Mega project
Tianjin Zhongwang
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EBNER’s success is not decided solely in our engineer-
ing offices, sales departments and workshops. A large
part is decided by our customers and their customers.
That is where end products, materials, characteristics
and geometries are set, which is why it makes sense to
involve customers and partners in EBNER’s strategy
process early on and intensively, to get to know their
plans, to exchange ideas.

One of the most complex questions every company
faces is: what products and services should be
developed and marketed in the future, i.e. in the next
10 years. There is an incredible variety of ideas just among
our own experts in the R&D, Engineering and Sales de-
partments, even though we are all looking at the same
market. The expectations of how the market will de-
velop and what products will be needed in the next 10
years are as varied as the imaginations and personali-
ties of the experts you ask.

Talking about the future demands a systematic
approach and a great deal of discipline in the manage-
ment team. Bringing in people from outside, especially
customers and their customers, is critical, but doesn’t
necessarily simplify things.

EBNER was among the first to tackle this problem and
has been using a roadmapping system since 2014. The
result has been the development of these “roadmaps of
the future” for three major markets: aerospace, automo-
tive, and the liquid metal area. They set forth the most
important technology and product paths. This allows
EBNER to test new developments in full-scale.

EBNER’s roadmaps, of course, all focus on heat treat-
ment (heating and cooling). The question to be answered,
with the time frame to 2025/26 in mind, is: What will the
major challenges for heat treatment in the future be?
What does the industry expect from a world-class fur-
nace manufacturer? Of course, our in-house research
and development teams are an incredible advantage,
allowing us to test new developments in full-scale.

Customers were thoroughly involved in the discussion.
For example, many well-known automotive manufac-
turers and suppliers had the opportunity to give their
input at EBNER’s Automotive 2026 symposium - “Steel
and Aluminium, the Best of Both Metals”. The EBNER
Aerospace 2025 symposium hosted many market lead-
ers in the aerospace industry.

Setting the bar high is key to roadmapping. We are
talking about giant leaps in innovation, breakthroughs
that are worthy of a market leader’s attention, but also
current customer requirements that exceed the short-
term view of one or two years. Roadmapping merci-
lessly demands this kind of long-term thinking, which
will be a paradigm shift for some; even top engineers
are not necessarily used to this type of long-term future
thought process.

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Keep an eye out for EBNER’s answers!

Robert Ebner

PS: You are welcome visit us and learn about our latest R&D developments in person at the Aluminum 2016 trade fair in Düsseldorf.
November 29 - December 1, Hall 10, Booth E15.
Mr Cherukupalli Nagabhushanam, nicknamed Nac, has taken over as Managing Director at EI. As a qualified mechanical engineer and postgraduate in business administration, he was instrumental in executing several projects of national and international importance in the non-ferrous metals and welding industry prior to joining EI as VP Sales & Service in May of 2014. He is determined to drive EBNER India to new heights together with his “Five Man Army”, the team of five EI engineers.

Avon Ispat & Power was impressed by the technical skills of EBNER’s engineers during the installation of the first facility in 2011. Another benefit is the EBNER in-house R&D department, which was able to optimize an innovative oil-fired heating system and future-oriented technology upon request. Less than two years later, the customer had already ordered an expansion facility, and then started discussions with EBNER for a further expansion of two workbases for recrystallizing steel strip coils.

Mr P.Y. Rajput, Director of Avon Ispat & Power Limited, visited EBNER Austria upon signing the contract for the latest expansion phase and was quite excited to see his own workbases being manufactured in the workshop.

Avon Ispat has been expanding their market base in the automotive sector (where reflectivity > 95% is a prerequisite in addition to microstructure quality and a smooth finish) by effectively harnessing the USP of having EBNER facilities for high quality products.
O.R.I. Martin has made an excellent investment in its future by investing in a modern EBNER HICON/N® bell annealer facility. The company produces steel for the automotive industry and emphasizes continuous quality improvement as well as environmentally conscious solutions. For example, O.R.I Martin was home to the first Consteel furnace in Europe as well as the first exhaust gas heat exchanger in Italy.

The state-of-the-art EBNER heat treatment facility meets every single one of the extremely high demands of quality, environmental compatibility, energy savings and economy.

SPECIAL FACILITIES.
The Italian steel producer O.R.I. Martin S.p.A. has been producing “Special Steels for Special Requirements” for decades. Now, the company’s motto could be updated to include “with Special Facilities”. Since February of 2015, an EBNER HICON/N® bell annealer facility has been in operation at the Brescia plant, processing up to 100,000 t (110,000 USt) of wire rod per year. Tailored annealing programs target and treat different types of steel.

This historic Italian company, whose roots go back to the beginning of the 20th century, processes products such as wire rod for fasteners for the automotive industry. The project involved replacing an obsolete bell annealer facility with a modern, environmentally friendly, high performance EBNER facility.

A big step toward a great future.

Improved quality, environmental compatibility, energy savings, cost reduction: EBNER delivers an all-in-one annealing facility.
Service en Español.

EBNER Customer Services takes care of all our Spanish customers.

Facility availability is essential. Because of the high demands placed upon industrial furnaces (temperature, continuous operation, industrial environment), high availability requires regular service. Furthermore, the extensive safety systems of an industrial furnace require experienced service specialists to ensure high quality work.

EBNER IS AT THE CUSTOMER’S SIDE.
The technical service team at EBNER Customer Services offers its expertise globally. Service packages are planned and implemented through maintenance contracts or individually. Thanks to EBNER’s long-term customer relationships, we are able to visit several customers in a single trip, very cost-effectively.

SPAIN: THE PRIME EXAMPLE.
100% of our facilities in Spain are serviced by EBNER service specialists. We plan service trips that may last several weeks and make several stops, scheduling the best time for each customer.

One of our regular customers is Global Special Steel Products, where EBNER regularly services a HICON/H® bell annealer facility with seven workbases, six heating bells and four cooling bells that are able to produce 88.000 t (97,000 USt) of steel wire annually. Global Special Steel Products invested in their first EBNER facility in 1998. The customer is fully satisfied with our annual technical service of all 8 expansion phases. Our service technician, Georg Meindl, knows these facilities inside and out, and works carefully on every customer request. Global Special Steel Products values the continuity of having the same service specialist for every visit.

100% facility availability is the goal, and to this end, all relevant safety systems are checked during a full facility service. Components which may cause stoppages in the coming year are replaced as a preventative measure.

Mr Guzmán Casanova, head of the Maintenance Department at Global Special Steel Products, responded very positively during an interview about servicing and preventative maintenance.

HICON®: Mr Casanova, as head of the Maintenance department, what do you see as the biggest advantages of annual maintenance?
Mr. Casanova: Well, as you know, there are two figures that show how well production is going. One of them is down time, especially for a facility working at full capacity like ours. The other is consumption costs for gas, hydrogen, nitrogen and electricity.

We have good numbers in both areas, but we are still working on reducing them. EBNER’s experienced technicians are helping us to guarantee the quality of our products at the lowest cost, while trying to keep the facility working like new.

HICON®: A service visit is not just about the facility; the operator personnel always takes part as well. What does your personnel think about that?
Mr. Casanova: The feedback we have gotten from our operator personnel about the service visits has been very good. Some of them highly value reducing down time. Others appreciate the technical information they learn. And everybody sees the benefit to the facility. We intend to continue doing services once a year.

HICON®: Working together so closely teaches your employees about wear parts that you can then replace yourself, without an EBNER technician having to help.
Mr. Casanova: Yes, definitely. By accompanying the EBNER technician during his annual visit, our personnel has acquired enough experience to solve the most of the problems that can occur in our facility. With this policy, we are improving our technical expertise and avoid having to rely on EBNER people for everything.

HICON®: What do your employees do when they encounter a situation they can’t handle by themselves? Do you contact EBNER?
Mr. Casanova: Well, fortunately, we have not had a lot of situations like that, but in these cases, we have always worked closely with EBNER and its technicians. In some cases, they have sent people to our factory and in others, they have given us tips and suggestions and this was enough to solve the problems. We were always mindful of keeping our employees safe; any hydrogen atmosphere furnace, even one from EBNER, can be potentially dangerous if care is not taken when working on them.

HICON®: Even well-maintained facilities eventually reach a certain age where service alone is not enough. To maintain 100% facility availability, Global Special Steel Products continually invests in upgrades. What investments are you planning next for your EBNER facilities?
Mr. Casanova: For us, employee safety is paramount, so a main focus of our investments is ensuring we have state-of-the-art equipment to guarantee our safety standards while of course providing best-in-class quality to our customers. We have ordered three new inner covers which will be operative throughout 2016 and 2017.

Finally, we just invested in a new workbase (#8) to cover Global Steel Wire Group (GSW and GSSP) annealing demand, a total annealing capacity of 98,000 t (108,000 USt). This will position us among the companies with Europe’s highest annealing capacity.

HICON®: Thank you for your time.
Mr. Knaus, why don’t we start with a review of your career at EBNER?
Knaus: I started at EBNER as assistant to the head of the Commercial Department and then also worked as a commercial manager. In 2005, I took a job at Siemens VAI as Key Account Manager for CIS countries, but I missed EBNER’s company culture. So I returned to EBNER the following year to help develop our contract management and, starting in 2010, to help set up a contract management department.

Why was that necessary at the time?
Knaus: Firstly, our orders were becoming larger and more complex. EBNER had started working in consortiums and as consortium leader. We developed export finance solutions for our customers during some of these large projects.

Also, our customers were developing more complex contracts, which raised the bar for us in this area, too. Forming a specialized department was essential.

So EBNER adapts to market conditions.
Knaus: We have to be flexible and creative to meet our customers’ needs. Not only in terms of technology, but also in the commercial area.

What were your next roles at EBNER?
Knaus: I was made responsible for the Finance and Legal department, and was promoted to Executive Vice President of Finance in 2014. On April 1, 2015, with plenty of relevant experience under my belt, I took over as CFO. I am now responsible for the Controlling, Finances, Legal, Import/Export, IT and process management, Accounting and of course, Human Resources Departments.

Mr. Knaus, what are EBNER’s strengths from a financial point of view?
Knaus: Independence is undoubtedly one of the main factors in our success and market leadership. Unlike many other companies, EBNER is family-owned and doesn’t have to depend on banks or shareholders who are more interested in short-term dividends. We can afford to think and plan for the long term. This independence gives us the stability and reliability that our customers value.

We also understand our customers’ commercial challenges and have a high level of expertise in financing and complex contract structures. We are able to offer our customers creative and innovative financing solutions.

Speaking of innovation. One of EBNER’s specialties. What difference does this financial situation make to EBNER’s R&D expertise?
Knaus: We are in the advantageous position of being able to finance our research projects ourselves. While others have to run the gauntlet of investor approval, we are already on our way to developing innovations for our customers. This also allows us to work on innovations that require a certain measure of patience.

Thank you for your time.
A brand new aluminum plant is being built in the Chinese city of Tianjin, near Beijing. Over the course of several years, this gigantic plant will grow to cover an area of about 6 km² (2.3 mi²). Tianjin Zhongwang Aluminium Co., Ltd, chose EBNER as their full-solution partner in developing and implementing the many types of high-tech furnace facilities.

Ultimately, Tianjin Zhongwang Aluminium will produce 1.8 million tons of products per year on two aluminum production lines, making it not only one of the world’s largest producers of high quality aluminum, but thanks to EBNER Group technology, one of the world’s most modern producers.

There almost aren’t enough superlatives to describe a project with 73 furnaces. In 2012, after extensive negotiations, EBNER and its subsidiary GAUTSCHI won the order from Tianjin Zhongwang Aluminium for the manufacture, delivery, installation and commissioning of a total of 73 furnaces to heat treat aluminum. From melting and holding, to homogenizing and through to heat treatment of aluminum plates and strip, the aluminum will be heat treated exclusively in EBNER and GAUTSCHI furnaces. This is by far EBNER’s largest order ever, with the most complicated installation schedule!

Strategic job site planning, job site supervision and coordination of the individual installation jobs are all concentrated in the EBNER Austria installation department under Helmut Wiesmair. Construction started in fall of 2013. Mid 2014 marked the start of installation of the first EBNER and GAUTSCHI facilities for Phase I of the project.

This phase includes 12 melting furnaces, 12 holding furnaces, 1 combined melting and holding furnace, 7 pusher-type furnaces, 2 roller-hearth furnaces, 3 batch-type furnaces and a floater furnace.

There is more to it than just material logistics, too: personnel was also an issue. Ronald Derflinger of EBNER Austria, the overall site supervisor, is responsible for each individual job site, each of which is manned with personnel from nearly all EBNER Group locations: EBNER Austria, EBNER Asia, EBNER India, GAUTSCHI Switzerland and GAUTSCHI China.

At the peak of this phase in Spring/Summer 2015, about 30 different furnaces were being worked on simultaneously. About 40 EBNER Group specialists were active on site at this busy time. EBNER was able to master this challenge thanks to the excellent communication channels within the EBNER Group. Another major factor for the success of the whole project is the exemplary level of cooperation EBNER received from the customer and EBNER’s excellent relationship with the Tianjin Zhongwang Aluminium management team.

In the second half of 2015, commissioning was started on the first facilities, which other facilities were still being installed. During commissioning, the already outstanding relationship with the customer was strengthened even more, by ensuring Tianjin Zhongwang Aluminium has the most efficient use of its facilities.

SUCCESSFUL END IN SIGHT.
Currently, commissioning of the first facilities is drawing to a close, while at the same time, installation of the 2nd line is about to start. EBNER’s installation and commissioning department is ready for the challenges that lie ahead at this enormous job site, and is proud to be able to deliver everything from a single supplier.
The Perth Mint has recently undertaken a massive increase in production capacity – by investing in a casting facility, rolling mill and an EBNER bell annealer – as part of their global expansion plans.

**A GOOD REPUTATION IS WORTH ITS WEIGHT IN GOLD.** EBNER has the reputation of being the quality and technology leader. While visiting the Austrian Mint, specialists from The Perth Mint noticed the EBNER heat treatment facility in operation.

This muffle-type furnace for coinage blanks was installed in 1993 and is still heat treating blanks for Austrian gold coins such as the famous Vienna Philharmonic coin. This first-hand example of EBNER quality spoke for itself. The result: in Summer 2013, EBNER received its first order from Australia in many years.

After discussing both a horizontal muffle-type furnace like the Austrian Mint uses or a bell annealer, the customer chose the bell annealer option. Because a new production bay was already being planned, the bell annealer facility was included in the plans.

The challenge in constructing this new production bay was that the main heritage building, which dates back to 1899, could not be modified. The solution: the EBNER facility was set up in the basement. Charging and bell handling is executed through an opening in the ceiling to the ground floor.

The EBNER facility was set up in the basement. Charging and bell handling is executed through an opening in the ceiling to the ground floor.

**TOP QUALITY PRECIOUS METALS.** The HICON/H₂ bell annealer facility will mainly be used to recrystallize silver and silver alloy strip coils in 100% hydrogen atmosphere. Silver coinage blanks can also be annealed in specially made charging baskets.

The design is struck onto the coins afterward: the series of coins featuring native Australian animals is especially popular with collectors.

This, the only EBNER facility on the Australian continent, is operating to the customer’s fullest satisfaction. It seems certain that Australian dollars with a touch of Austria will be valuable collectors’ items for years to come.
The quality of the ingots processed in EBNER HICON® pusher-type furnaces largely depends on temperature uniformity while maintaining excellent throughputs. EBNER’s innovative ingot temperature computer model is raising the bar of precision and efficiency.

In this sneak preview, we will report on the usual methods of temperature supervision. The entire article will soon be published in Heat Processing as well as Gaswärme International. Part 2 will of course also be published in the next edition of the HICON Journal.

Direct measurement of ingot temperature using penetration thermocouples used to be the only way to control the temperature within the furnace. However, the TREATperfect thermal computer model is an EBNER innovation: the PLC (programmable logic controller) now controls the temperature by calculating the temperature of every ingot in the furnace. Penetration thermocouples are only used for sampling to verify the calculation and the ingot data that form the basis of the calculation.

PROCESSING WITH A HICON® PUSHER-TYPE FURNACE FOR ALUMINUM INGOTS.

In order to accelerate the heating up of ingots in the furnace and increase throughput, the furnace is operated at a temperature greater than the actual setpoint material temperature (referred to as overshoot temperature). The furnace wind temperature must be reduced by the time the material has reached the required temperature.

In the past, dual penetration thermocouples in furnace floor leadthroughs were pneumatically pressed against the underside of the ingots in each zone to measure their temperature.

However, this is only possible at furnaces with passages or space in the foundation below the furnace. This is not always the case, especially at existing facilities.

DISADVANTAGES OF PENETRATION THERMOCOUPLES.

» Penetration thermocouples have limited accuracy which depends on ambient factors including the ingot and furnace wind temperatures. The high convection of HICON® pusher-type furnaces also subjects the thermocouple to high rates of heat transfer. So the thermocouple measurement is always affected by its environment. This effect is most pronounced during the heating up and cooling phases, during which too high and too low temperatures are reported. The tips of the thermocouples also have to reach the temperature of the ingot they are measuring in order to accurately record its temperature.

» The temperature recorded by the penetration thermocouple is usually not enough to effectively control the overshoot temperature, because temperature scatter within the ingot during the heating up phase depends largely on its thickness. This has to be accounted for in the PLC.

» The thermocouple can only measure the temperature at one point of the ingot, which depends on the thickness of the ingot.

» Every thermocouple needs to be serviced periodically, depending on the measuring interval and duration.

EBNER HAS THE SOLUTION.

The TREATperfect computer model allows the operator to use all the advantages of overshoot temperatures without this kind of penetration thermocouple. The model is supervised by a single penetration thermocouple per zone in the furnace floor or roof which double checks the temperature at intervals during the heating up phase.

Part 2, describing the functions and advantages of the TREATperfect computer model, will appear in the next edition of the HICON Journal.
Customers having charges tested under production conditions in advance is a bit unusual, but not unheard of. In the case of China’s CNMC Ningxia Orient Group Co., Ltd. the test material traveled around the world.

In order to heat treat a copper alloy exactly as the customer wanted, EBNER tested the customer’s charge under production conditions in a similar vertical strand annealer for copper alloys located in Italy. CNMC Ningxia Orient was able to see what their product would look like after heat treatment in the EBNER facility.

EBNER’s competitors were unwilling to guarantee material quality. This special material was new to EBNER too, so testing it was essential in order to make reliable claims. The tests were successful, and the material was sent back to the customer in the Chinese province of Ningxia - where it was accepted with the fullest satisfaction. It hardly came as a surprise that the order was placed with EBNER for this project.

PROCESS OPTIMIZATION.
With the installation of a HICON/H₂® vertical strand annealer, the customer’s downstream pickling process could be completely eliminated, further increasing economy and reducing environmental impact. EBNER’s sophisticated facility produces completely bright material.

The facility, which was designed entirely in Austria, promised the customer the highest standards and has delivered on that promise. CNMC Ningxia Orient’s end products can be found in almost any electrical component, so the highest quality is required. Since the project was completed, the HICON/H₂® bright annealing line has been in operation 24 hours a day.

Proof of EBNER quality secures order.
EBNER’s reputation as the most innovative and competitive full-solution provider in thermal processing has been underlined yet again with the company’s latest innovation for the metals industry: a continuous annealing line processing in 100% hydrogen atmosphere and quenching with 100% hydrogen instead of water.

Upon completion of installation and commissioning of the EBNER 100% hydrogen ultra hardening and tempering (H&T) line by the end of 2016, HyCAL Corp. in Michigan (USA) will be the first company in North America to offer continuous heat treatment of steel in straight hydrogen atmosphere on a toll processing basis.

The facility provides 20 times the throughput of a conventional hardening and tempering line along with improved quality, increased processing flexibility, and processing of a wider range of strip dimensions. While this horizontal version at approximately 140m (460 ft) long has 20% the throughput of a other vertical continuous annealing lines (CAL) or continuous galvanizing lines (CGL), EBNER’s vertical version can match CAL & CGL throughputs while still providing key advantages.

**QUENCH REVOLUTION.** The hydrogen jet quench is a revolution in precisely controlled cooling. Its delivery of incredibly high cooling gradients—in excess of 200 K/s per mm—plus precise cooling across the strip entire profile (i.e., thickness, width, and length) plus the ability to stop quenching and then control the metal temperature at a technologically advantageous level, give EBNER customers ultimate flexibility with transformation of the material microstructure in addition to high throughputs.

**BEST QUALITY, BEST FLATNESS.** With decades of experience in both heat treatment of automotive steel and thermal processing using hydrogen atmosphere, EBNER is a global market leader and has earned a reputation for quality and safety in thermal processing especially using hydrogen. The HICON/H₂® ultra H&T line with H₂ jet quench enhances EBNER’s reputation for quality by providing incomparable flatness even when a thermal process calls for extremely high cooling rates—the same thermal processes required for many advanced high strength steel (AHSS) grades including DP, TRIP, martensitic, Q&P, and others with yield strengths of 580 - 1700 MPa.

**R&D IS THE DIFFERENCE.** In the end, customers demand equipment that performs. EBNER delivers performance to them through its own research and development. In this case, EBNER R&D not only initiated the new technology, but also developed it, as it often does, to the point of running a full-scale test to prove critical assemblies for the facility at EBNER before carefully disassembling and shipping.

The innovative technology of the HICON/H₂® ultra H&T line will further strengthen HyCAL’s position in the toll annealing market. And EBNER is proud to have another 100% hydrogen facility that will 100% satisfy a customer’s requirements.
EBNER moves and modernizes bell annealer facility.

Manufactured by one of EBNER’s competitors. The facility was shipped from the USA to Italy where it was completely rebuilt and modernized. The entire electrical system, all media couplings and the process control system were brought up to EBNER standards.

Upgrade for the Environment.
This project includes the complete relocation and modernization of 22 workbases and 11 heating bells - manufactured by one of EBNER’s competitors. The facility was shipped from the USA to Italy where it was completely rebuilt and modernized. The entire electrical system, all media couplings and the process control system were brought up to EBNER standards.

Listening to our Customers.
Strategic planning is a dialogue with customers and partners. Because this is our philosophy, EBNER held a series of symposiums in 2016. EBNER USA and EBNER China each held very successful events focusing on hardening and tempering lines at the beginning of the year.

With a select audience of guest experts drawn from EBNER customers and international partners, we enjoyed a very interesting technological discussion regarding current demands on modern hardening and tempering lines. Our specialists gave presentations and were also available for one-on-one meetings about customers’ individual technological needs. The customers reacted very positively to the idea of working together to drive research and development and actively implementing these innovations.

The second half of 2016 was all about innovations in the heat treatment of aluminum, in no small part due to the upcoming ALUMINIUM trade fair in November in Düsseldorf, Germany (where we are exhibiting at booth 10E15).

The first of these highly successful symposiums was held at EBNER China in July. We generated a lot of interest in our innovations among the guests. Another symposium will be held at EBNER USA.

This series of symposiums is slated to continue through 2017.
### Trade fairs. Conventions. 2016.

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We look forward to seeing you there!

### New orders.

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