

ŠTOREQSTEEL

165 let

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Courage, knowledge and business development

Another year is coming to an end. A year, in which sales prices hit the lowest point in the recent years. We endured the pressure of cheap steel from surplus capacities, successfully started the new continuous caster and increased the production



We started with the preparation of a new strategic document for the period until 2021, which will address numerous challenges that exceed everyday activities.

Our company is a part of industry that is very demanding on investments and at the same time severely exposed to competition from the cost efficiency standpoint. Remaining cost competitive, keeping our products in a higher price range and at the same time constantly reaching quality will be also in future a measure of our investment efficiency. We have enough knowledge to develop new products, for which we will have to look for all the synergy with development institutions that are available to us.

In the near future, we will have to take advantage of society's attention to circular economy. Circular economy has always been a basis of our business model.

We have to use all by-products in the steel production to reuse all the available materials. There has been a lot done in the field of energy efficiency but smaller

consumers of electricity will be made more efficient too. Some more opportunities are to be exploited in the use of waste energy.

There is a lack of recognition of common interests by economic, environmental and social institutions for an environmentally friendly development. For example, Slovenia has a great opportunity for using slag by creating conditions for relatively small quantities of slag from three locations, where steel is produced (Jesenice, Ravne, Štore), to become a part of circular economy. Courage, knowledge and development supported by corresponding legislation and regulations are needed for that.

In the times to come, the key imperatives to have are to be courageous, use knowledge and develop business. We believe that these are the mechanisms that empower us to be more flexible and present on the most demanding markets.

Marjan Ma košek, Jani Jurkošek, Boris Kumer

On the cover: Bundle of flat bars with logo Infinity Recyclable; photo above: Jani Jurkošek, Marjan Ma košek, Boris Kumer

Expanding the Product range

Our business environment is rather demanding since we produce within EU, where environmental and social standards are high. That is why production costs are essentially higher when compared to those by competition from Asia (Turkey, China, India...).



The local environment (Slovenia) is also not inclined to energy intensive industries such as ours. That is why we try hard to keep a good image in the public.

Spring steels for flat springs are still our basic product, where the quantity is decreasing despite keeping a one-third share in the European market. That is a result of globalisation since truck industry is moving to more cost effective parts of the world, though with slight delay. By following development trends and satisfying customers, we are definitely going to try to keep the status of the first supplier.

The second largest sales segment are steels for automotive part forging, which are supplied to one of our owners (Unior, Unidal, Ningbo), and are supplied for the same purpose to other customers all across Europe. With this product group there is still some market potential to be gained – particularly with new generation of microalloyed steels.

The third group are engineering steels, which after being further processed; also to a large extent end up in the automotive industry. This group is of particular interest because we can reach higher added value by additional processing (peeling, sawing, centre boring). This group also has potential to grow including higher

Photo: Visitor of Doors open day have tour on new continuous caster

degree of product finalisation.

By starting the new continuous casting line, new opportunities arise to expand our product range and enter new market niches. Here we talk about higher alloy steels, which could not be cast on the old caster. It is important that these are not mass produced steels, which are manufactured in millions of tons and where the competition is the largest. These specific steels are of various shapes and are used in industries where our presence is not worth mentioning. A part of these steels belongs to tool steels, which are used in rubber, paper, wood and other industries. This kind of steels belong due to their specifics into a higher price range that will improve conditions for increasing added value.

We are aware that this cannot happen overnight and that we will have to put a lot of development into it and a smaller investment or two. But this is by all means a course that enables us to continue growing.

By manufacturing steel in higher ranges, we could decrease the effects of transport costs on the final price. This would enable us to enter into more remote markets, such as USA, Canada, South America, Asia...

Jani Jurkošek

Strategic Conference

The Štore Steel company organised on 17 November 2016 in Terme atež the first in a series of meetings of employees in the scope of activities to prepare the new company strategy for the 2017-2021 period. Thirty-three employees, who took part at the conference, exchanged their opinions in a very constructive and open way to highlight the present situation of the company.



Why was this strategic conference so much different from the previous ones? In the years that followed the turbulent year 2009, when there was a partial recovery of European economy, the Štore Steel company faced numerous challenges, which surpass everyday adaptations to new situations. We are indeed a small company but nevertheless deeply involved and dependent of events on the European and world steel market. Our industry is very demanding the investment standpoint. On the other hand, we are expected to be highly flexible in finding appropriate answers to customer expectations within the demanding automotive industry.

Who are we? What are our values? Where are we going? What do we expect from the company? Do we

understand the present and know what the future holds? Are our competitive advantages, which we so much like to quote, still our competitive advantages or are they becoming our weaknesses? Who are our old and new competitors? What are the dangers awaiting us? These and similar questions are part of our everyday and it is only right to answer them adequately in the following months.

The meeting in atež was primarily intended for exchange of views and highlighting the present situation of Štore Steel. Views were exchanged among process engineers, heads of departments, services and plants, and members of management. We were all equal in the discussion; we tried to create conditions for completely new considerations and ideas.

Photo: Participants of the strategic conference



Most important questions, of course referred to the field of our product sales. Štore Steel are bound up with the automotive market with more than 90% of its products. This market is extremely demanding and due to expansion of competition from China and Turkey to the European market, becoming less profitable in a certain segment. Consequently, we are abandoning less demanding and therefore less profitable products and thus changing our competition structure.

We are aware of importance of the coming investment cycle, which will enable us stabile quality and cost efficiency of the existing product range, which will be competitive to larger European automotive industry suppliers. Customers often give priority to the product cost and less to other benefits, such as technical service, one-month delivery periods and fast response time.

At the same time, we will have to find opportunities to enter other market niches, perhaps to more remote markets, which will lessen our dependence on automotive industry and European market. We have enough knowledge to seriously consider entering the field of certain tool steels. We would like to continue the development of products with a higher added value. Mass production is not the way Štore Steel would like to tread.

Photo: in-line dimension and profile measurement system Zumbach

It is completely clear that development plans cannot be carried out without enthusiastic employees. It is necessary to ensure that all the employees will understand what is happening around and in the company, and create an atmosphere that will encourage creativity and innovativeness. A part of that is adjusting company culture and organisation, which has to be able to convincingly respond to the present challenges at any time. We want to work in a company, where we respect each other, can rely on each other and we can all be proud of. The company and employees are willing to invest their creativity, energy and time into their products but also want to be adequately rewarded for that.

It is important that the initiatives for ideas, which emerged in Štore Steel, originate within the company. Today's generation of employees does not accept mediocrity. It wants the company to be ambitious, even more successful and they want to express their opinions. Energy that is brought to the company by many young people is a guarantee of the company's bright and long-term future. With new ideas and decisive actions!

Boris Kumer

Additional processing - possibilities and capacities

Quick economic development in the recent years has changed and is still changing thoroughly the traditional way of thinking and working in all activities. Every economy has the same goal – to confront the global market and remain there.

	2010	2011	2012	2013	2014	2015
Total sales (t)	127000	135000	115000	126000	130000	135000
Peeled steel (t)	20300	21330	21350	27620	33720	37100
Sawn flat steel (t)	8970	11160	10880	10978	12400	11590
Together(t)	29270	32490	32230	38600	46120	48690
Share	23,0 %	24,1 %	28,0 %	30,6 %	35,5 %	36,1 %

Table 1: Additional processing quantities in comparison to total sales of the company.

If ten years ago the undeveloped world (China, Turkey...) did not present a serious threat to the developed countries, this is not the case anymore. That reflects heavily in steel industry too. Competition in the steel industry market has become increasingly larger since the countries from the undeveloped world have entered it. Capacities are essentially bigger than the number of consumers. That is also one of the reasons, why the prices of steel products are falling every year.

Our company has to face these problems too. Štore Steel as a mini steelworks can survive only by being adaptable and reacting fast to changes, which is what large companies cannot do. That is why the orientation into a steelmaker according to user's demands in market niches, which cannot be met by big manufacturers, is the only right one. It is also the right decision to orient to production of steels with a higher level of additional processing. Additional processing

brings higher prices and bigger added value. Added value is a basic economic indicator and the fundamental standard of economic activity and success of a company.

As can be seen from Table 1, the share of additional processing (peeling bars and cutting flat steel) in total sales increased from 23% in 2010 to 36.1 % in 2015. The share of sawn flat spring steel has been around 9% (11,000 t) for years, the share of peeled steel in total sales increased on the other hand from 16 % (20,300 t) in 2010 to 27 % (37,100 t) in 2015. As can be seen from Table 2, the share of the sawn peeled steel in total sales of peeled steels increased from 21.8% (4,420 t) in 2010 to 27.3 % (10,110 t) in 2015. In Table 2 can also be seen that the sales of half axles with central bores increased from 80,000 pieces (160 t) in 2010 to 400,000 pieces (800 t) in 2015.

	2010	2011	2012	2013	2014	2015
Peeled steel (t)	20300	21330	21350	27620	33720	37100
Sawn steel (t)	4420	5020	5050	6500	7140	10110
Center bores (t)	160	170	170	180	400	800
Share of sawn steel	21,8 %	23,5 %	23,7 %	23,5 %	21,2 %	27,3 %
Share of center bores in comparison to sawn steel	3,6 %	3,4 %	3,4 %	2,8 %	5,6 %	7,9 %

Table 2: Additional processing quantities from peeled steel.



All business plans of the company include as one of the goals production of steels with a higher level of additional processing. That is why we started with production of peeled steels in 1998 and in 2002 with sawn flat spring steel, which reached the peak in 2008, when we sawed 29,000 t of flat spring steel. The production of drawn steel was decreasing and in 2013, we put an end to drawn steel production. In 2006, we started sawing peeled steel bars for half axles that have been increasing every year now. In 2014, we started producing sawn pieces from peeled steel for cold forging, where weight of sawn pieces in grams is essential and not the length tolerance. In the same year, we developed technology and purchased equipment for boring flat spring steel. We also deliver to the NEAPCO customer two products from our steel that demand a lot of additional processing (turning). This machining and centre boring is outsourced.

All additional processing that is already performed by Cold Finishing (inclusive outsourced) such as:

- cutting of flat spring steel,
 - boring of flat spring steel,
 - cutting of peeled steel (half axles and others),
 - cutting of peeled steel for cold forging,
 - centralization of half axles (outsourced),
 - production of final products such as drive shaft, front shaft (outsourced) and more,
 - other sorts of cutting,
- have to be further developed.

Photo: cutting of peeled steel for half axles

Sawing peeled steel capacities will be increased at the beginning of the year by purchasing a new saw. Capacities for other additional processing are still large enough. However, a decision will have to be made whether we develop operations and manufacturing of products that are now outsourced or they will be still outsourced. Which of course depends on customers (quantities).

Further possibilities of additional processing development of peeled steel are oriented to:

- cutting of peeled spring steel for stabilisers (1-2m length),
- manufacturing of racks for steering shafts,
- manufacturing of products for direct installation in the automotive industry and
- there are needs for induction hardening (EUR 2 million investment)

Induction hardening again opens new possibilities of further processing (grinding...).

By further developing additional processing we will follow customers' demands as well as our joint goal: to improve our steel by increasing additional processing and creating higher added value.

Alojz Gajšek

Circular (geen) Economy - Waste

'This blue planet of ours is the most delightful habitat we know. Its life is our life; its future, our future.'

Dalai Lama

Is linear economy a definition for the end of humankind?

Is circular economy a solution for it?

Maybe... or setting an appropriate ecosystem on Mars...



Humans are created to hunt, which enabled them to survive in the past and that is still seen in our way of living. Modern people don't like changes that is why we subconsciously try to destroy everything that is unknown, different to us. Man is a creature who can destroy the planet and therefore himself. Unless changes become something permanent, unavoidable. We have to learn how to turn a line into a circle...

It was back in 1769, when James Watt invented a steam engine and so man modernised through the industrial revolution and started introducing the linear industrial system, which uses natural resources to manufacture material assets and after its lifespan discards the product in form of waste.

Is it really necessary for every family to own two cars? And every 10-year old a new telephone every two

Photo: new steel will be made from waste

years? A telephone that will all too soon become worthless waste.

'It is not important to have your own watch but to always know the time,' says Guido Braam, Netherlands Circular Hotspot project leader.

'Instead of continuing to sell cars, we must sell as much mobility as possible,' believes former European Commissioner for Environment and present International Resource Panel member at UN Janez Potočnik.

The linear model is entirely dependent on natural resources, which quantities are not unlimited, available and affordable. Continuous growth of world population creates an additional pressure. Dependence on raw materials is the weak spot of world economy.



The model of circular economy has developed as a response to risks of linear economy, which should be abandoned in opinion of most ecologists. Circular economy model introduces a new pattern, which is based on facts that sources are not unlimited, are becoming less available and that there are real restrictions on our planet. Economy focuses on reuse, repair and recycling of existing materials and products. It demands use of renewable energy sources, abandons use of dangerous chemicals, decreases raw material use and reduces waste by carefully designing products. The concept originates in natural systems, where every component optimally supplements the whole. Products in circular economy are carefully designed to enable material circulation and preserving added value for as long as possible. Products remain within the economy even after they reach their lifespan.

According to circular (green) economy, we are trying to keep various sources in the circle for as long as possible but there are business models, patterns and habits to be changed for that. Recycling is a solution but in circular economy system, it only presents one of the stages – the last one. Products have to be planned in a way to consider the fact that sources are limited and take costs into account. If possible, they should be designed to replace individual components with such that have a longer lifespan.

Efficient use of resources and circular economy have become Europe's development goals until 2030 and further through strategic documents like Plan for Europe, Roadmap to a resource-efficient Europe and 7th EU Environment Action.

The European Commission published in the beginning of July 2016 a packet Towards a circular economy: A

zero waste programme for Europe (<http://ebm.si/zw/o/2014/evropa-snuje-pot-v-krožno-gospodarstvo-kaj-pa-mi>). In the packet, it proposes formation of joint and coordinated framework for circular economy support. This includes smart regulation, market-based instruments, information exchange and support for voluntary approaches. They include key fields of research and development, design, investment and financing unlocking, company and consumer support, and policy and objective modernising in the field of waste management.

By 2025, landfilling of recyclable materials will be banned. Among other measures, there are better traceability of dangerous waste, setting of minimum requirements for strengthened producer responsibility, simplified reporting, and use of economic instruments and simplification of waste legislation.

In Slovenia, there is no strategy for efficient resources use, also, there is no strategy for circular economy, and we even don't have strategy for waste management or an operational program for waste reduction. However, there are quite some cases of good practice in companies, among researchers and innovators...

There is usually only one right way. Others are better or worse alternatives. Moreover, since we have only one planet, as a raw material and natural resources consumer we have only one right way to step:

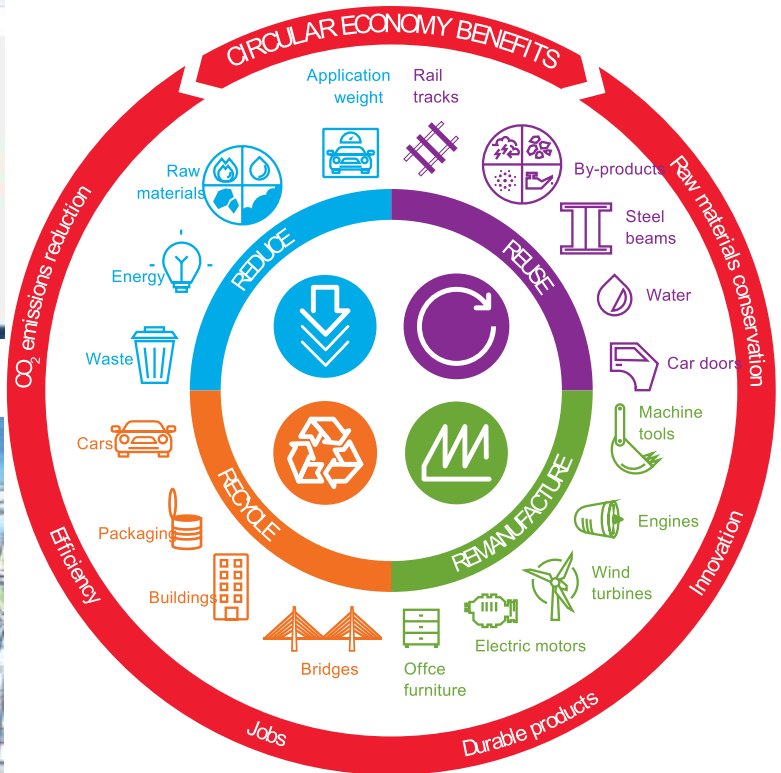
'Circular economy yes or no, that is not a question anymore. Circular economy is here.'

Brigita Kokli

Photo: building materials will be made from slag – by-product of steel

On Circular Economy in Steelmaking

Circular economy is essentially the basis of the business model of electric steelworks such as Štore Steel, which re-melt steel waste into new types of steel.



Sources from the second half of the 19th century show that waste use, as a manufacturing source has always been present in thinking of the management of our company. In the statistical overview of iron industry in the Duchy of Styria in 1857 (Die Eisen-Industrie des Herzogthums Steiermark im Jahre 1857, Josef Rossiwall, Wien 1860) the following record can be found „In descriptions of the ironworks a blast furnace for smelting slag was mentioned. It was built to process slag and ore in a way that had not been used until then under the privilege acquired by the manager of the company C. A. Frey in Štore and mining engineer F. Lang.“

Circular economy in steelmaking sources is nowadays a well-described and elaborated topic. On the World Steel Association's internet site www.worldsteel.org we can download a Steel – The permanent material in the circular economy brochure on 24 pages with rich infographics. We can also dive into the material on <http://circulareconomy-worldsteel.org/>.

The subject starts with the 4Rs commandments: Reduce – Reuse – Remanufacture – Recycle.

By commandment Reduce, we decrease the amount of material, energy, other resources used to create steel, and at the same time, we reduce the weight of steel used in products due to higher grades of steel.

By Reusing we use the object or material for its original purpose or a similar purpose in the same or different form. The reuse has to be considered in the earliest design phases. This topic also includes use of by-products of steel manufacturing for new products.

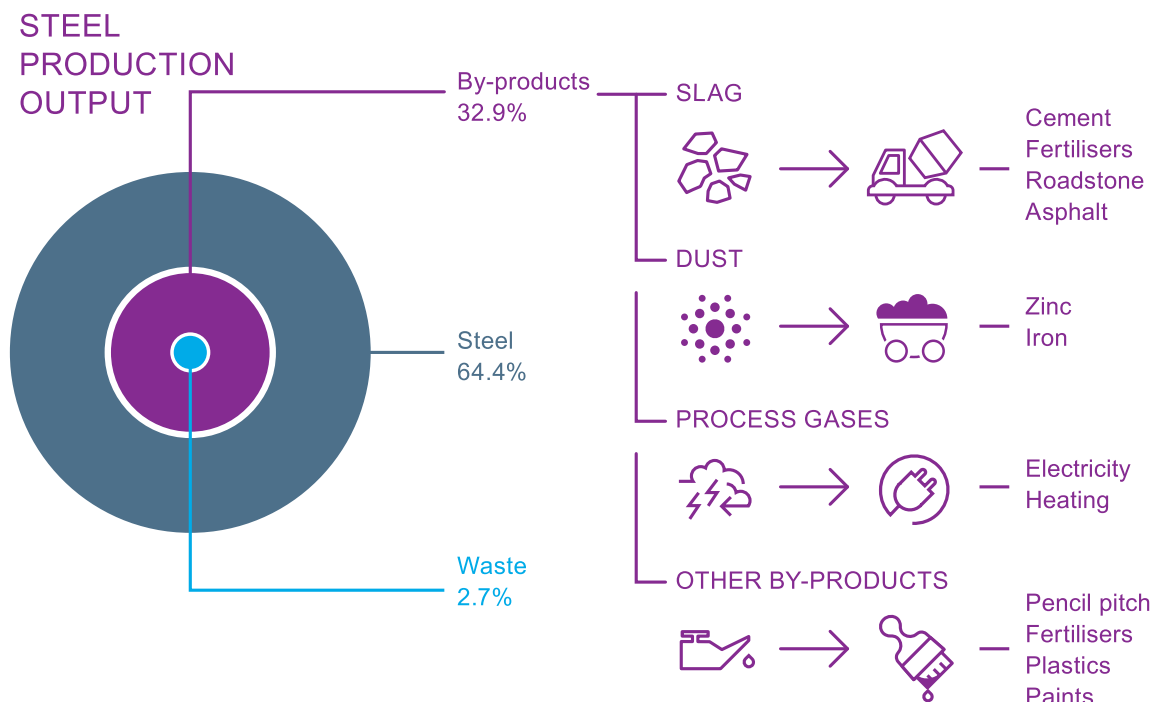
Remanufacturing is becoming increasingly important since steel products can be restored to as-new condition and it is not necessary to discard them and purchase new ones.

By Recycling we melt steel products at the end of their useful life and create steels for new products. Steel can be repeatedly recycled forever.

By circular economy in steel industry, we preserve natural resources, reduce energy use and create new jobs.

Above right: web page www.worldsteel.org; Below right: illustration from Metals Magazine; Left: infographics from brochure Steel – The permanent material in the circular economy (www.worldsteel.org);

Main steelmaking by-products and their uses



The European Steel Association EUROFER has contributed several facts on steel in the discussion on circular economy in the European Commission (www.eurofer.org, 12/5/2015):

Steel is 100% recyclable and is the most recycled material in the world. Steel properties in its lifespan contribute to efficiency of the product and to reduction of environmental impact. Lifespan of steel products is longer than with other materials, appropriately designed products can be repaired and their durability is prolonged.

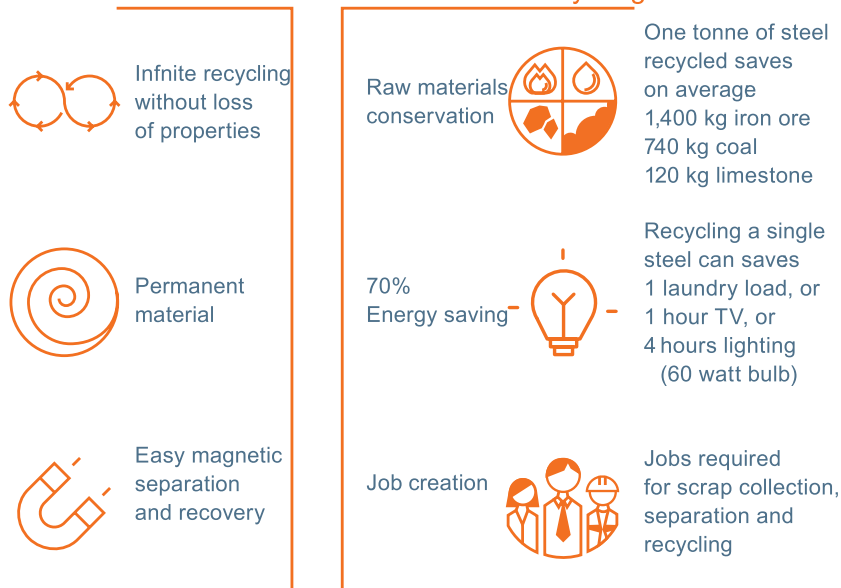
Collecting waste steel for steel manufacturing is an activity with a very long tradition, low cost and a well-established infrastructure. Due to magnetic properties of steel, steel waste can be efficiently separated from other waste. 56% of steel produced in Europe comes from waste steel.

EUROFER suggests to the Commission to redefine the term recycling in the existing European Waste legislation. It should provide for encouragement of recycling and reduction of waste landfilling. Furthermore – steel waste should be considered an important material source in the European Union.

Regarding the product policy, i.e. Ecodesign Directive, the Commission should recognise the concept of “permanent materials” such as steel and encourage their use.

By-products such as slag can replace materials from natural sources and it is not necessary to discard them. The Commission should enable their equivalent use within legal powers.

Steel attributes — Benefits of steel recycling



For steel industry and everyone living in a circular economy society, it is essential to have a long-term vision. A lot of that can be found in an interesting article in the Metals Magazine 2/2016, The Future of Metals – The outlook for the metals industry in the decades to come (www.primetals.com).

Before we leave our future to advanced and daring technological solutions, let us think of our behaviour and how we can contribute to a better future.

Marjan Ma košek, Gorazd Tratnik

Zgoraj: infographics from brochure Steel – The permanent material in the circular economy (www.worldsteel.org);

Energy Efficiency

The company Štore Steel has been aware of the energy efficiency importance for many years. As a socially responsible company, we are continuously trying to improve energy efficiency. Being an energy intensive company, where energy costs represent over 13%, we are forced to reduce specific energy use because of the competition too.



Monitoring energy use, setting goals and programs for a more efficient use of energy as well as monitoring how these goals and programs are met, have been a long-term practice in steel industry. This has been done systematically within the environment management system, which is confirmed by the ISO 14001 standard. We acquired the certification in 2007 for the first time and have been continuously renewing it since. We are aware of importance of an effective and active energy management that is why we deal with efficient energy use on a daily basis.

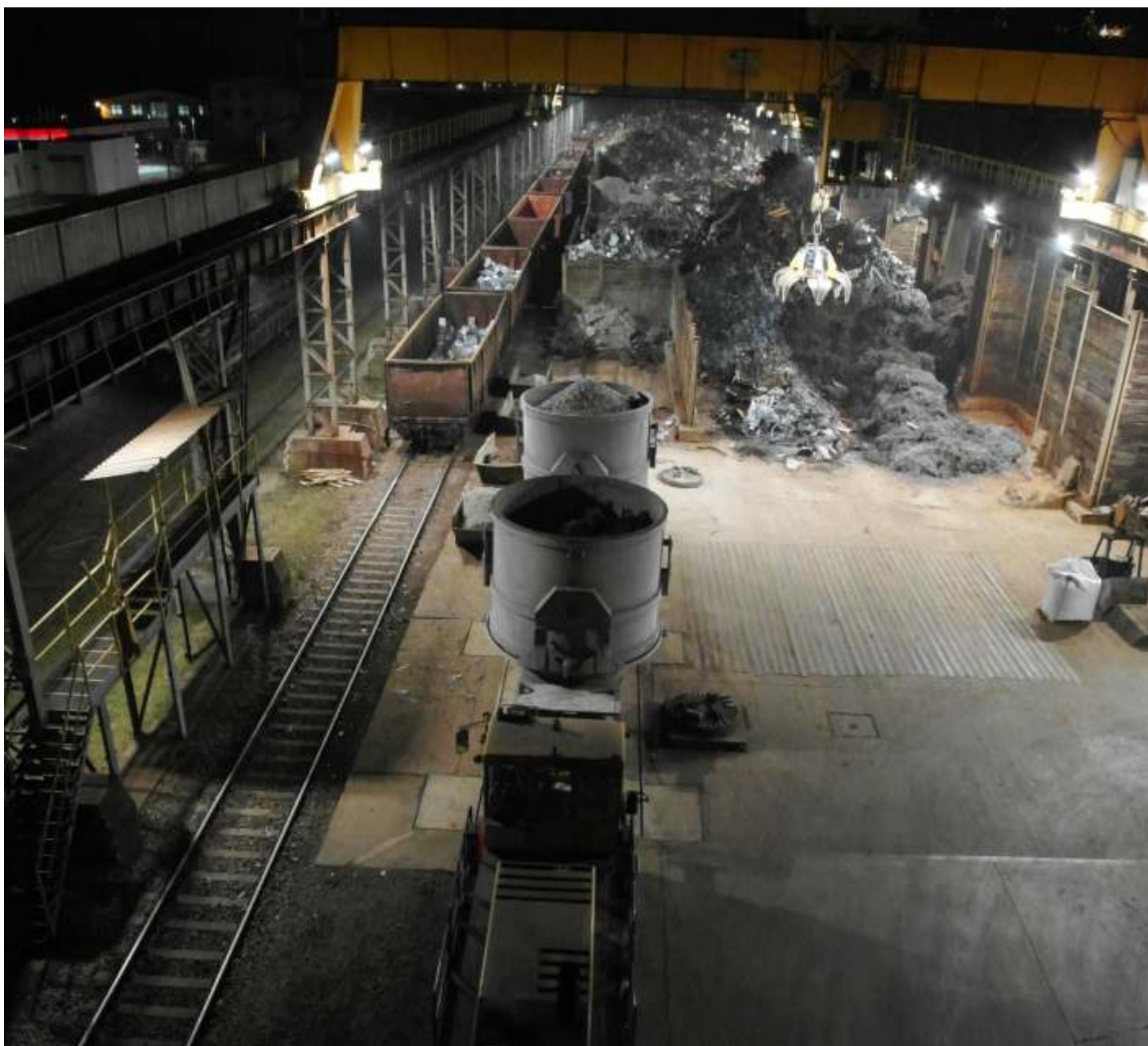
When compared to competition, the energy efficiency of our company proved to be on a very high level. This was confirmed by energy use supervisions that found out that most of the technologies used in the company belong to the best available technologies (BAT). There are some further measures that would enable us to achieve a certain reduction of energy use, but are when

compared to the total use of energy relatively small. Most of these measures demand considerable investments, which are for the company difficult to provide, due to long pay-back time.

The company's annual consumption is approximately 120 GWh of electric energy and for 120 GWh of natural gas. The energy use supervision revealed that all the suggested measures would save us approximately five GWh a year. Among suggested measures are some worth mentioning such as improving motor efficiency, reconstruction of the cooling system, reduction of compressed air leakages and lighting reconstruction. This year we have decided to renovate the existing lighting based on energy performance contracting to improve energy efficiency.

The renovation is being performed by two energy performance contractors: BUTAN PLIN d.d. and GEOPLIN d.o.o..

Photo: lighting of the cold finishing hall



BUTAN PLIN d.d. is carrying out energy performance contracting in the steel cold finishing hall, scrap yard and exterior lighting. Despite less power of installed illuminants when compared with the old ones, is illumination at both locations much better after renovation. At the same time, we reduced electricity consumption in cold finishing hall by 2 and a half, in scrap yard 4 times and exterior lighting by little less than 2 times. With replacements there will be an annual saving of 240 thousands kWh.

GEOPLIN d.o.o. is carrying out lighting system renovation in the halls of the rolling mill, where LED illuminants will replace more than 750 old illuminants. After renovation of the illumination system, the power of illuminants will be 3 times lower, which means that there will be an annual saving of 1,8 million kWh.

When renovating the illumination system, we will

upgrade the monitoring system for electrical energy usage as well. Electrical energy meters will be installed to enable independent monitoring of illuminants usage in individual halls and monitoring usage of larger machines, e.g. straightening machine, saw, shears, control line, press...

Despite a high energy efficiency index in the company, there are still some potential sources of wasted energy that could be used. Development of new technologies increases economic viability of investments for using this energy. In the future, we are planning to use the heat of flue gases from steelworks, heating oven in the rolling mill and annealing furnaces. This heat can be used for district heating, steam production or electricity production.

Bojan Sen i

Photo: lighting of the scrap yard

Equipment for Measuring Dimension and Profile of Rolled Pieces

Measuring the dimension and profile of hot rolled pieces is a demanding process due to heat and speed of production. These measurements have been performed manually so far without automatic measurement devices. In 2015, we decided to modernise the measurement equipment and started an investment in an in-line measurement system of the company Zumbach.



Performing manual measurement of dimension and profile of rolled pieces is not feasible in a modern industrial rolling process. Every time we changed dimension or profile, we had to perform hot measurement with a calliper, burning wood into the profile and also cut a sample, cool it rapidly, measure it and compare it to different templates. Such sample measurements do not assure a controlled and constant rolling process.

To provide better measurement coverage we decided in 2015 to purchase an in-line dimension and profile measurement system for hot rolled pieces. After having studied available systems on the market, we chose two measurement systems for the final decision Zumbach and LAP. After introduction of the two companies and demonstration of working measurement systems in the Saarstahl and DEW rolling mills, we chose for the supplier the Swiss Zumbach company with their PROFILMASTER SPS 400-S4 measurement system.

The PROFILMASTER SPS 400-S4 uses four heads at angles of 45°, 135°, 215° and 305° for measurements. Each head has a camera with resolution 2048x1088 and a type 3B laser. To avoid interferences, the lasers work at two different wavelengths, that is, at 405nm (purple) and 450 nm (blue). The measuring field is a circle in the centre of the measuring unit with a diameter of 400mm, which can be shot by each of the cameras and adjusted to the profile we are measuring. The measurement can be performed at a maximum total frequency of 2000 Hz⁻¹, which means that 500 measurements of the whole profile can be performed in a second. The laser draws a contour on the profile, which is shot by the camera. The data from the camera is then processed by the Profile Gauge

computer system, which connects individually measured points, compares them to the other cameras, and draws and measures the whole cross-section at once. The PROFILMASTER program was developed to simplify interaction between the user and measurement and which enables the display of measurements according to users' wishes. The program enables current creation of SPCs, with Cp, Cpk and X charts, which will enable a real-time insight in the process stability and fast response time in case of eventual irregularities. We agreed with Zumbach on use of a test program for surface fault detection- SFD, which scans the surface of rolled pieces and detects larger surface irregularities.

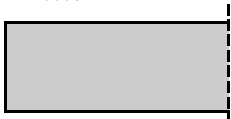
To ensure the best possible working process, we will have to lay emphasis on training of staff, who will use the device and also respect their wishes. The development of the device will be done in co-operation between Zumbach and our employees. The Zumbach company wants to use our company for reference in the field of steel profiles. Great emphasis will have to be laid on technology that is necessary to obtain accurate measurements (e.g. shrinkage, emission factors) and optimum working conditions for the measuring device.

The device was commissioned and tested in the beginning of November in Orpundu in Switzerland. The measuring system will start with a test run in the beginning of December in the presence of the Zumbach company engineers. A complete integration of the system into operation of the continuous rolling line is planned by March 31, 2017.

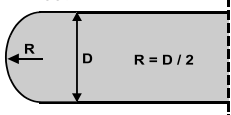
Andrej Resnik

CROSS-SECTION SHAPES

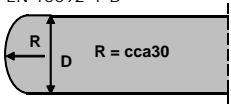
FLAT BARS WITH SHARP EDGES
EN 10058



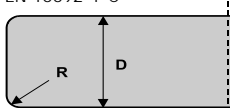
FLAT BARS
EN 10092-1-A



FLAT BARS
EN 10092-1-B



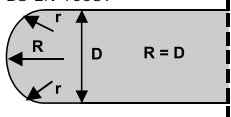
FLAT BARS
EN 10092-1-C



FLAT BARS
EN 10092-2



FLAT BARS
BS EN 10089



SPRING STEEL:

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

ENGINEERING STEEL:

Forging steel:

EN 10025-2: S355J2, S235JR
EN 10083-2: od C22R, C35R, C40R, C45R, C50R, C55R, C60R
EN 10084: 16MnCr(S)5, 20MoCr(S)5, 20MnCr(S)5
EN 10083-3: 30MnB5, 25CrMo(S)4, 34CrMo(S)4, 42CrMo(S)4,
DIN 17350: 31CrV3, 51CrV4

Carbon steel – for case – hardening:

EN 10084: C10E, C15E, C10R, C15R

Alloyed steel - for case – hardening:

EN 10084: 17Cr3, 16MnCr5, 20MnCr5, 18CrMo4, 20MoCr4, 17CrNi6-6, 20NiCrMo2-2, 18CrNiMo7-6

Carbon steel – for hardening and tempering:

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

Alloyed steel - for hardening and tempering:

EN 10083-3: 30CrNiMo8, 34CrNiMo6, 34Cr4, 41Cr4, 25CrMo4, 34CrMo4, 42CrMo4, 50CrMo4, 51CrV4

Structural steel:

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

Steel for welded chains:

DIN 17115: 27MnSi5, 20NiCrMo2, 23MnNiMoCr54

Steel for cold forging:

EN 10263: C4C, 17Cr3, 17CrNi6-6, 18CrMoS4, 34CrNiMo4, 20NiCrMoS2-2,
38Cr2, 34Cr4, 37Cr4, 41Cr4, 16MnCrS5, 20MnCrS5, 25CrMo4, 34CrMo4, 22B2

Alloyed steel:

WNR.:1.5231: 38Cr4

EN 10083-3: 30CrNiMo8, 34CrNiMo6, 34CrS4, 37CrS4, 41CrS4, 25CrMoS4, 34CrMoS4, 42CrMoS4, 50CrMo4, 51CrV4

EN 10085: 31CrMoV9

Structural steel for housings of bearings:

DIN EN ISO 683-17: 100Cr6, 100CrMnSi6-4

Steel for heavy duty automotive parts:

WNR.:1.5231: 38MnVS5

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

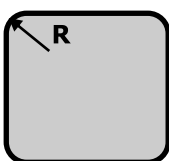
VW-500-30: 36MnVS4, 70MnVS4, 46MnVS5

EXEM STEEL WITH IMPROVED MACHINABILITY:

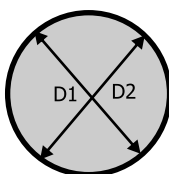
po WNR.: 20MnV6 EX, 38MnVS6 EX, 30MnB4+Ti EX
EN 10084: C15R EX, 16MnCrS5 EX, 20NiCrMoS2-2 EX, 20MnCrS5 EX,
EN 10084 in UNI 7846: 16CrNi4 EX,
EN 10025-2: S235JR EX, S355J2 EX,
EN 10083-2: C22R EX, C35R EX, C40R EX, C45R EX,
EN 10083-3: 25CrMo4 EX, 41CrS4 EX, 42CrMoS4 EX
UNI 7845: 39NiCrMo3 EX,
UNI 7846: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



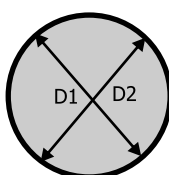
SQUARE BARS
WITH ROUND EDGES
EN 10059



ROUND BARS
EN 10060



BRIGHT ROUND BARS
EN 10278



SQUARE		FLAT	
Dimension mm	Radius mm	Standard	Dimensions mm
40 x 40	6	EN 10058	50-200 x 8-62
45 x 45	6	EN 10092-1-A	60-150 x 8-36
50 x 50	6	EN 10092-1-B	50-200 x 8-35
55 x 55	8	EN 10092-1-C	60-120 x 14-67
60 x 60	10	EN 10092-2	120 x 12-20
65 x 65	10	BS EN 10089	60-120 x 27-42
70 x 70	10		

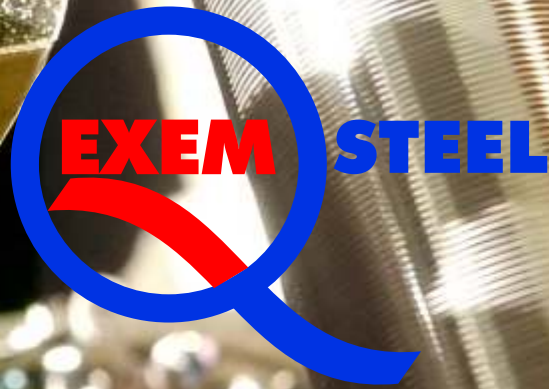
ROUND	
Standard	Diameter / Process
EN 10060	20-68, 70, 72, 73, 75, 77, 78, 80, 82, 83, 85, 90, 95, 100, 105 mm / rolled
EN 10278 (h11)	18-105 mm / peeled
EN 10278 (h9)	18-100 mm / peeled



ISO/TS 18949
BUREAU VERITAS
Certification
N° SLO - 16561/TS



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



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Železarska cesta 3, 3220 Štore, Slovenia
Phone: ++386 3 78 05 100
Fax: ++386 3 78 05 384
www.store-steel.si