

ŠTORE QSTEEL

50 years cold finishing

**Drawing Mill - Cold Finishing
1969 - 2019**

Štore, 29. 6. 2019



Vision of finalization

There can not be 50 years of existence of an activity or a production without the effort of people, without the development and the vision... Every anniversary, both the individual or of the company, is an opportunity to look back to the past, as well as to the future. Every future has its own past. So is the 50th anniversary of the Cold finishing an opportunity to remember the beginnings – the foundation of this plant and its development and the perspectives within the company Štore Steel. During this time the plant suffered great shocks, the same as the ironmaking in Štore in the years 1990 – 1997. Social changes (the disintegration of Yugoslavia, the collapse of the Soviet Union, the fall of the Berlin wall and others) which happened at that time have resulted in tectonic changes in the economical sphere (loss of markets). Nevertheless the ironmaking in Štore retained and thus also the Cold Finishing plant.

Finalization of steel products (drawing, grinding) was one of the visions of the Štore Ironworks more than 50 years ago. This orientation has remained till now and is even more prominent in Štore Steel today. Therefore, the decision to invest in a new, modern peeling line was adopted a few years ago. Just at the 50th anniversary of the start of the cold finishing production (then in the Drawing plant), the new line will be put into operation. On this occasion we would like to thank everyone, both former and present employees, for their efforts and congratulate them on the 50th anniversary of the plant beginnings.

Managing director Ivan Jurkošek

Technical director Boris Kumer

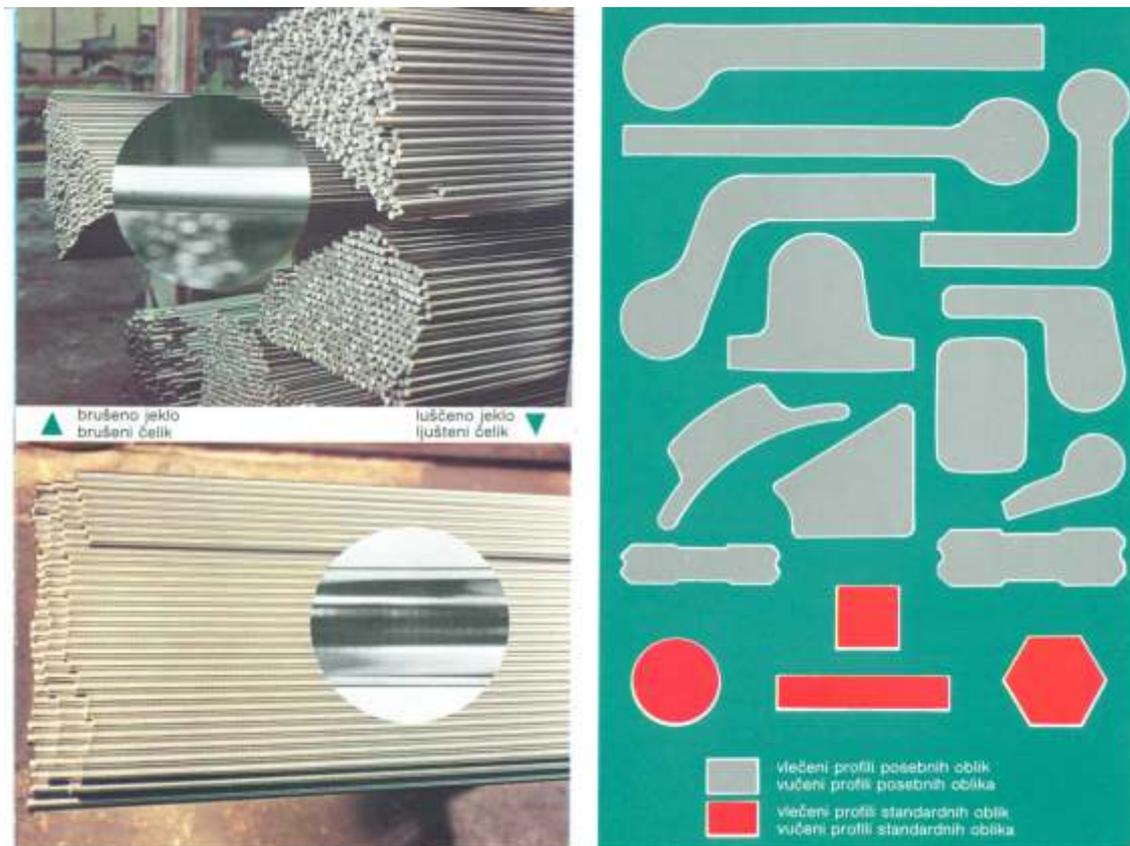
A 50-year chronology of cold finishing (steel drawing)

Overview of important events with photographs

1969

Start of regular production of drawn and ground profiles in the then not yet finished Rolling mill II building.

Part of a brochure: assortment of ground and peeled steel, and drawn profiles.



1972

Foundation of the Steel drawing mill within section 114, Franc Trafela appointed first manager.

Photo: Steel drawing in the north annex of the Rolling mill.



1980

The Steel drawing plant becomes a Steel drawing TOZD and Boris Marolt was appointed director.

Photo: Steel drawing hall during construction.



1982

New hall finished and production started.

Photo top: New steel drawing hall.

Photo right: Machinery in the new hall.





1993

Production standstill in the Rolling mill I (special profiles).

Photo right: Profiles for magnetic pole

1997

Foundation of Jeklo Štore (steelworks, rolling mill and steel drawing).

Below: Jeklo Štore logotype



SLOVENSKE ŽELEZARNE
JEKLO ŠTORE
Podjetje za proizvodnjo jekel d.o.o.



1998

Line 250 standstill, wire rolling for up to Ø17mm in coils.

Photo above: Rolled wire in coils.

1998

Investment in the first peeling machine for Ø18- Ø85mm bars.

Photo right: WDH 75 peeling machine.





2000

Flat spring steel cut technology start-up.

Photo above: Peeled steel warehouse.

Photo right: Manipulator and two circular saws.

2003

The company INEXA Štore was renamed to ŠTORE STEEL and the Steel drawing plant becomes COLD FINISHING.



INEXA ŠTORE
ŠTOREQSTEEL

Above: INEXA ŠTORE and ŠTORE STEEL logotypes.

2005

Ground steel production standstill.

Photo left: Grinding machine (in the rolling mill hall before 1980).

2007

Start of peeled steel cut (used for half axle production).

Photo left: Simec saw.

Photo below: Half axle containers.



2007

Investment in a new modern centre for cutting flat spring steel (two circular saws and a robot).

Photo right: two Kasto circular saws and the robot



2012

Investment in the second peeling machine to increase peeled steel production.

Photo left: Mair peeling machine and SAS polishing machine.



2013

Drawn steel production standstill.



2014

Investment in the automatic packaging line.

Photo above: packaging line.

Photo left: TRB 40 drawing bench (in the rolling mill hall before 1980).





2017

A new saw and a robot increase cut capacities of peeled steel for half axles.

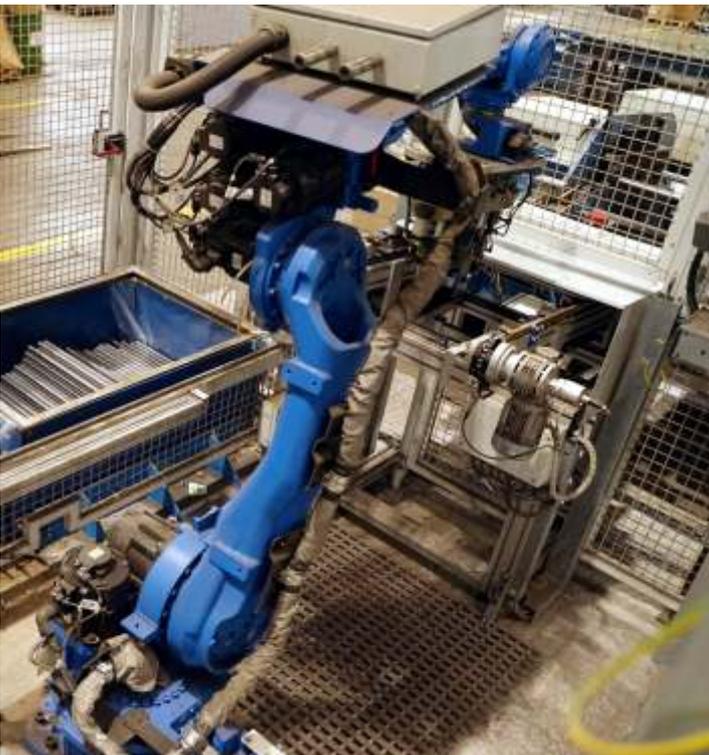
Photo above: Simec circular saws with a Yaskava robot.

2018

Regular bar centering start-up.

Photo bottom left: Yaskava robot.

Photo bottom right: sawing and centering.





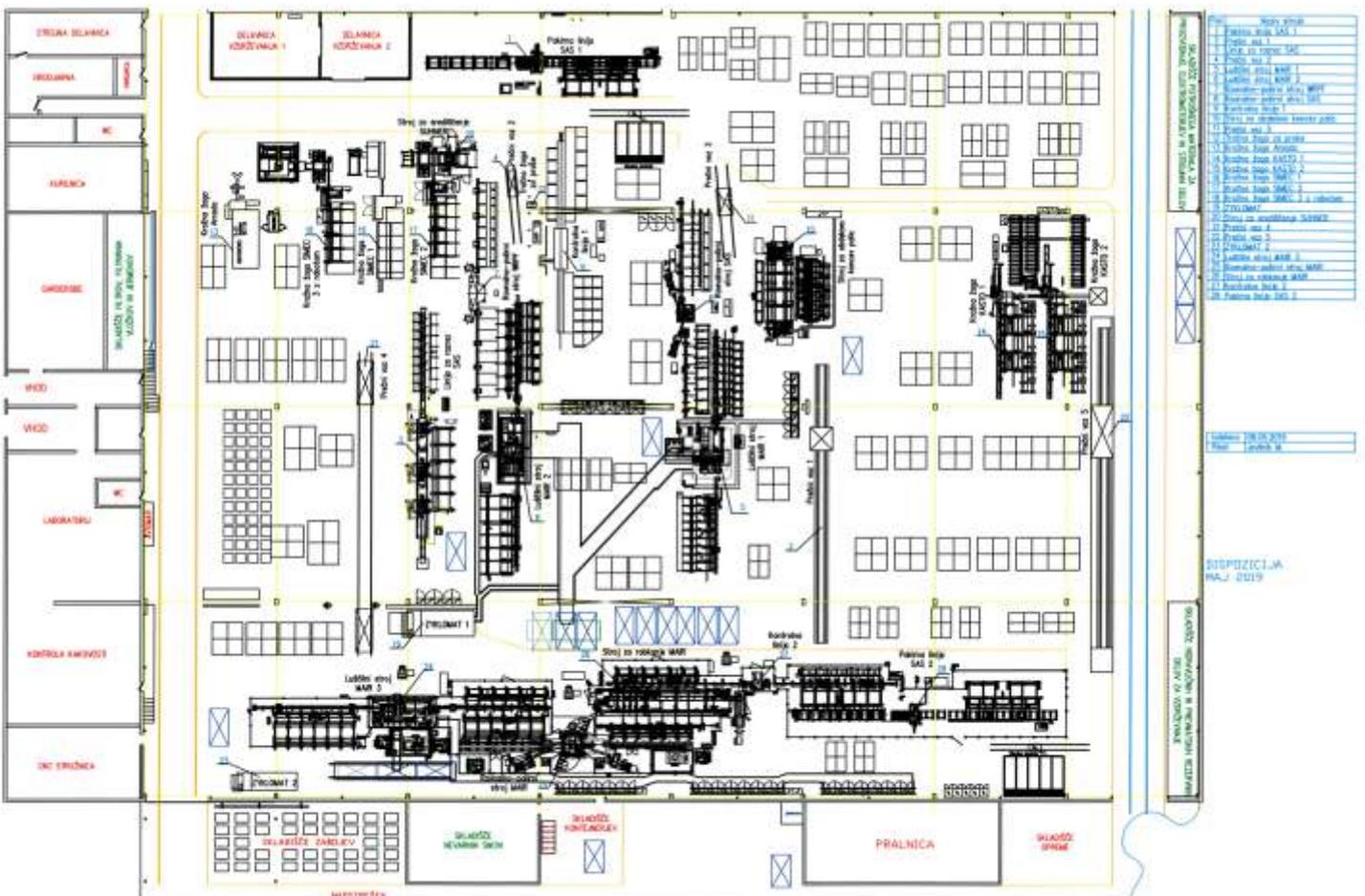
2019

Investment in a modern peeling line (peeling, polishing, chamfering, inspection and packaging). Straightening of rolled bars Ø20 to Ø 30 is transferred to the Rolling mill. Replacement in the transformer station and power supply voltage increased from 5,000V to 35,000V.

Photo above: Main hall of Cold finishing in 2019.

Photo right: Installing the new peeling line.

Scheme below: Machinery layout in 2019.



50th Anniversary testimonies: Boris Marolt

A decade has almost passed since I went to retirement. I admit that by that time, I had been always genuinely grinning when retiring colleagues and acquaintances explained how they were always busy and that they did not have much time. However, I quickly found myself on the same rails surrounded by my numerous family.

That is why I was surprised by the phone call from the present manager Mr. Gajšek, who invited me to drop by in Štore. They are preparing a celebration of the 50th anniversary of the operation of the Cold finishing plant and Steel drawing plant. I thought that it was not long when we celebrated the 40th anniversary. In the abundance of domestic and various other obligations, it seems that the years are running too fast, and the memories of the service years are slowly slipping into the background and even fading.

When visiting Štore in mid-May, I was with my former colleague Mr. Hernavs and we viewed with great interest the current operation of the plant. I am pleased the plant successfully managed various crises and turbulent times, when many companies collapsed and that it works well, is modernized and moves forward. All too many memories woke up, which led me to a time when I came to Štore as a young engineer. That was in the autumn of 1974, before that, I had worked for almost five years in Linz at a company producing industrial furnaces. There I met different working areas and work processes.

At Železarna Štore I first headed the construction bureau at that time, and at the same time I was also acquainted with work in other ironworks plants. As head of the construction bureau with a professional examination, I was involved in various investment projects and new constructions. Based on the acquired knowledge and experience, I was also involved in the project of building a new steel drawing plant.

The key man for cold finishing in Štore was certainly Mr. Franc Trafela. With help from Mr. Jože Urbančič, engineer of metallurgy and the rolling mill manager, and with cooperation of Emil Kranjc, they started drawing special profiles, with the purchase of other necessary equipment, they started grinding, too. Due to rapid growth in production, a plan for the construction of a new steel drawing plant was created in 1977, where I was actively involved. This was precisely and extensively described by Mr. Trafela on the occasion of the 40th anniversary.

In 1980, I was appointed manager of Steel drawing TOZD, as the plant was named in those times. Already a decade ago, I wrote what we have done and reached in the field of cold finishing. However, less was written about how we realised the planned tasks and goals. The most typical part of my work in the steel drawing plant was that I had two functions, which were intertwining at all times. The first was management of the Steel drawing TOZD, which today would mean that I was the director of the Cold finishing plant. And the second was management of the project team for construction of a new steel drawing plant, which, would nowadays probably mean an independent job as a manager of the investment. The efficiency of the plant was more or less in our hands. Good business results were a reflection of successful management, I had excellent associates and in the production quality and well-trained workers.

It was with different with investments and management of the new construction. All consents and permissions were based on projects and studies. At this work, external contractors and institutions also participated. That the work was normally done is also a merit of the New Construction Sector. The coordination of all participants was often a very demanding and difficult task. From today's point of view, at that time, there were also unusually large bureaucratic requirements, administration and also illogical things, which we managed successfully, since the entire project of the new steel drawing building and its relocation was completed within the anticipated deadlines and without additional price increases.

A considerable part of the equipment was the result of domestic knowledge and workmanship. The major problem was the imported technological equipment. To illustrate, let me just give an example of buying a Schumag polishing machine from Germany.

Of course, foreign currency was needed for the purchase. In fact, we had to buy them back home from the profits of exporting our products to foreign countries by overpaying them. When purchasing the Schumag line, there was an additional problem, because the deadline for the purchase was very short, as the option to buy appeared when the new construction was already in progress. The import license was linked to consents, one of which was to be obtained from SSNO (Federal Secretariat for National Defence of Yugoslavia) in Belgrade. The procedures for acquiring consents were very lengthy, so the then director engineer Senčič and I decided to leave for Belgrade immediately. The SSNO explained to us what needed to be prepared and delivered to obtain the consent, which usually lasted several months. I was convinced that we could deliver all the necessary things by 3 p.m. the same day. We went to the Metalka representative office in Belgrade, where we asked for space and administrative help, so we managed to prepare everything necessary. Everything was brought to SSNO in person. The procedure was led by a high-ranking military officer, a mechanical engineer who graduated in Ljubljana. When we brought the documentation, he immediately appointed the members of the commission to sign a consent or permit for the import of the Schumag line. One of the members did not want to sign because he did not read the documentation. The head of the commission explained to him that if people from Štore could prepare everything in one morning, the commission's members should also study everything at a later date. We brought the import license to Štore on the same day. The equipment has served us for a long time and served well.

Moreover, there were quite a few similar cases.

In 1986, I went to another post in the ironworks. Of course, I followed the work of the steel drawing plant as an integral part of the ironworks through the whole time of employment there and I viewed the work and progress there whenever I was there for a visit. My memories of work in the steel drawing plant are pleasant and satisfying. Fifty years is a long time, and fifty years of good and quality work is a great achievement. On the occasion of the golden anniversary, I express my sincere congratulations and I wish everyone well.

Boris Marolt, univ. dipl. str. inž.

50th Anniversary testimonies: Emil Hernavs



On the anniversary of beginnings of cold steel finishing in Železarna Štore, I would like to describe the events and my contribution to the development of this activity from my perspective.

I got a job at Železarna Štore in the middle of 1971 as apprentice constructor at the then design bureau. I designed individual hardware parts for the repair of certain machines and devices in the rolling mill II. As a young constructor, I was addressed by Mr. Franc Trafel, if I would like to participate in the Steel drawing plant, as a maintenance assistant. I became immediately interested because I could gain a wider understanding of machines and their maintenance for uninterrupted operation.

At the beginning, the emphasis was on repairs of existing hardware, which was rather outdated and worn out, and later I was involved in modernization and deployment of newer machinery for cold finishing technology. So I was directly involved in solving technological problems in production and in production management.

The cold-finishing technology of steel was divided into two branches, namely the cold drawing of steel bars of different cross-sections, from round, square, rectangular and, in particular, special shapes and other technology of grinding round steel bars.

In these two different finishing procedures, much effort had to be made to prepare technological procedures and equipment for successful production, which we increased from year to year.

With the growth of production, organizational changes in leadership were also needed, so I was appointed head of the Cold finishing plant. For the needs of machine maintenance, Mr. Milan Butinar joined us together with foremen from individual work shifts and accompanying workshops. With the successful growth of production, the need for a new cold-finishing hall soon appeared, where I also collaborated with Trafelo in the preparation of technological equipment installation and modernization of technological procedures. During the whole period, the emphasis was placed on the production of drawn profiles of specific cross-sectional shapes for individual customers. This required extra engagement of technologists in the calibration plant,

where I must point out the great effort of Mr. Ivan Čretnik, because without his efforts, they would not be able to acquire the appropriate drawn pre-profiles for successful and quality finishing with cold drawing.

On the other branch of finishing, a non-centre grinding technology was used to provide clean surface and workpiece dimensions for the needs of the automotive industry. Of course, this was a technological version of finishing, which was conditioned by the then possibilities of equipment purchasing. For this purpose-oriented production, the treatment with peeling would be more appropriate, which at that time could not be invested in due to high price and problems at acquiring appropriate approvals.

In 1980, we started building a new hall, which was taken over by engineer Boris Marolt, who later took over management of the Steel drawing plant. During this period, Trafel focused on technological development, but I myself took over the management of production. After 1986, when engineer Marolt was transferred to the management of Železarna Štore, and I took over his post as manager of TOZD Steel drawing plant until 1990, when my work was succeeded by engineer Alojz Gajšek.

At that time and in those circumstances, we made what was most possible for the development and growth of the production of drawn and ground profiles. I am pleased to know that our operation set the conditions for growth and advancements in cold finishing technology, which the current staff continues successfully in accordance with the needs and requirements of customers in an increasingly demanding global market.

In the present time, with help of mass communication and data acquisition, a faster and more appropriate technological development is possible, in particular in terms of organization and production optimisation. It may also be a little easier when investing, where, I hope, there are not as many complications as when we were small in a big country.

In the future, I wish a lot of progress and business success for the Cold finishing plant.

Emil Hernavs, inž. str.

50 YEARS OF COLD FINISHING – STEEL DRAWING PLANT 1969-2019 (Part II)



INTRODUCTION

The development of the Cold finishing plant is based on the history of Železarna Štore development, which confronted our predecessors with new challenges on daily basis and for which they were persistently trying to find solutions and develop high technical skills.

In the previous volume, I described the production start in the Drawing plant and its growth in the first twenty years of development. The peak of the Drawing plant was reached in 1988, when 21,778 tons were produced and it employed 182 workforce. The Drawing mill was then lead by Hernavs Emil, who succeeded Marolt Boris. After 1988, business problems emerged at Železarna Štore and so at the Drawing plant too. They were associated with social changes in Europe (collapse of the Soviet Union, collapse of Yugoslavia...). These changes had a great impact on the market. Year 1991, when Yugoslavia finally collapsed and Slovenia gained independence, was a very stressful year for Železarna Štore as well as for the Drawing plant. Markets in then Yugoslavia and East Europe were lost.

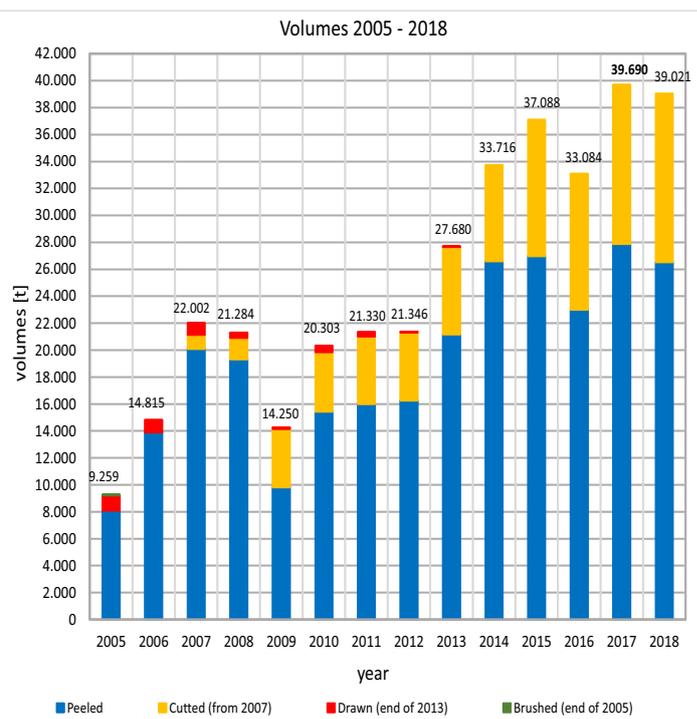
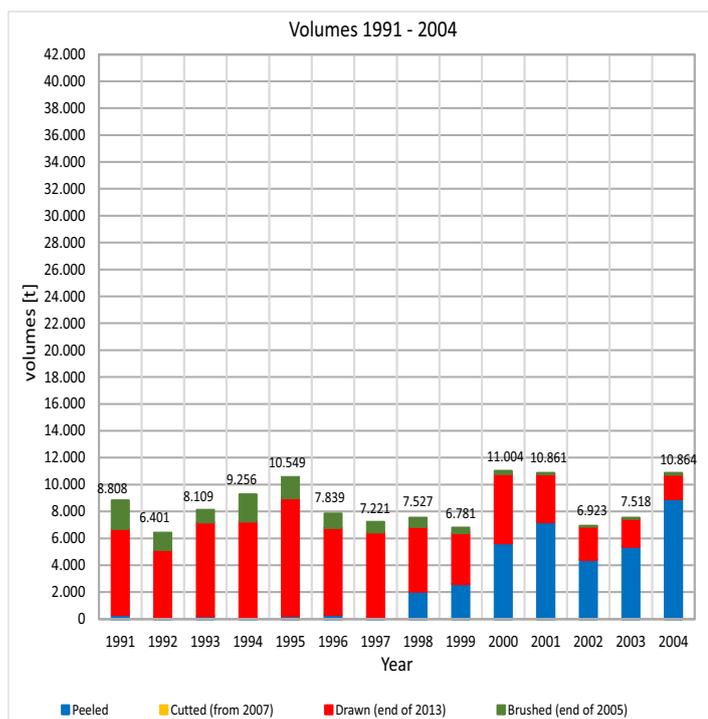
The basic production programme in the Drawing plant was drawn steel (special profiles) and ground spring steel for spiral springs. Železarna Štore and the Drawing plant started to fight for survival. I took over the management of the plant and Štefan Zidar became the production manager. It was an extremely difficult period without markets i.e. orders, downsizing... A battle was fought in Slovenia for ferrous metallurgy to survive. Another unfavourable decision in Štore for the Drawing plant was made in 1993 – the old Rolling mill shutdown. The Drawing plant got no deliveries of special profiles for

drawing. That meant the end of special profile drawing as one of the symbols of the Drawing plant and the old Rolling mill. The production halved in that difficult period from 1991 to 1997. Even more, the annual production shrank to 6,500 – 9,000 tons. The number of employees was reduced to only 53 employees in 1997.

NEW DEVELOPMENT FROM 1997 - 2008 (See production scheme 1991-2004)

Metallurgy survival agony in Štore and the Drawing plant lasted until July 1997, when a decision was made to found a company JEKLO ŠTORG comprising three basic plants: Steel plant, Rolling mill and Drawing plant. This new decision gave us all new zeal and optimism. New development was urgently needed as well. New markets had to be found and technology for these new markets developed. Restructuring in sales and production was needed. The aim of the new company Jeklo Štore was an independent, globally oriented build-to-order steel manufacturer in market niches, whose needs cannot be fulfilled by major manufacturers. The aim of the Drawing plant in particular was to achieve a high degree of additional finishing of the drawn steel. The aim in the first twenty years was drawn and ground steel, which changed in the new period to peeled steel with narrow tolerances and with a high degree of additional finishing (cut, centre boring...)

Already in 1998, there was an investment in a second-hand peeling machine for dimensions from $\varnothing 18 - \varnothing 85\text{mm}$ and in an automatic line for surface defect control. By shutting down the rolling line in 1998, we finally departed the dimensional programme of up to $\varnothing 18\text{mm}$ in Štore.



The Schumag drawing line and the Kieserling peeling line were left without the basic insert. The whole development was oriented on the $\varnothing 20$ to $\varnothing 100$ mm bar programme. The production of peeled steel developed and grew. The production of ground and drawn steel on the other hand declined. In 2005, the last quantities of ground steel (32t) were produced and in 2013, the last quantities of drawn steel (13t). For the period 1997-2008, there was a record production in 2007, when 22,000t were produced. Fifty workers were employed at that time. A lot of old equipment was written off in that period and there were new investments made in new equipment.

There was a decision made at Jeklo Štore in 2000 to develop a technology of spring flat steel cut in the Steel drawing plant in addition to the peeling technology. For this purpose, there was an investment in a modern cut centre with two circular saws and a bar stacking robot. In 2008, there were almost 29,000t of flat spring steel sawn.

In 2003, INEXA Štore changed the ownership and renamed to Štore Steel and the Drawing plant was renamed to Cold finishing plant. In 2006, we started developing technologies for peeled bar cut according to plans for half-axle production. At the end of 2008 and in 2009, we were again confronted with an economic crisis. The production was reduced in accordance with essential reduction of orders. The investment cycle stopped, however the time was used to prepare new investments. Fortunately, market conditions changed already in 2010.

FURTHER DEVELOPMENT OF PEELED STEEL IN 2010-2019 PERIOD
(See production scheme 2005-2018)

Rapid peeled steel production growth and peeled steel cut are typical for this period. That is why we continued

with investments in new technology, which was technically up-to-date and which enabled us to keep up with competition. We made further investments in a new peeling and polishing machine, cut system for rolled bars before peeling, increased peeled bar cut capacities, purchased a new automatic packing line with weighing... In 2018, we made an investment in a machine for centre boring. That is the way we are trying to achieve a high degree of steel finishing and increasing the added value. We also invested in equipment for permanent dimensional inspection of products. The total production for the market increased from 20,303t in 2010 to 39,000t in 2018. The peeled cut bar production increased from 1,039 t in 2007 to 12,756t in 2018. In 2018, approximately 6 million pieces for half axles were cut. That means that three million cars were equipped with front axles from steel made in Štore.

CONCLUSION

The Cold finishing plant development is a good example how it is necessary to regularly adapt and develop to market demands. You should never give up, since life without fight is life without success. You have to be receptive to changes, believe in success and follow the goals. Customers (market) are the ones that lead and direct. That is the case with the Cold finishing plant. Constant development, changing technology, knowledge and adapting to customer demands made the Cold finishing plant a very important part of the company Štore Steel. There would not be all these successes in the 50-year history without diligence of present and past employees and all those who took part at the plant development
(Photography of the peeled steel warehouse).

Alojz Gajšek, univ. dipl. inž.

IATF 16949

BUREAU VERITAS
Certification



SLO-20673/TS

ISO 9001
ISO 14001
OHSAS 18001

BUREAU VERITAS
Certification



SL22548Q / SL22425E / SL22432S

PEELED ROUND BARS EN 10278 (h9, h 11) 18-105 mm

Cut-to-length cutting:

lengths 10-300 mm, tolerance $\pm 0,5$ mm

lengths 300-2000 mm, tolerance ± 1 mm

Chamfering:

lengths 3000-8000 mm

diameter 18-105 mm,

angles 300 - 450 - 600

100% inspection of surface defects of peeled round bars:

diameter 18-105 mm,

bar length 3-8 m,

minimum defect depth 0,1 mm, test speed 0,2-2 m/sek,

testing of carbon, low and high alloyed steel

ŠTOREQSTEEL

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