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# CISDI

## NEWSLETTER

### Vol. 5, 2019



Intelligent breakthrough greets  
Bayi Steel's coil warehouse

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- Light rail rolling line is a Chinese first



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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## CISDI and Shaogang unite their strengths for a brighter steel future



The agreement is signed between CISDI and Shaogang

Shaogang Steel has signed a strategic co-operation agreement with CISDI.

At the signing, Xuwen Xiao, CISDI's chairman, expressed his appreciation for the two decades of trust shown in his company by Shaogang.

CISDI was awarded the contract to create an intelligent manufacturing centre at Shaoguan Steel in late 2018. The first of its kind in China, the centre will redefine Shaogang as a modernised and intelligent steel producer.

CISDI is tasked with creating a big data centre, a series of online intelligent mathematical models and an upstream-BF integrated management and control platform, which will enable

intelligent production of upstream-BF units and energy media.

"Both parties are cementing the mutual trust they have built by working together on the groundbreaking project, Shaogang Intelligent Centre," commented Mr Xiao.

"We are merging our respective strengths to meet the challenges and opportunities ahead in steel transformation, upgrading and intelligent manufacturing.

He added: "We will be working together to research and develop new technologies and new methodologies which will transform the future steel industry."

Operating under the Baowu Group, Shaogang is a major

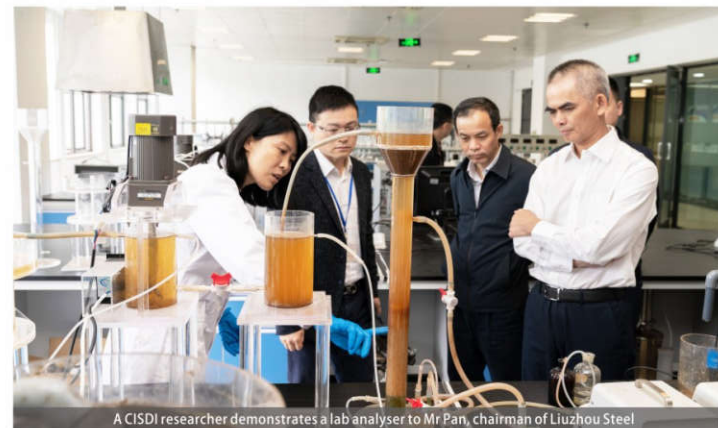
steel base in southern China.

The hi-tech enterprise is an important producer of steel plate for shipbuilding and its annual output of plates, wire rods and bars can reach six million tonnes.

During the signing of the new agreement, Shaogang's chairman, Shiping Li, described CISDI as a critical partner and praised the role CISDI is playing in the creation of its intelligent centre.

He commented: "Shaogang and CISDI need to work on the great progress they have already made on intelligence to seize steel development opportunities and push the steel industry forward to ever higher quality production."

## Liuzhou Steel's leader visits CISDI



A CISDI researcher demonstrates a lab analyser to Mr Pan, chairman of Liuzhou Steel

Liuzhou Steel's chairman Shiqing Pan praised CISDI's developments for intelligent steel production on a recent visit to its HQ.

CISDI is undertaking EPC-based services for twin mega blast furnaces at Liuzhou Steel Fangchenggang's new steel base at China's Beibu Gulf Economic Zone.

Mr Pan met with CISDI's chairman Xiao and president Yu and expressed his hopes to consolidate greater co-operation between the two companies.

"I am impressed by CISDI's latest developments for the digital factory and for intelligent manufacturing and am very grateful for its contributions to the

construction of our new blast furnaces," said Mr Pan.

Chairman Xiao pledged that CISDI would pool all resources to ensure a smooth progression and startup of the twin Fangchenggang furnaces, which will each have a volume of 4,150 cubic metres.

"CISDI's multi-disciplinary integrated innovations meet Liuzhou Steel's expectations and will enhance their systematic, intelligent, green and product competitiveness."

Mr Pan and his team were also invited to visit CISDI's research and development showroom, remote diagnosis centre and water quality analysis lab.

## CISDI shines at North America's leading steel tech event

**"Impressed by the latest technology presented by CISDI and looking forward to further technical discussion and cooperation in the near future"**

**"Excited to learn about CISDI Blast Furnace and Hot Stove technology"**



CISDI showcased its total solutions and intelligent manufacturing expertise at AISTech 2019, the leading annual technology exhibition for the North American steel sector.

For the second year running, it was the sole Chinese engineering company present at the event, which is an influencer for steel businesses throughout European and America.

CISDI was also a sponsor of the event, which was held in Pittsburgh during May and is hosted by the American Iron and Steel Institute.

Over 550 steel enterprises demonstrated their specialist



strengths and new developments to over 8,000 attendees, following AISTech's theme for 2019 – improving steel producers' competitiveness and sharing good engineering practices in sustainable steel developments.

In technical meetings at AISTech 2019, CISDI gave 12 speeches on its cutting-edge technologies, including the intelligent stockyard, centralised control and the intelligent blast furnace.

CISDI's stand showcased the world's first upstream-blast furnace integrated control centre, along with the



company's multi-media intelligent and green solutions.

Clients and partners from AMUSA, Tata Steel, USS, Nippon Steel, JSW, Gerdau, Mecon, POSCO, SSAB, Stelco, NLK, Ellwood, Rockwell Automation and Hatch visited the stand and were impressed by CISDI's latest technology. Many expressed interest in discussing potential co-operation.

"Their feedback indicated that CISDI's expertise and feature products are well aligned with steel development trends in the North American and world markets," said a company spokesperson.

## Construction of Phase II begins at Baosteel Zhanjiang

Baosteel Zhanjiang has begun its Phase II construction project.

All work will focus on its blast furnace 3.

Foundation piles have been driven in, and CISDI teams have taken up their positions at site. Its engineers, purchase managers, optimisation and sales staff are poised.

CISDI will implement the general design for Phase II and plant designs for the stockyard, blast furnace, continuous casting, 1,780mm hot strip mill and utilities.

### Setting eco-friendly and intelligent benchmarks

Zhanjiang Steel is an important support for the regional economic development of the Guangdong-Hong Kong-Macao Greater Bay Area, which is designated at national strategic level as a driver for high quality development.

Baosteel plans to utilise Zhanjiang Steel as a production capacity substitute for its sister company, Meishan Steel.

Zhanjiang Steel acts as not only a booster for Baowu Group's steel restructuring and re-distribution, but also as model for China's steel modernisation. Phase II will be created to an even higher standard than Phase I.

Commented Xinku Fan, general manager of CISDI's Consulting Business Division: "At Phase II, we have the opportunity to offset a few deficiencies experienced with Phase I's plant-wide mass balance and hot and cold rolling output. We will be creating optimised

performance indicators and enriching and improving product mix, and using our design, construction and operational expertise to ensure ultra-low emissions, to the strictest standard prevailing in China."

"Full-process environmental protection technologies and equipment will enable the gas and dust collection systems to achieve ultra-low emission targets and zero liquid discharge", said Mr Fan.

CISDI's team plans to create a smart steelworks building and intelligent manufacturing equipment at Phase II to increase output without increasing the workforce.

Zhanjiang Steel will see a 30 per cent increase in production efficiency, and a cost reduction of US\$10 per tonne of liquid steel when Phase II's systems start up.

### Building a better blast furnace

Blast furnace 3 needs to have a longer service life and be able to operate with higher environmental and intelligent performance figures, despite having a similar process configuration to blast furnaces 1 and 2.

Aware there was room for improvement on the twin blast furnaces, CISDI has carried out months of studies on process parameters, general layout, design and construction and

proposed applications for an intelligent casthouse and hot stoves' automatic combustion expertise.

On launch of Phase II, Zhanjiang Steel will be producing 12.25 million tonnes of hot metal a year.

CISDI is organising engineering and pile testing work at the site and going all out to meet a 27-month construction deadline.

## ■ Piloting intelligent hot metal transport

CISDI is testing the critical technologies of the intelligent hot metal transport line at Zhanjiang Steel.

Preliminary design and primary tests have been completed over a six-month period. The site's unmanned locomotive is now under testing to prove its operational capabilities during special meteorological conditions, heavy duty loads and in other complicated conditions.

Engineering manager Hui Liu explained: "Every day at this ironmaking plant, almost a hundred torpedo ladle cars transport metal at over 1,000 deg.C. It's really a dangerous and complicated process. There is risk to workers, and the involvement of manpower can impede the locomotive's efficiency, which causes a drop in hot metal temperature. This has a negative effect on production cost and quality control."

To that end, CISDI has developed an unmanned locomotive, with intelligent

scheduling and automatic hooking systems. When these intelligent products run online, transport efficiency can be enhanced by 20 per cent and the number of workers at the hot metal transport area can be reduced from 42 to nine.

By the end of this year, a test run of 28 torpedo ladle cars and eight unmanned locomotives will be carried out – a global first for the steel industry.

Zhanjiang Steel is on the way to intelligent logistics – less manpower, a number of unmanned stations and greater intelligence for a full logistics process from wharf to stockyard, from traffic to locomotive, and from access-in inventory to final product outbound.

A large number of CISDI engineers have been devoted to the site survey, design, construction, testing and commissioning for Zhanjiang Steel's intelligence upgrade, with operational safety as a priority.

## ■ Practice BOS at stockyard

Zhanjiang Steel Phase II will build a blending stockyard as designed Model B. In the meantime, a Model C stockyard and two Model A stockyards will be modified.

Zhanjiang's intelligent stockyard is a working model of CISDI's blue ocean strategy (BOS).

As an initiator of intelligent stockyard expertise, CISDI has created a promising market. Zhanjiang Steel, Laiwu Steel, WISCO and Masteel in China, whatever Greenfield or Brownfield, are incorporating CISDI's intelligent stockyard technology. CISDI engineer Quansheng Yang, who has played a major role in developing Zhanjiang's intelligent stockyard, commented: "I am very proud to be applying my company's technology to the building of this intelligent stockyard, which will be unique in my country."



CISDI's engineers, testing the intelligent hot metal transport line

# Intelligent breakthrough greets Bayi Steel's coil warehouse



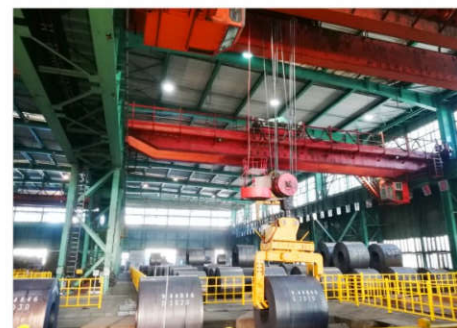
Bayi Steel has reported a major technological breakthrough in the rebuild of its hot mill coil warehouse.

The third bay at the warehouse is now the first in China to have full automatic control.

From now on, processes including truck outbound, walking beam offloading, warehouse pile switchover, and transfer car

reloading can be run without the need for workers. This saves labour costs for Bayi Steel, improves efficiency and also averts risk for employees.

CISDI is the turnkey contractor for the intelligent rebuild at Bayi Steel, which is the first of its kinds in China. The process can now be applied at other steel plants.



The intelligent hot mill coil warehouse at Bayi Steel now has unmanned operations, which makes it safer and more efficient



## CISDI creates eco-friendly stockyard at Pingxiang Steel



Pingxiang Steel's stockyard in China's Jiangxi Province has been rebuilt to eco-friendly standards and successfully started up.

A covered stockyard with a total area of almost 200,000 square metres has been created by rebuilding the east primary, blending and coke yards and the west yard and relevant process and blending bins.

CISDI carried out the work to an EPC mode and innovatively applied a method of sharing one intermediate rail track between two stacker-reclaimers.

The process has improved the storage areas for raw materials, reduced building spans and created annual cost savings.

CISDI's project team dealt with numerous challenges along the way. The biggest issue was a very tight time schedule, and during the rebuild, the spread yards and peripheral existing facilities posed difficulties. In addition, the east primary yard needed to be covered but had a span of around 120 metres with arched lattices.

Every milestone was met, however, and the engineering work was completed in under four months.

CISDI's solutions included an accumulative



The eco-friendly covered stockyard at Pingxiang Steel

sliding method of construction. And to minimise impact on production, CISDI transferred the large stacker-reclaimer to its new location in one piece, a process which took only 40 days.

CISDI designed the blending yard with flat lattices, covering at least 70 metres.

Construction had to be carried out in a tight space hemmed in by existing facilities, so CISDI made the decision to put the middle starting frame arched and enable the extended structures upward to both sides. It created a safe and efficient construction.

CISDI's innovative methods and high quality construction won great praise from Pingxiang Steel and its parent company Fangda Group.

## Construction of steelmaking and strip mill begins at Baosteel Zhanjiang's Phase II

Baosteel Zhanjiang has begun construction of its steelmaking and strip mill projects.

CISDI has been tasked with the design of the continuous casting plant, and will package-supply the equipment for the casting platform, the mechanical maintenance area, strand ejection and finishing area.

At Phase II, the steelmaking shop will feature BOF 4, mechanical stirring desulphurisation facility 1 and auxiliaries. The continuous casting shop will be built with a 1,650mm caster 3 and auxiliaries. The annual production capacity of qualified slab will be 3.60 million tonnes by this single phase.

Phase II's steelmaking and casting shops will be started up by February 2021 and will feature intelligent equipment, smart quality

control, unmanned operation and a management centre.

After startup, Zhanjiang's steelmaking will reach a total production capacity of 12.35 million tonnes a year, the world's largest. The per capita productivity will be greatly enhanced.

The strip mill at Phase II will reach a designed capacity of 4.50 million tonnes a year, and is expected to start up in August 2021. The main products will be high-strength hot-rolled and cold-rolled strips, and high-strength pickled strips.

Big data expertise will be employed to achieve model-based fully automatic rolling.

The strip mill is on the way to becoming a highly automatic, efficient, flat structured, and digital production line.

## Baosteel's Desheng upgrades its De-Si station with CISDI expertise

Baosteel's Desheng Stainless Steel Plant in China's Fujian Province now has an upgraded desilication station up and running.

CISDI re-designed and supplied the main equipment for numerous technological upgrades. Its teams carried out the intricate design optimisation plan, calculating readjustments on equipment parameters and the commissioning of its automation control system.



Baosteel's upgraded de-Si station at Desheng

## Upgraded furnace at Minmetals Yingkou

BOF 3 at Minmetals Yingkou Steel has passed its hot commissioning.

With CISDI providing services to an EPC mode, BOF facilities were upgraded and new facilities were installed at the existing meltshop.

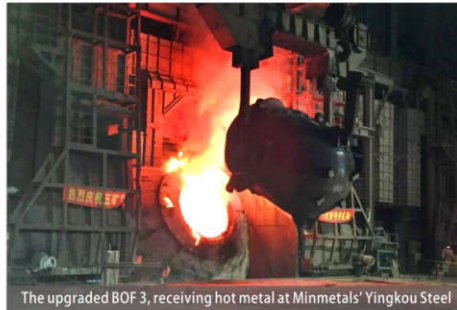
The furnace proper, the heat recovery steam generation boiler and fume exhaust chamber have been modified.

CISDI-SACS patented technology has been used for this BOF, which is featured by a 4-point linkage suspension system. The existing combined-blown desulphurisation station has been relocated.

Other new installations at the meltshop include a KR desulphurisation station, a semi-steel furnace, an LF, RH furnace and a single-strand heavy continuous caster.

CISDI renovated BOF 3's rebuilding construction by putting its mouth up and assembling it into the trunnion ring.

This has proved to be more successful than the conventional assembly method, which positions a BOF with its mouth down into the



The upgraded BOF 3, receiving hot metal at Minmetals' Yingkou Steel

trunnion ring.

The innovative method adds to CISDI's BOF engineering and project management references.

Without influences on existing production, the rebuild and addition construction work had to be carried out to a tight timeline to avoid affecting production, and in complicated, dusty and noisy conditions.

CISDI's innovative design, scientific management and tailored construction process ensured all targets were met.

## CISDI's intelligent filtration system for Ningno Steel will be a world first

Ningbo Steel has contracted CISDI to supply the world's first intelligent siphon bottom filtration system.

The system will filter the granulated slag from the plant's new blast furnace 1.

Its innovative design will enable unmanned operation and intelligent collection of slag, which removes workers from hazardous

corrosive areas, increases efficiency and prevents equipment from being damaged by manual operating errors.

CISDI's most advanced 3D scanning, fast modeling and expertise will be employed to ensure the siphon bottom filtration system works safely and efficiently in complicated site conditions.

## CISDI's latest success at Rizhao

Shandong Steel's Rizhao steelmaking plant has announced the successful hot commissioning of its hot metal KR-process desulphurisation system 4.

All major production facilities at the plant are now operational.

CISDI is the plant's main contractor. Its unique purging de-slagging development has been applied to the four KR de-S systems. Key features are a very simple structure, easy maintenance, facilitated slag skimming, more efficient desulphurising and a shorter treatment cycle.

The last two de-S systems were constructed while four BOF were in operation.

CISDI faced numerous difficulties. The project team had to work to a challenging time schedule to avoid any interference with production at the plant, and assembly of reusable devices had to be done in situ.

But thanks to the team's well-organised management and experiences learned during construction of the first two KR de-S systems, difficulties were overcome and project targets were achieved.

## Light rail rolling line is a Chinese first

Under CISDI's technological leadership, Yongyang Special Steel's light rail production line has gone into operation.

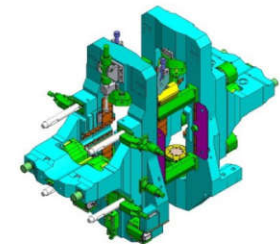
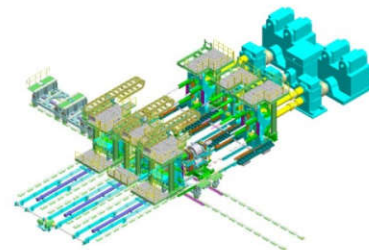
It is China's first semi-continuous light rail rolling line, with a universal mill at its core.

CISDI's supplies to Yongyang include core equipment for two breakdown mills, five universal mills and two edger mills, as well as

hydraulic systems.

CISDI created an innovative series of universal mills, termed as UMCDs, in specifications ranging from 450mm to 1,000mm.

The proprietary products are welcome by China's section steel producers who have to import otherwise.



A diagram of CISDI's universal mill development

## International status for two CISDI innovations

### CISDI-SACS BOF and high-strength, high-speed CAL



The CISDI-SACS BOF at Baosteel's Meishan Steelworks has a tonnage of 250



CISDI's high-strength and high-speed CAL at Anyang Steel

Two of CISDI's innovative science and technology projects have gained international status.

A group of experts have assessed and unanimously approved CISDI's 4-point linkage suspension system for basic oxygen furnaces, and the company's high-speed continuous annealing line for high-strength steel, to world-class levels.

CISDI-SACS, an invention for basic oxygen furnaces, is based on the phenomenon of alternating elastic sliding, which affects the stability of a BOF's mechanical linkage structure.

Since 2004 when the issue was first identified, research and engineering studies have achieved major breakthroughs in BOF safety and improving resistance to breakout.

The innovative 4-point linkage suspension system adapts itself to any over-constraint

occurring in the BOF's mechanical structure. It does so by building a model of an elastic framework. This has proven to be a remarkable upgrade of BOF operating stability, reliability and safety.

Already 26 furnaces, including Meishan Steel's 250-tonne BOF, and Xinyu Steel's 210-tonne BOF, have applied CISDI-SACS and have seen substantial economic and social benefits. CISDI-SACS expertise has been awarded four patents for invention and two patents for utility model.

CISDI's research and development of a high-strength steel (780MPa) and high-speed (larger than 300m/min) continuous annealing line is a Chinese first.

Awarded four patents for invention, CAL expertise has seen successful applications at YIEH PHUI (CHINA) Technomaterial Co. and Anyang Steel in China.

#### CISDI's CAL results:

Strip's steady-state control and non-steady-state transitional control

Thermodynamic coupling control model in the L2 model, and the sectionalised, zoned

wet skin pass mill

Simultaneous control of multi-tower loopers by compensating auxiliary roll speed

# CISDI

Technology and Solutions Partner  
for the Global Metals Industry



Baowu Shaogang upstream-BF integrated intelligent control platform - CISDI builds it as a benchmark of China's steel intelligence levels.

## MEET US at METEC Hall 3 | C40 - MCC Booth



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