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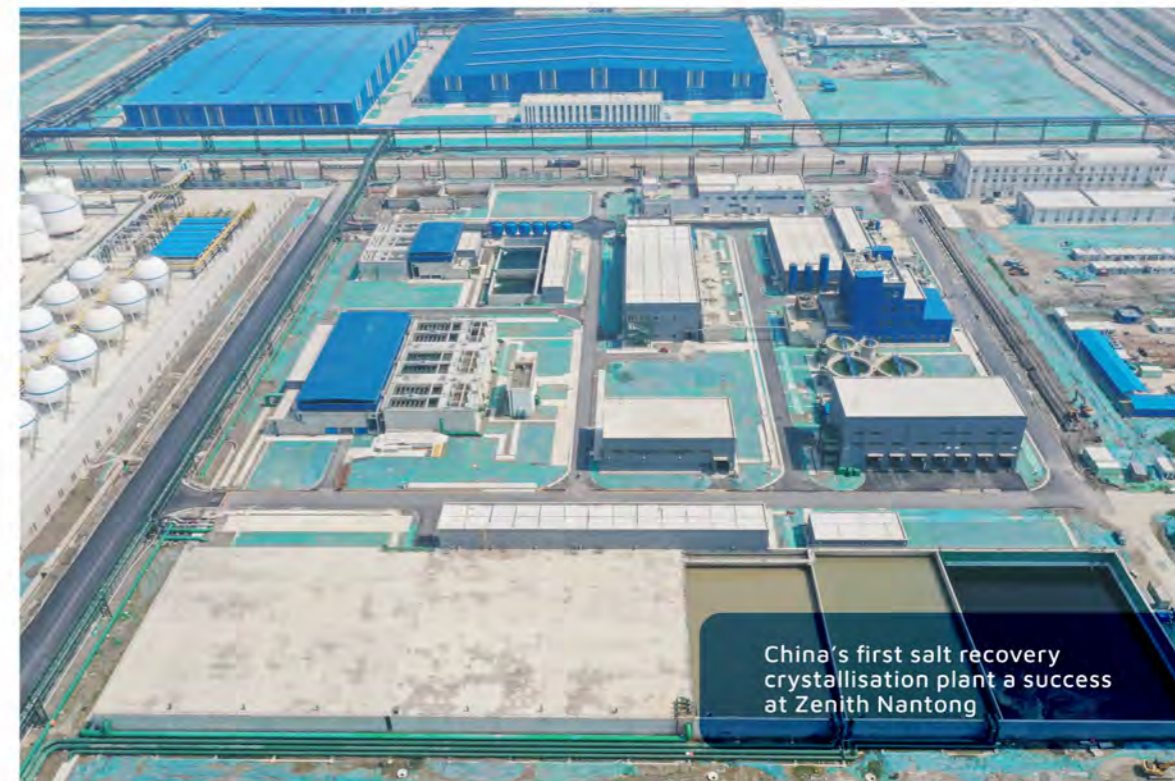
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# CISDI NEWSLETTER

## Issue 6: June 2022



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- Our state-of-the-art electric arc furnace is in demand
- CISDI's automation upgrades bring massive results for two Chinese rolling lines
- Maanshan Steel's green 'makeover' begins
- Our breakthrough product – the separately-driven reducing and sizing mill





# Technology and Solutions Partner for the Global Metals Industry

## ☉ FULL-PROCESS SERVICES

CISDI provides full-process services from the bulk material handling yard to the final post-processing line of rolling mill.

## ☉ FULL-FUNCTION SERVICES

CISDI provides standard and customized consulting, execution, and operations management services.

## ☉ FULL-LIFE-CYCLE SERVICES

CISDI provides the FEED (front-end engineering & design), implementation, and production and operations management services throughout the entire project life cycle and provides continuous after care services and support.

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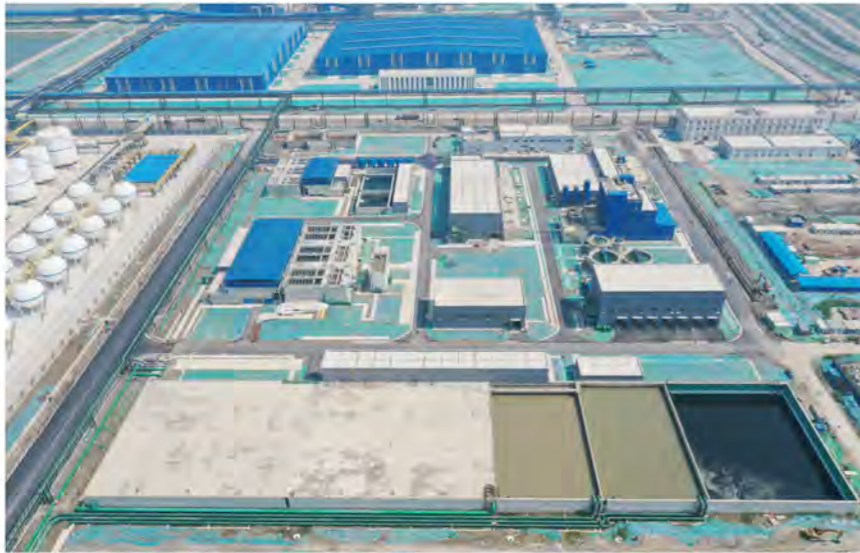
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# China's first salt recovery crystallisation plant a success at Zenith Nantong



The water treatment plant, operating to high-standard green levels

A state-of-the-art salt recovery crystallisation process is resulting in zero liquid discharge at Zenith Nantong Steel - a first for China.

Nantong's central water treatment plant is producing salts via a critical crystallisation process, which is the first of its kind in China.

CISDI was the water plant's EPC-based service provider and ZLD targets have been met since start-up.

Liyuan Dong, president of Zenith Nantong Steel, celebrated by hitting the salt production button, along with Nantong's deputy chief Xuesong Zang and Zhichun Hu, CISDI's Zenith Nantong administrative deputy chief and vice-president of CISDI Engineering Co.

Long focussed on transforming steel to green and intelligent levels, back in the early stages of planning Nantong Steel, Zenith Group voiced its determination to build China's first ZLD plant with salt recovery crystallisation at its core.

CISDI undertook the ZLD plant's master plan, designs and construction, focussing on a central water treatment system, plant-wide water supply and drainage pipeline network, plus a storm water collection and recycling system.

A high level of scientific, optimised expertise and equipment featured in CISDI's total solutions:

- ⊙ a front-facing top-level design
- ⊙ self-sufficient water-salt balance forecast system
- ⊙ state-of-the-art FLOC FOCUS® intelligent dosing system
- ⊙ advanced nano-filtration crystallisation expertise
- ⊙ sector-leading computing platform for storm collection and recycling

Source water at Nantong Steel is particularly high in mineral and salt content.

To counteract this, CISDI applied a multi-stage concentration and separation system, featuring the FLOC FOCUS® intelligent dosing system, a global-first, and advanced nano-filtration crystallisation expertise.

Waste water laden with salt is further concentrated and separated. The solution is then evaporated to produce sodium chloride, an industrial salt with a purity of 99 per cent, and the water left is converted to desalinated water - a complete recycling process.

As a result, the entire plant's waste water discharge has been reduced by 12 million tonnes a year and all waste water is turned into resources.

### Link

Zenith Nantong Steel, a Greenfield complex still under construction, will have the capacity to become the world's largest producer of steel.

CISDI is the primary partner for its master plan, overall designs, EPC management and the EPC-based services for its 10-plus major plants.

Nantong Steel is a green, smart champion.



Teams unite to celebrate the commencement of salts production at the CISDI-built water treatment plant at Zenith Nantong Steel in China's Jiangsu Province

CISDI's team Chinese principles: green, genius, guarded, guiding and grace - the 5Gs.

The project is now a leader in China's zero waste water discharge developments. CISDI's expertise in this sector is consistently improving the green and smart credentials of numerous Chinese plants.

Nantong Steel now has its blast furnace ironmaking, BOF steelmaking and ZLD water treatment plants running, thanks to CISDI's innovative tech and solutions.

Each plant is hitting its environmental targets for low-carbon smelting, super-clean melting and zero liquid discharge production, making Nantong Steel the benchmark for green, efficient and smart standards.

It operates with no liquid and solid waste discharges.

Gaseous waste emissions are 30 per cent cleaner than China's national ultra-low emissions standard. Over 90 per cent of materials are transported by clean transport.

All its energy consumption indicators are Chinese steel sector leaders.



## CISDI's automation upgrades bring massive results for two Chinese rolling lines



CISDI's team is pictured giving technical assistance for hot rolling line commissioning, applying intelligent upgrades to increase the line's efficiency and quality

Thanks to CISDI's optimisations for automation systems, two Chinese hot rolling lines have made massive increases in daily output.

Each line features a nominal roll barrel length of 1.78 metres.

One of the lines, which is located in China's north, had its automation control system upgraded after over ten years of operation. It resulted in a remarkable increase in rolling rhythm and a much-improved coil quality.

CISDI carried out the front-end preparations and were onsite for critical rebuilds and

commissioning assistance.

A daily record of 852 coils and a daily production exceeding 19,500 tonnes has been achieved. The line's daily average output has risen by 34.6 per cent.

Meanwhile in southern China, optimisation of a hot rolling line has resulted in a huge increase in production and quality.

Working remotely with the client's onsite team, CISDI solved acute problems which had been occurring at the three-year-old line.

Optimisations boosted the rolling rhythm, enabling the line to produce 49 coils per hour.

Its daily maximum output is now 876 coils, amounting to a minimum daily production of 25,440 tonnes – a record for China's wide strip rolling sector.

CISDI's talent pool of hot-rolling specialists and its advanced toolkit of automation and control models is bringing about major

transformation.

Its safe, fast remote ops management and digital hot rolling systems are playing a unique role in providing tailor-made solutions.

With a vast amount of engineering and package supply experience, CISDI is empowering China's hot rolling with IT-based, digital production.

## Switch-on at Desheng Steel's 110kV substation

An important support for Desheng Steel's new blast furnace 4 in China's Sichuan Province, the plant's Shunhe substation is now in operation.

It has been designed as the furnace's power hub for loads across the new blast furnace and existing areas.

Its 110kV bus, main transformer 1 and 2 and its 10kV four sections of bus are now fully charged.

In addition, a new integrated control system is now enabling Desheng to have centralised control of power scheduling and of main and auxiliary systems at the new and existing grids. This improves power regulation, control and management at the steel plant.

Piling for the project began in December 2021, and the project was completed 10

days early.

During commissioning, CISDI's construction and technical teams had to overcome numerous challenges. China's Spring Festival holiday period affected workforce availability and issues were caused by the pandemic, complicated local geological conditions and severe storms.

Civil construction took four and a half months; all-round commissioning was completed in a week and power supply and transmission acceptance was passed within a week.

"CISDI is a brand of quality and speed. We greatly value its contribution to our quest for greater energy conservation and carbon reduction at our vanadium and titanium plant," said a spokesperson at Desheng Steel.



## Hengyang tube mill rebuild an all-round success



Hot testing of the three-roll cross tube mill, which now features an upgraded mandrel system

CISDI has re-engineered and supplied facilities for a three-roll cross tube rolling mill at Hengyang Steel's plant 219 in China's Hunan Province.

The line passed hot commissioning on schedule and to quality standards.

The arrangement of the mill's upstream and downstream facilities was modified and the retained mandrel system was upgraded - technically difficult tasks which needed to be carried out within a tight schedule.

The tube mill is now able to perform flexible online switchovers between rolling modes with the aid of a full-floating and retained mandrel.

In addition, production capacity has been increased and the mill's competence in producing thick and ultra-thick tubes has been enhanced.

The rebuild has expanded product specifications and ensured a more stable rolling.

CISDI's outstanding project management skills shone throughout the rebuild process.

It took the team only four and a half months to fulfil equipment deliveries.

The mill was closed down for the rebuild, but CISDI's onsite technical assistance team took just 13 days to hit hot commissioning targets.

## Our state-of-the-art electric arc furnace is in demand



CISDI's constant progress in green melting research and development has paid off - the company's green electric arc furnace - CISDI AutoARC and CISDI SuperARC have been industrialised and are now sought-after products in the Chinese market.

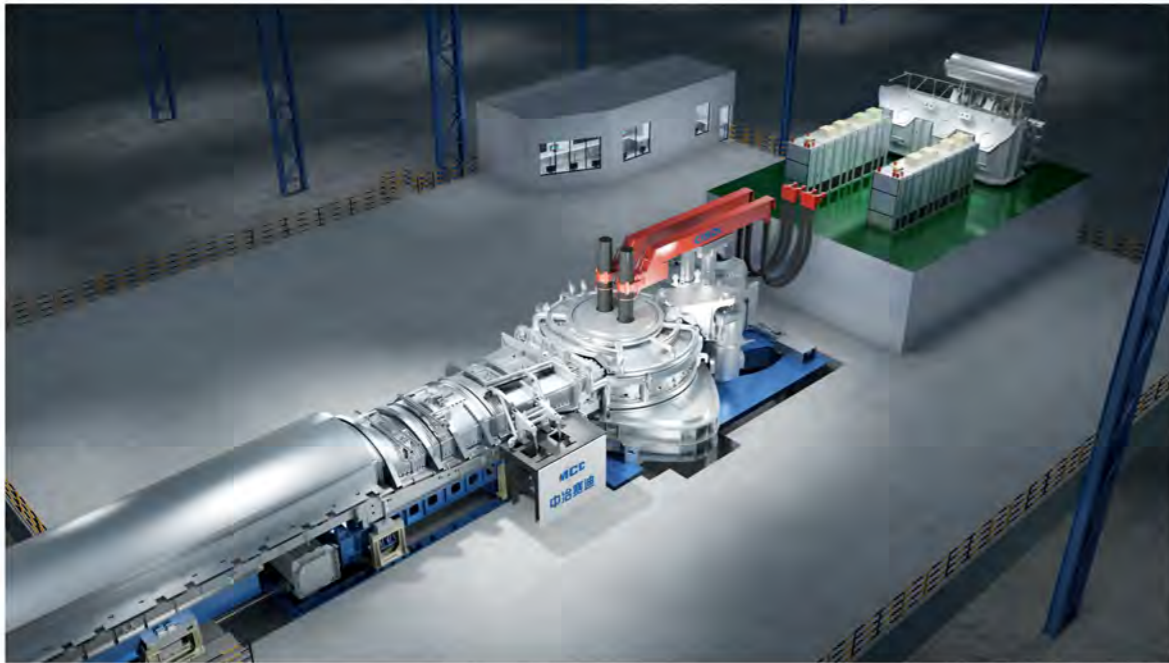
A model of CISDI's SuperARC EAF

### VALIN Hengyang's CISDI AutoARC

An order for two CISDI AutoARC EAFs has been placed by VALIN Hengyang in China's Hunan Province. The furnaces will feature these 2<sup>nd</sup>-generation advanced technologies and benefits:

- ⊙ cascade distribution and continuous charging of raw materials
- ⊙ AC power
- ⊙ multiple melting systems for different material compositions: 60 percent scrap plus 40 percent hot metal can be charged into the EAF, reserving an all-scrap charge for use when required
- ⊙ continuous transportation of scrap into the horizontal section via a caterpillar conveyor enables a fast charging at scrap's preheating section and its batching bays - an innovative method for enhancing productivity





Two further models of the innovative, greener melting equipment

- ⊙ scrap is preheated and continuously charged on the cascading channel, in step with continuous hot metal-pouring from a dedicated, tiltable hot metal ladle car.

As a result, the furnace's power-on time is 15 per cent shorter and production capacity is enhanced by more than 25 per cent over

**Yunnan Xianfu Steel's CISDI SuperARC**

A 70-tonne CISDI SuperARC EAF and a twin ladle furnace are currently being designed and manufactured at CISDI for Xianfu Steel in China's Yunnan Province.

The CISDI SuperARC EAF features the combined advantages of CISDI's unique 3<sup>rd</sup>-generation products:

conventional furnaces operating in the same working conditions.

CISDI AutoARC EAF at VALIN is designed to achieve an average tap-to-tap cycle time of 32 minutes per heat and a melting power consumption of 190kWh per tonne of liquid steel.

- ⊙ an innovative IGBT-based flexible DC power
- ⊙ cascaded distribution and continuous charging of raw materials
- ⊙ an air-cooled bottom anode with feeler pins

- ⊙ scrap preheating
- ⊙ dioxin control expertise
- ⊙ a fume waste heat recovery system
- ⊙ intelligent production units
- ⊙ an advanced automation control system.

This expertise and advanced equipment meets melting energy requirements and addresses short-circuit over-current impacts faced by the DC EAF.

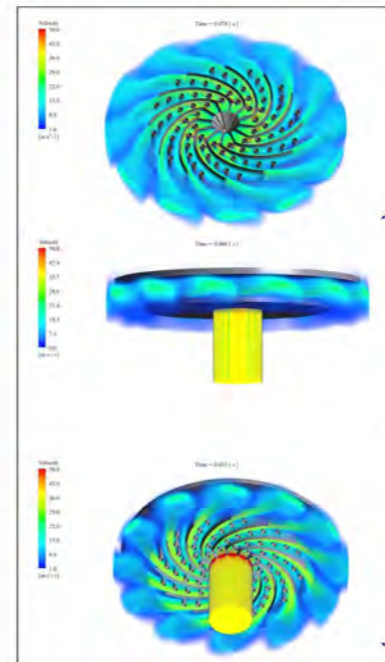
The Xianfu SuperARC furnace feeds with full scrap, reserving capacity for melting with 70 per cent scrap and 30 per cent hot metal when required.

Scrap is charged by a caterpillar conveyor

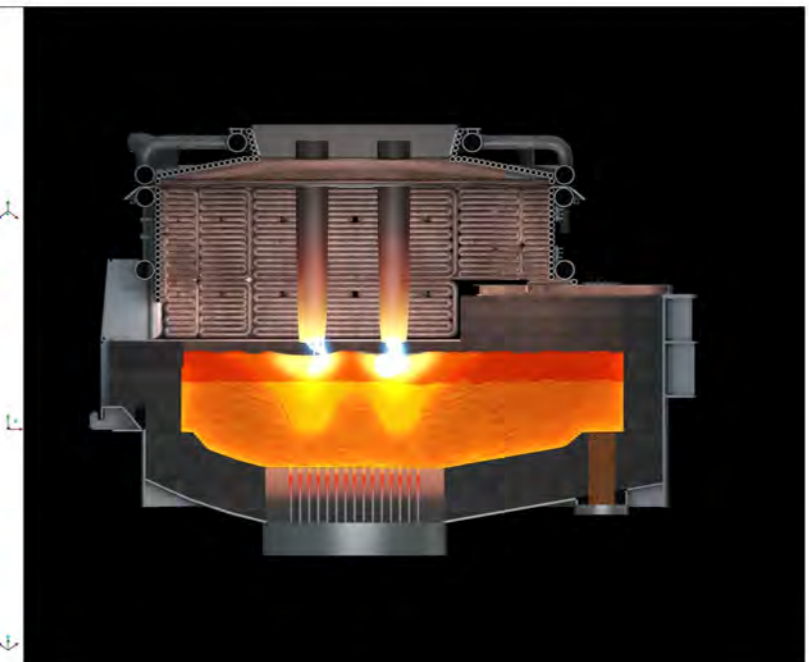
and a cascade distribution system onto the horizontal continuous charging section, in synchronisation with a dedicated hot metal ladle car with a tilting function, which continuously pours hot metal into the furnace.

IGBT-based flexible DC power features a modular design. It allows a swift rejection in the event of a module's failure. Other modules continue to work without cutting off power in the system.

The CISDI SuperARC EAF will achieve an average tap-to-tap cycle time of under 30 minutes per heat, and a melting power consumption of less than 300kWh per tonne of liquid steel, with full scrap charged.



CISDI's IGBT-based DC EAF





# Maanshan Steel's green "makeover" begins

CISDI to transform steel plant with parks and green spaces



Artist's impression of the green Gangliaoyuan Park at Masteel

CISDI has been tasked with transforming one of China's biggest steel plants into an attractive, urban green space.

The company has been contracted to EPC mode to improve the environmental spaces and buildings at Maanshan Steel's vast site in China's Anhui Province.

Designs and constructions will bring a green parkland vibe to the riverside development.

Two parks will be created - Mengtangyuan and

Gangliaoyuan. Five of the plant's zones will also be transformed - the wharf, the coal and coking South Road, the Tuzhashan, the North sharing service centre and South coking plant, and greening at the North major ring road.

Buildings requiring greening lie in a 241,700 cubic metre area, the new buildings in 6,680 cubic metres, and the elevation rebuilds in around 32,000 cubic metres.

CISDI's Project Management Office has utilised all available local land and met its targets for

cost efficiency, strong functions, easy maintenance and swift action.

The team overcame numerous challenges. Long-distance working, issues caused by the pandemic and the sheer scale of the site were successfully managed by meticulous planning and the use of digital technologies - including drone surveying and mapping and real-scene fusion.

Over the last three years, CISDI has carried out multiple regional environmental improvement schemes.

It created an intelligent centralised control centre at Masteel, where a "Steel Plant Plus" philosophy has been carried throughout the plant's landscaping, building and structural

engineering and ecological system. The site is now home to cultural exhibitions and features areas where industry and city exist in harmony.



A scenic, green view of Masteel

## Boosting cleaner production at Maanshan Steel

CISDI is to supply clean production equipment to the Raw Material Handling Plant for the Maanshan Steel Port Group.

The supplies will support Masteel's comprehensive control of unsystematic (previously uncollected) emissions.

This environmental improvement project is the most difficult task in Masteel's ultra-low emissions programme and is required to achieve a Grade A environmental KPI in China's steel sector.

Improvements cover a wide range of sub-plants at the port, plus the stockyard and the external delivery site. Across these areas, over 500 points at complicated processes and multiple interfaces need to be addressed.

In response to the tight schedule and complex requirements, CISDI has proposed solutions to address root causes and apply categorised, accurate controls.

CISDI's supplies will include six dust collection facilities and over 300 green units - hoppers, automatic cleaners and dry mist dust suppressors.

CISDI's solutions regularly win customer applause for their:

- highly-efficient dust collection, clean transportation and transfer systems to address the dusty stockyard conditions
- scientific, systematic methodology to solve the sectoral chronic dust problems produced by production and residual materials.



## CISDI to supply short-stress path rolling mills to Jiangsu Yonggang

Two high-speed wire-rod rolling lines at Yonggang in China's Jiangsu Province are to be upgraded with CISDI's unique, patented short-stress path rolling mill technology.

All producing and standby roughing mills, intermediate mills and auxiliaries will be manufactured and delivered by CISDI Equipment Co, which is based in Chongqing, China.

The order will be the 120<sup>th</sup> for CISDI. This unique mill has won more than 10 patents in China.

A core product for the company, it features a high standard of rigidity, precision and stability and its standard equipment can be manufactured to 13 specifications, ranging from NHCD300 to 1000.

A full gamut of product specifications has been applied around the world and the

mill is showcasing world-class performance levels for special steels rolling.

Winning the contract was a challenging process. During the bid, pandemic lockdowns in China meant communications between CISDI's team and Yonggang could only be carried out by video link or phone. But combined with its long list of references and strong reputation, the team managed to submit what the client considered to be outstanding proposals.

Yonggang's new high-speed wire-rod rolling lines will produce special steels, with a projected annual production capacity of 1.15 million tonnes.

Products will be high-quality wire rods in a diameter range of 5.0 to 28.0 millimetres. A space at the site has been reserved for the future construction of heavy coils.

## Our breakthrough product – the separately-driven reducing and sizing mill

10 years of research and development has led to outstanding rolling speeds and precision



The SRSCD mills, made at CISDI Equipment Co in Chongqing's Jiangjin District

The reducing and sizing mill plays a critical role in the production of special steels and building steel.

Much is demanded of this key equipment. It has to cope with a heavy rolling load and adapt to a wide range of product specifications, achieve a fast rolling speed and a high product dimensional precision.

CISDI began its research and development for the reducing and sizing mill back in 2012.

Its continued focus on the mill's core process and its equipment and control has resulted in a number of major breakthroughs, leading to the development of the modular, separately-driven reducing and sizing mill, the high-speed pinch roll and laying head units.

These outstanding products are at the cutting-edge of China's high-speed wire-rod rolling technology. They have won around 40 patents and achieved world-class indicators for rolling speed and product precision.



**First application in China**

CISDI's dual-module SRSCD mills saw their first application at a stainless steel high-speed wire-rod rolling line at Yasheng Metal Products Co. in China's Jiangsu Province.

They enabled the ultra-precise production of

small wire-rod to be controlled to within plus/minus 0.05 millimetre, a world-leading level, and laid a solid foundation for CISDI to outperform their rivals in China's high-speed wire-rod rolling sector.



SRSCD mills operating at Yasheng's high-speed wire-rod rolling line

**Improving speed by 25 per cent**

CISDI put its dual-module SRSCD mills into operation at a single high-speed wire-rod rolling line at Jianlong Group Ningxia, which is based in China's Ningxia Hui Autonomous Region.

The mills replaced original equipment and improved the line's rolling speed by 25 per

cent.

Rebar coil, in a diameter of 6 millimetres, is produced at a speed of 105 metres per second, a record for Chinese-manufactured lines.

The mills' high performance indicators have smashed their designed targets.



The SRSCD mills at Jianlong Ningxia's wire-rod rolling line operate at a speed of 100-plus metres per second

**Mill tech highlights:**

- ▶ Product specification: ranging from 5.0 to 25 millimetres in diameter
- ▶ Rolling speed: a maximum of 115 metres per second
- ▶ Rolling precision: plus/minus 0.1 millimetre
- ▶ Single pass: simplified pass schedule
- ▶ Free-pass rolling: highly competent in expanded product specifications and able to meet special specification rolling
- ▶ Modular design:
  - separate modular designs for the reducing mill and the sizing mill
  - a compact structure
  - bearing a heavy load
  - flexible applications with a separate reducing mill from a sizing or combined reducing and sizing mills.

CISDI's SRSCD mills are now in use at over 30 rolling lines across China, including Baowu, New Tianjin Steel and Shengquan steel plants. Supplying SRSCD mills to a wire rod and BIC line for Yieh Hsing Steel in Taiwan is now top of CISDI's design and manufacture agenda.

The mills' innovative core tech, which creates higher-speed rolling and more accurate production, is making them much sought-after in the market.

They have become a major brand product for CISDI, which is playing an active role in transforming China's wire-rod rolling equipment.



## High-precision assembly at Shenglong proved a massive task



The challenging assembly of the ladle turret at CISDI Equipment Co's workshop

CISDI's first ladle turret and cover manipulator has been delivered to Shenglong Metallurgical Co. in China's Guangxi Province.

The assembly process was a formidable task in both size and precision. The turret has a huge volume, requiring a large team and a 5-metre-high platform - and equipment had to be assembled to within 0.1 of a millimetre.

The workshop team meticulously planned a strict procedure protocol and countered difficult circumstances. While connecting

the swing arms and ladle support, four workers on top of the platform had to work in a crouched position due to lack of head height.

Two overhead cranes were used to make numerous adjustments to the position of the arms, ensuring assembly was controlled to within 0.1 millimetres.

It took the team nearly 10 days to complete the first set assembly to quality standards.

Shenglong Metallurgical Co expressed its appreciation at the ex-works inspection.

## CISDI's rotary hearth furnace is cleaning up the steel sector

CISDI's rotary hearth furnace recycles 100 per cent of a steel plant's iron-bearing dusts and sludges and converts them to resources.

The RHF is now a leading product for achieving clean, green steel production and more efficient use of resources.

The 14 operational RHF's built by CISDI account for around 80 per cent of the Chinese market.

They bring about the following results each year:

- up to 3.30 million tonnes of zinc-bearing dusts and sludges with a high content of iron recycled
- waste recycled into 2 million tonnes of iron products and around 100,000 tonnes of zinc products
- over USD 147,000,000 economic returns are gained.

Xinyu Steel had been experiencing difficulties in piling its iron and zinc-bearing dusts and sludges.

Dusts and sludges were returning into main production procedures, causing operational and environmental problems.

CISDI's RHF has enabled the plant to achieve zero discharge of its solid wastes and produce 162,000 tonnes of direct reduction iron, 13,000 tonnes of zinc hypoxide powders and 164,000 tonnes of steam for power generation - creating around USD 23,570,000 of economic benefits a year.



The rotary hearth furnace at Xinyu Steel in China's Jiangxi Province, which has an annual production capacity of 250,000 tonnes

All iron and zinc-bearing dusts and sludges are recycled at WISCO and amount to around 390,000 tonnes in dry basis. These valuable resources are reutilised, achieving an outstanding demo for zero discharge of iron-bearing solid waste.

The twin rotary hearth furnaces at Baosteel WISCO in China's Hubei Province, each with an annual production capacity of 200,000 tonnes

