front wall on the exit side. Execution of the sanitation was planned to be done during the annual overhaul in the mill.

The furnace ceiling is composed of 25 different ceiling blocks for which it was necessary to find all drawings of models in archives.

Wooden and metal models for making of ceiling blocks were found but it was necessary to repair them.

For execution of the sanitation was chosen a company Calderys from Austria which at its location produced all blocks and roof burners and performed also their heat treatment.

Demolition of the furnace and the fireproof lining were in record time conducted by the company Vigo d.o.o. from Jesenice.

Control of concreting, assembling of blocks and burners was carried out by Calderys and the management of the Rolling mill.

Above: the ceiling blocks are hang on a metallic construction; below: burners

On the OFU walking-beam heating furnace were there carried out the following works:
- replacement of the furnace's ceiling in the third and partly in the second heating zone in the length of 31 fields – that is 280 roof blocks;
- changing of all 12 burners in the third zone;
- changing of 12 burners in the second zone;
- replacement of the front wall on the exit side;
- repair of the left and right side of walls on the exit side;
- repair of linings on all door openings;
- replacement of insulation on all door frames;
- setting up of a big door on the left side of the furnace;
- changing of 15 blocks on the flexible and stable part of the furnace's bottom;

There was built - in a volume of about 60.000 kgs of various material and there was transported out just the same quantity of the waste material.The value of all works carried out amounted to EUR 190.00,00.

Mirko Pajek, head of rolling lines Rolling mill

Flood protection in the area of ŠTORE 2

The area of the former Železarna Štore (Ironworks Štore) – the Štore 2 industrial zone where is completely placed our company Štore Steel was during the last 15 years exposed to floods.

The first flood hit us in the night from the 4. to 5.November 1998, where was, with exception of the Cold finishing plant , flooded the complete area of the company. There was out a volume of 100.000 m3 of water from the Voglajna river and its inflows. For better illustration: this is a volume of water found in the Savinja river at its width of 50 m and depth of 1 m and 2 kilometers along.

With a great dedication of all firefighters and employees we succeeded - despite unfavorable weather conditions (cold and even snow), without electricity – in restarting of our production in three weeks.

The next flood which was of a lesser extend happened to us on 18. and 19. September 2010. Due to organizing of water pumping and other measures (flood protection bags, a temporary embankment built on the north side of the Rolling mill) we managed to prevent from water the new continuous rolling line, but the Steelworks was completely flooded. The Cold processing plant facilities were not affected by the flood. Thanks to a good organization of after-flood activities it was possible to restart our production in one week.

Already after the first flood in the year 1998 all the companies located in the Štore 2 area agreed about an integrated approach to the measures about an increasing of flood safety.

At that time the agreed measures were not realized as the state authorities wanted to pass all costs on the companies of the Štore 2 industrial zone, but the companies are not responsible that the Voglajna river catchment is now subject to flooding.

After the last year's flood we decided - together with the company Petrol Energetika - PE Štore – to carry out at least a part of the flood protection measures on our site and thus to reduce the flooding risk. We estimated that the state does not intend to carry out anintegrated flood sanitation of the Savinja, Voglajna and Hudinja rivers soon.

The company's management appointed a team responsible for preparing and implementing of flood protection measures.

Above: Voglajna river as it was near Steel plant on 5. November 1998;
Next page above: Voglajna river near the Steel plant on 19. September 2010;
Next page below: Voglajna river after cleaning of its banks, 17. November 2011;

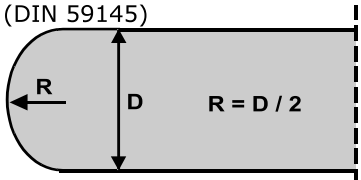
The team formed two types of measures:
A. those which have to be state-executed and funded included:
- cleaning of the Voglajna river flow from Štore to Celje what was partly carried out in this summer;
- for inflow waters coming from the site of Maribor-Ljubljana railway line is there necessary to build an additional culvert at Godec site what had been also required in project conditions for building of the Lipa overpass;
- decreasing of the water level of the Slivnica lake;
B. those which were executed in cooperation with Petrol Energetika - PE Štore.
These measures included:
-building of an embankment on the right bank of the Voglajna river on a distance from the site where the Steelworks' material is prepared to the premises of company Multimovens.
- on all effluents from the Steelworks and asphalt surfaces which are linked to the main rainwater collector of hinterland water from the site of Maribor –Ljubljana railway line were installed counter-flow valves.
- the Petrol Energetika secured the over flow from the SIIIa pool by a flip-drop flap.
- the Petrol Energetika will in case of a flood use its pumps for pumping of water from the SIIIa pool through an emergency release placed on the decarbonisation site on the energy bridge.
- on the cable duct spread nearby the Steelworks, at the site of the Steelworks' entrance, was built a flood-protection wall;
- at the intersection of cable ducts coming from the Steelworks and from the central transformer station was at the site of the Rolling mill entrance built a gate;
- on the north side of the Rolling mill, near the SIIa pumping station and the ecological stock as well as near the boiler room, were there placed two constructions for installing of flood protecting gates;
- together with corresponding tubes were there bought also some submersible pumps of capacities from 700-2300 l/ min.;
- there was purchased also an adequate number of anti-flood bags;
As part of project documentation for the new continuous rolling line was there also produced a project for protection of the outer walls - facades of buildings. This protection will be implemented in three ways:
A. With "big-bag" bags stored in the extension building of the Steelworks will be there protected:
- the whole extension building of the Steelworks and one part of the Rolling mill;
- all sectional lift-up doors in the extension building of the Steelworks;
- all floor gratings;
B. With prefabricated anti-flood gates will be protected:
- all sliding and folding doors on the north and south side of the Rolling mill;
C. With bags filled with granular material will be there :
- filled gaps between the "big bags";
- protected entrances into the final products' warehouse;
The Cold processing plant seems - on base of an "100-year water" analysis not to be flood endangered. Based on an elaborate, made by a projective organization called Hidrosvet, we developed a "manual in case of a flood event."
In the manual are there defined measures, including responsibilities for local flood protection. The measures include:
- performing of activities related to monitoring of meteorological and other data associated with an increasing water levels of water courses;
- decisions about starting of performing of the measures;
- performing of the measures;
- stop of production;
- turn –off of the voltage;
- an eventual evacuation of employees.
I am sure that we made, considering all experience from the last two floods, a good systematic approach to the flood-protecting measures, and in this way reduced or at least limited a possibility of flood surprises to a minimum – of course, if also the state authorities will implement their measures within their competences.

Bogdan Žekar, head of investment projects

Above: cleaning of banks - discovering of in former times already executed amelioration of Voglajna river course

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

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



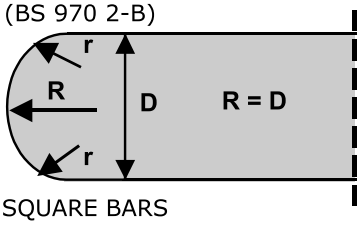
FLAT BARS
DIN EN 10092-1-B
(DIN 4620)

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

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

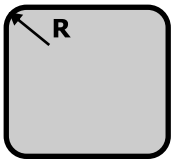
ENGINEERING STEEL
Forging steel:
EN 10025: St52-3, St37-2
EN 10083-1: from Ck22 to Ck60, 25CrMo(S)4, 34CrMo(S)4, 42CrMo(S)4,
EN 10084: 16MnCr(S)5, 20MoCr(S)5, 20MnCr(S)5
EN 10083-3: 30MnB5,
DIN EN ISO 4957: 31CrV3, 51CrV4
Carbon steel - case - hardening:
EN 10084: C10, C15, Ck10, Cm15, Ck15
Carbon steel - hardening and tempering:
EN 10083-1: Ck22, Ck25, Ck35, Ck45, Ck55, Ck50, Ck60
Structural steel:
EN 10025: St37-2, RSt37-2, St44-2, St50-2, St60-2, St70-2, St52-3
Steel for welded chains:
DIN 17115: 27MnSi5, 20NiCrMo2, 23MnNiMoCr54
Steel for cold forging:
DIN 1654: QSt323, 15CrNi6, 36CrNiMo4, 21NiCrMo2, 30CrNiMo8, 34CrNiMo6, 38Cr2, 34Cr4, 37Cr4, 41Cr4, 16MnCr5, 20MnCr5, 25CrMo4, 34CrMo4, 41CrMo4,
Alloyed steel:
EN 10083-1: 36CrNiMo4, 30CrNiMo8, 34CrNiMo6, 38Cr4, 34Cr4, 37Cr4, 41Cr4, 25CrMo4, 34CrMo4, 42CrMo4, 50CrMo4, 30CrMoV9, 51CrV4
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

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

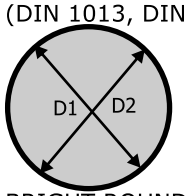


EXEM STEEL WITH IMPROVED MACHINABILITY:
WNr.: 20MnV6 EX, 38MnVS6 EX, 30MnB4+Ti EX, C15 EX,
EN 10084: 16MnCr(S)5 EX, 21NiCrMo2 EX, 20MnCr(S)5 EX,
EN 10084 in UNI 7846:16CrNi4 EX,
EN 10025: RSt37-2 EX, St52-3 EX,
EN 10083-2: C22 EX, C35 EX, C40 EX, C45 EX,
EN 10083-1: Ck45 EX, 42CrMo(S)4 EX,
UNI 7845: 39NiCrMo3 EX,
UNI 7846: 18NiCrMo5 EX,

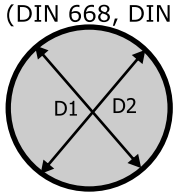
SQUARE BARS
WITH ROUND EDGES
DIN EN 10059 (DIN 1014)



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
EN 10058 (DIN 1017)	65 - 120 x 40 - 55
EN 10058 (DIN 1017)	50 - 150 x 7 - 40
EN 10058 (DIN 59200)	150 - 200 x 7 - 25
EN 10092-1-A (DIN 59145)	50 - 120 x 8 - 35
EN 10092-1-B (DIN 4620)	50 - 200 x 7 - 30
EN 10092-1-C (DIN 59146)	60 - 120 x 16 - 62
EN 10089 (BS 970 2-B)	60 - 120 x 30 - 36, 40 - 42
EN 10092-2 (DIN 1570)	90-120 x 10-20

ROUND

Standard	Diameter/Process
EN 10060 (DIN 1013)	25 - 68, 70, 72, 73, 75, 77, 78, 80, 82, 83, 85, 90, 95, 100, 105 mm / rolled
EN 10060 (DIN 2077)	25 - 68, 70, 72, 73, 75, 77, 78, 80 mm / rolled
EN 10278 (DIN 668)	24 - 50 mm / drawn 24 - 95 mm / peeled
EN 10278 (DIN 671)	24 - 95 mm / peeled

ISO 9001
ISO 14001
OHSAS 18001
BUREAU VERITAS
Certification
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ISO/TS 16949
BUREAU VERITAS
Certification

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