

CISDI NEWSLETTER

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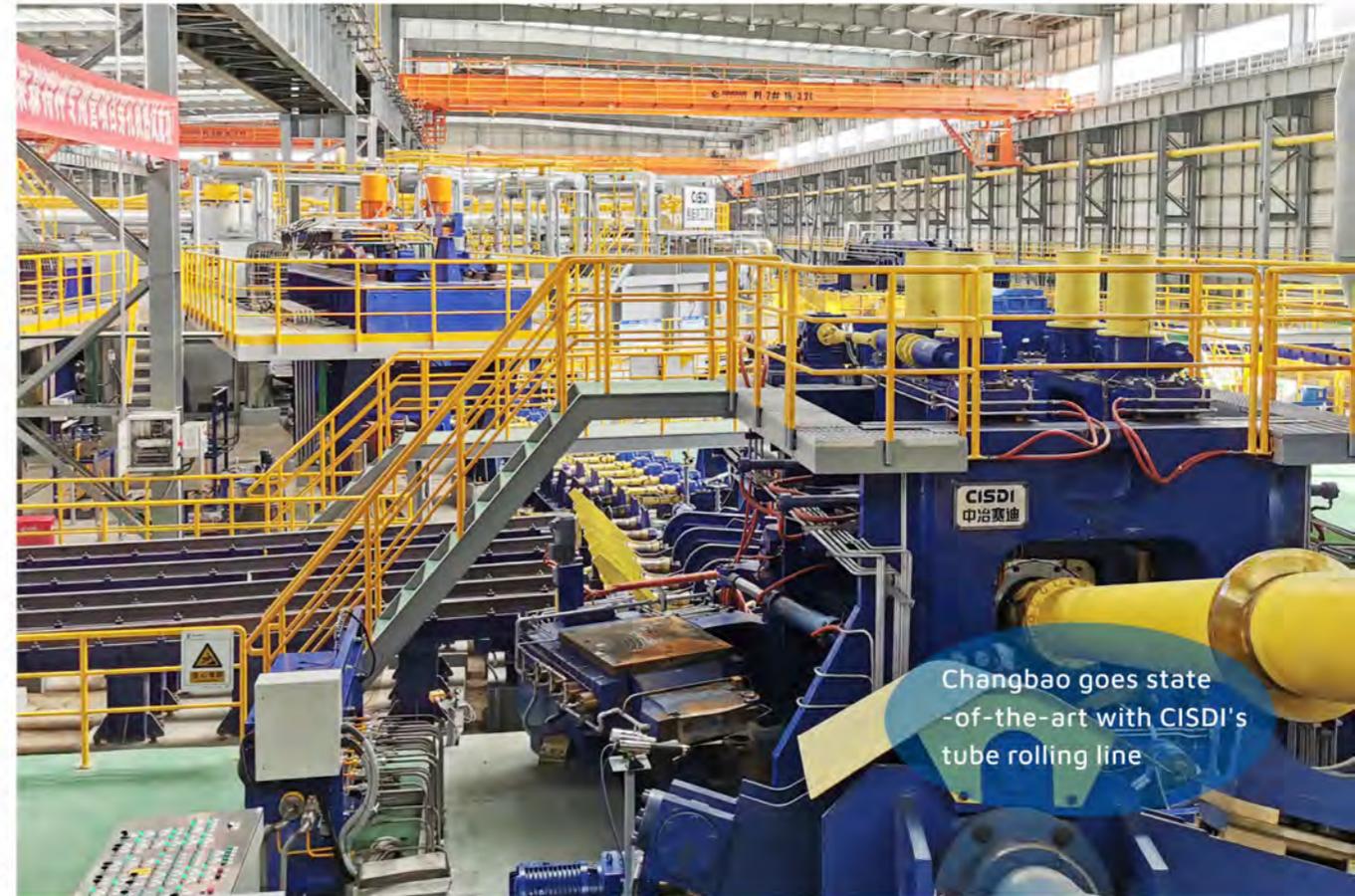
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Changbao goes state-of-the-art with CISDI's tube rolling line

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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 boss meets with British Consul General



Chairman Xuewen Xiao is pictured with British Consul General Stephen Ellison at CISDI's HQ in Chongqing

CISDI Group strengthened its relationship with the UK steel sector during a visit from the British Consul General.

Britain's representative in Chongqing Stephen Ellison arrived at CISDI's HQ in the city to discuss future opportunities with its chairman, Xuewen Xiao.

He praised CISDI's investment, construction and development efforts in the UK, and expressed the hope that CISDI and British enterprises could explore more joint opportunities.

He pledged to assist with CISDI's projects in the UK and Europe, as he believed globalised companies would see a better recovery of their businesses after the pandemic, commenting: 'We hope to see more promotions and applications of CISDI green, intelligent fortes in the UK and beyond.'

CISDI has a strong relationship with Britain - CISDI UK, which is based in Sheffield, is spearheading the group's overseas business development.

'Throughout the pandemic, our UK team has pursued progress, while delivering stability. It has ensured smooth, reliable delivery of our services to customers around the world.'

'We are a trusted partner to British, European and American customers who are transforming and upgrading with cost-effective, eco-friendly and intelligent solutions,' he added.

'CISDI is continually developing advancements for green and intelligent manufacturing. We have the only applied industrial internet platform for the global steel sector and have made major breakthroughs in achieving ultra-low emissions, carbon reduction and hydrogen metallurgy technologies.'

With a philosophy of openness and development-sharing, CISDI Group encourages its UK operations to pursue localization and contribute to local economies, cultures and societies. As a result, CISDI UK has become the preferred service provider of customers in the UK and beyond.

Mr Xiao expressed his hope that the British consulate in Chongqing would continue its support for economic, trade and cultural exchange and for CISDI's development in the British market.

Discussion also focussed on recent developments in urban construction, energy conservation, environmental protection, rural revitalisation and equipment manufacturing.

Baosteel Zhanjiang's Phase II is on target



Aerial view of Baosteel Zhanjiang, showing its phase I in operation and its about-to-run phase II

Baosteel Zhanjiang's phase II is on target for full start-up in June 2022.

Construction began in March 2019 and all unit plants and lines are going full-steam ahead to meet the deadline.

The steel complex, which will be centralised around its blast furnace 3, is designed to be a streamlined and super-efficient Green Factory, a world-leader in cost-effectiveness, quality and environmental control.

Phase I, which went operational

in July 2016, had achieved its designed output and performance standards and hit efficiency and reduced consumption targets by 2017.

Phase II will stay true to the principles set for Baosteel's new base in southern China, and in alignment with its role as a global steel leader.

Zhanjiang Steel will improve competitiveness even further via the restructuring of its product mix, optimisation of its production lines and their

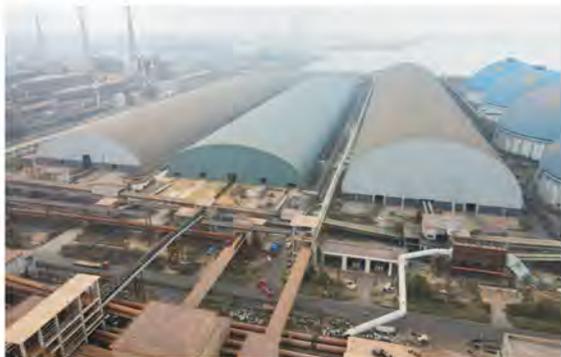
functions, and the operation of its green, smart manufacturing methods at phase II.

CISDI is providing Baosteel Zhanjiang with the majority of its design, supply, construction and management requirements.

Its expertise for phase II includes the master design, stockyard expansion, blast furnace 3 (with a volume of 5,050m³), 1,650mm

The project in detail >>>

◆ Smart, green stockyard



Zhanjiang phase II's stockyard under construction



An artist's view of Zhanjiang's stockyards

continuous caster, 1,780mm hot strip mill, plant-wide water treatment expansion, plant-wide power supply and distribution system expansion, plant-wide lab expansion and the plant-wide solid waste treatment system expansion.

To ensure all projects meet their targets, over 100 CISDI management and technical assistance specialists are on site.

Phase II's stockyard project will run alongside those at phase I and its upgrades. It will store, process and handle raw materials and fuels required for a hot metal output of 12 million tonnes a year when Zhanjiang phase II is operational.

Phase II's build includes a blending yard (B5) and supportive charging, crushing, screening, proportioning and other sub-systems and utilities.

CISDI is responsible for the intelligent, unmanned stockyards at both of Zhanjiang's development phases.

Keenly aware of the local climate and conditions, CISDI's team had to carefully pre-plan, design and order, to enable an acceleration of construction in the dry season.

The blending yard has been operational since January and the transport, crushing and screening systems are currently being commissioned. A multi-disciplinary on-site CISDI team is providing technical assistance throughout.

◆ Blast furnace 3 - an industry giant



The blast furnace 3 in process of construction at Baosteel Zhanjiang



CISDI team celebrates the heating-up of BF3's stoves

Blast furnace 3 is at the centre of Baosteel Zhanjiang phase II's operations.

It has a volume of 5,050 cubic metres and a wealth of CISDI-based core tech and equipment – BCQS no bell top, top combustion stove, heavy-duty blower and large, dry TRT.

The furnace's intelligent casthouse and stoves enable smart production and operation.

Compared with blast furnaces 1 and 2 at phase I, BF3 has a more compact layout, will operate more smoothly and give easier access for maintenance, thanks to CISDI team's surveys and systematic optimisations.

The four top-combustion stoves supplied by CISDI were successfully heated up in March, laying the foundation for a full start-up.

◆ 1,650mm continuous caster, operating with world-leading levels

The CISDI-supplied 1,650mm continuous caster was the first major plant to be hot-commissioned and go into operation at Baosteel Zhanjiang phase II.

It produces high-strength steel, silicon steel, deep-drawing steel and other high-

value-added slabs.

CISDI did the casting plant's design, casting and finishing equipment supplies, and construction of its centralised control centre.

The caster is operating at world-leading

levels for automation, economy, safety and efficiency. It is equipped with intelligent facilities and controls for quality, operation and management and boasts the world's largest ladle turret (520 tonnes).

Robots man the casting and automatic mould powder charging positions, the mechanical scarfing machine is online and efficient, green utilities are featured.

Operational from January, the caster is performing well and is on target to achieve its designed production capacity of 2.80 million tonnes a year. It feeds stock slabs into the downstream 1,780mm hot strip mill.

Slab specifications range is 230mm thick, 900mm-1,650mm wide and 8,000mm-11,000mm long.



Running smoothly: The CISDI-supplied 1,650mm continuous caster at Baosteel Zhanjiang

◆ 1,780mm hot strip mill - Baowu's first intelligent hot rolling line

Zhanjiang's 1,780mm hot strip rolling line will be the first of its kind for Baowu Group.

Intelligent, super-efficient high-strength steel rolling will be achieved. State-of-the-art tech gives centralised control, and intelligent equipment diagnosis, quality control, roll grinding and warehousing.

CISDI has supplied the line's three reheating furnaces and water treatment and high-pressure water descaling systems. It is also responsible for design of the plant and non-standard equipment.

Advanced tech and equipment has created ultra-low NOx emission, energy-efficient burners, composite, cascade excess heat recovery, nano thermal insulation material, zoned, real-time air-fuel ratio optimisation, energy-conservative hydraulic unit, cyclone pool's orificed plate guide, fast filter leakage



The reheating furnace 3 for 1,780mm hot strip mill has been successfully dried off at Baosteel Zhanjiang

detection, innovative cyclone pool and horizontal sedimentation tank.

The rolling line was fed power for its high-voltage system in November last year and dried off its reheating furnace 3 in April this year.

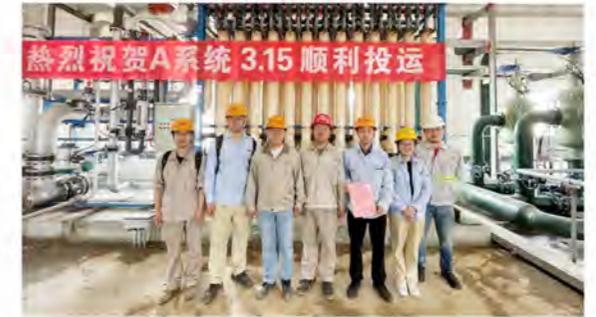
◆ Water treatment plant with zero liquid discharge

Zhanjiang's phase II water treatment plant plays a vital role in boosting green, waste-to-resource developments.

CISDI has undertaken the plant design and supplies of treatment systems A and B and the sludge treatment system, fulfilling its supplies ahead of schedule.

The alum identification and intelligent dosing system will be operating in June.

CISDI's engineering manager, technologists and electric and automation specialists remained onsite for a long period. They monitored and controlled itemised schedules and supervised the implementation of every Change Order and installation quality check.



CISDI team celebrate the success of phase II's deep processing system A at Baosteel Zhanjiang's water treatment plant

Their dedication and workmanship ensured timely, effective solutions were achieved for any site issues that occurred.

◆ Solid waste treatment centre to boost green credentials

The CISDI-supplied rotary hearth furnace 2 for Zhanjiang's solid waste treatment centre phase II has been started up.

It adds another annual 200,000 tonnes of ferrous waste treatment capacity to that already provided by phase I's rotary hearth furnace, which was also supplied by CISDI.

The treatment centre creates a greener, cleaner Zhanjiang Steel, achieving zero ferrous waste discharge while maximising waste to energy.

A very tight design and construction schedule was met by CISDI. It was a record for similar projects in China. The design was carried out from May 2020 to October, installation of hearth machinery began last



Rotary hearth furnace 2, in operation at Baosteel Zhanjiang

July and dry-off of the furnace commenced last December. The furnace went into operation in April 2021.

◆ Intelligent, autonomous hot metal transport system for world-class steel logistics

Zhanjiang phase II's autonomous hot metal locomotive acts as a supportive logistics system for all Phase II projects, which are centralised around blast furnace 3.

Phase I of the intelligent transport system went operational in 2019 and serves blast furnaces 1 and 2.

Two additional locomotives and nine torpedo ladle cars have been installed in Phase II. Commissioning of their intelligent units, which will upgrade the existing hot metal intelligent scheduling system, is now taking place.

The system needs to accommodate a longer hot metal transport route from blast furnace 3 to the steelmaking plant, and also to interface with the existing phase I system and cope with more complicated scheduling conditions.

To that aim, CISDI has optimised multi-object tracking algorithm models and software operation efficiency, and improved the stability



Phase II's intelligent, autonomous hot metal transport system at Baosteel Zhanjiang is being commissioned and scheduled to operate in June

of its core intelligent equipment.

CISDI is utilising Phase I's massive data for reinforcement learning and algorithm iteration.

As a result, Phase II's autonomous hot metal transport system will be even safer, more stable and efficient.



A bright market ahead for CISDI's combined caster

● Package supply of combined caster to Xinye Special Steel

CISDI has won an order for a new 3-strand round and square bloom caster which will transform a Chinese steel specialist's production.

It will be supplied to Xinye Special Steel in China's Hubei Province, enabling it to become the only producer in China able to create both round and square blooms - a highly-complicated technical process.

The caster is being designed with a projected production capacity of 600,000 tonnes of die, bearing and spring steels a year. The strand's

cross section will range from $\Phi 300$ - $\Phi 800$ mm for rounds and 420mm \times 530mm and 380mm \times 800mm for squares.

CISDI will apply the following specialised tech and equipment:

- ⊙ Soft and heavy reductions
- ⊙ Mould's electromagnetic stirrer
- ⊙ Secondary cooling end's EMS
- ⊙ Mould wire-feeding.

● Heavy slab caster to be built for Shenglong Metallurgy Co.

Two new 2-strand slab casters will be built by CISDI for Shenglong Metallurgy Co. in China's Guangxi Province to an EPC mode.

The casters will produce seven million tonnes

of slabs a year, with specifications ranges of 250mm \times (1,000-2,150)mm.

CISDI will provide design, supply and technical assistance services.

● New slab caster for Dachang Metal Materials Co.

A new 2-strand slab caster will be built for Dachang Metal Materials Co. The project is a co-investment by the Shougang Group and the Anhui Dachang Mine Industry.

The caster's projected production capacity is 3

million tonnes a year, and its maximum specification is 2,300mm.

CISDI will provide the caster proper equipment and its utilities and technical assistance services, on an EPC basis.



Changbao goes state-of-the-art with CISDI's tube rolling line

Shining example of modern seamless tube rolling

The CISDI-supplied piercer mill is pictured in place



Changbao's $\Phi 159$ mm seamless tube rolling line in operation, designed and partly-supplied by CISDI

A state-of-the-art, special-purpose tube rolling line has been successfully hot commissioned at Changbao Precision Steel Tube Company in China.

It is the highest-standard modern seamless tube rolling line to be designed by a Chinese engineering company.

CISDI undertook the line's engineering, EPCM, technological leadership and part of the package supplies.

The CISDI-supplied Piercer Mill features high rigidity, efficiency and precision and convenient operation and maintenance.

It applies multiple examples of CISDI's expert tech – rack-driven plug bar, automatic plug change and automatic model setup. A centralised control room has been designed for this line and the process arrangement is simplified and smooth.



A piece of hollow bloom being processed (nitrogen blowing and borax blasting) before entering the downstream mandrel pipe mill

The line's main products are high-quality petroleum oil casing pipe and line pipe, with outer diameter ranges of $\Phi 51$ mm to $\Phi 159$ mm and wall thickness ranges of 4.0mm to 20mm. The annual projected production capacity is 300,000 tonnes.

CISDI's mechanical, hydraulic and electric equipment supplies cover the line's tubular stock area, piercer mill train and auxiliaries, retained mandrel circulation, cooling bed and pre-finishing mill areas.

Changbao is based in Changzhou City, in the Jiangsu Province. Supply and construction was hit by the pandemic but CISDI's team adopted scientific and holistic approaches to ensure staff were protected from the virus as work resumed.

Online meetings between CISDI, Changbao and the partners involved ensured design, supply, commissioning and management targets were met.

Link

Changbao Steel Tube Co. was founded in 1958 and is China's leading brand for the production of small and medium-calibre tube for the energy sector. It is also a dominant force in the global production of OCTG industry and small boiler tubes.

Changbao's quality products have been welcomed by markets in Europe, America, the Middle East, Russia, Southeast Asia, Australia and Africa.

The company was listed on the Shenzhen Stock Exchange in 2010.

Its location in Changzhou City has an internal railway to connect with the Shanghai-Nanjing line.

A CISDI-supplied piercer mill for the latest line was hot-commissioned last December. Mid April saw the line go fully operational.



Green orders from Pangang

EPC-based rebuild for reheating furnaces

CISDI is to apply multiple energy-conserving and intelligent technologies and equipment for green rebuilds at Pangang Metalwork Co.

Reheating furnaces for a high-speed wire-rod rolling line and a high-speed bar rolling line will be rebuilt to operate online.

Part of the Pangang Group, the metalwork company is based in Panzhihua City in China's Sichuan Province.

It requires the wire-rod rolling line's furnace to achieve an hourly output of 130 tonnes. The furnace serving the bar-rolling line will meet a 170-tonne target.

EPC-based services for colour coating line

A new colour coating line will be built for Chengdu Plate Co.'s sheet metal production. Its product is used for high-end home appliances.

CISDI's main tech focuses on curing furnace hot air circulating and RTO waste gas burning systems. It will transform the existing galvanised and galvaluminised sheets to coated products, which have a higher added value.

Chengdu Plate Co. is part of the Pangang Group. The 80,000t/a colour coating line will expand Pangang's product range and improve its market competitiveness and economic returns.

EPC-based upgrade for reheating furnace 3

Reheating furnace 3 at Xichang Steel's 2,050mm hot strip rolling line under Pangang Group will be upgraded by CISDI to an EPC mode.

It's the first of the line's three reheating furnaces to be upgraded.

CISDI tech will enable full-process automatic tracking, smart combustion model control and one-touch combustion operation.

The upgrade will play a key part in enhancing the line's quality and production capacity.

The CISDI-supplied reheating furnace 4 for the same line went into operation in June 2019 and has been highly successful.

A Pangang spokesperson commented: "The new furnace has been performing to China's top levels, thanks to CISDI's efficient, energy-saving combustion system, advanced automation control for furnace intelligent combustion and its reliable machinery."

Link

China's first independently-designed and built large steel complex, Pangang has become renowned for its ivory, sculpted profile.

Chongqing Ferrous Metallurgy Design Institute (the predecessor of CISDI, which operated from 1958 to 1978) designed the world's first large vanadium-titanium smelting blast furnace for Pangang and became China's first design institute able to independently undertake the engineering of a large steel complex.

CISDI has forged a lasting partnership with Pangang and continues to provide services for its full process, from ironmaking to steelmaking, continuous casting and cold rolling.

Innovative installation skills enable success for Isdemir COG holder



The COG holder is capped at Isdemir in Turkey

CISDI had to be extra-innovative when it came to constructing a COG holder for Isdemir in Turkey.

The Piston, Oil Seal, Cylindrical Shell Type (POC) gas holder is a patented CISDI product.

Construction requires 70 tonnes of mounting facilities, including the top crane, external and internal scaffolds, central stand, top limit wheel and post connection clamp.



CISDI team onsite with the construction partner

However, the top crane, external and internal scaffolds could not be approved by the European standard for safety.

CISDI had to come up with an innovative solution.

Its team adapted Turkish machinery and tools, relied on a tower crane and replaced the conventional external and internal scaffolds with a single-layer platform.

The construction process had to integrate installation, welding and inspection onto the same working platform. It was completed successfully, ensuring the gas holder's mounting was accurate and met European safety standards.

The COG holder has now been capped, with its last post and top steel structures connected.

Sanbao prepares to roll optimum quality

A new reheating furnace for the high-strength optimum bar and wire-rod rolling line at Sanbao Special Steel in Fujian Province has now been dried off.

It is CISDI's second reference for Sanbao. It previously built the reheating furnace for the company's 1,500mm hot strip rolling line.

A number of CISDI's green, intelligent reheating technologies have been applied:

- ◎ BFG-air dual-regenerative combustion: preheating the air and gas to above 1,000 deg.C results in a high excess heat recovery rate, saves fuel consumption and reduces energy consumption.
- ◎ Ultra-low NOx energy-efficient burner: substantially controls the NOx content in reheating furnace fume, in accordance with the national ULE standard.
- ◎ Residual oxygen online monitor: enables intelligent air-gas proportioning and greatly improves labour productivity.

Sanbao's furnace will feed reheated billets for both bar and wire-rod rolling processes, which is designed to produce 1.39 million tonnes of quality bars and rods a year.

CISDI are supplying a high-rigidity short-stress path rolling mill, standardised flying shear, super-heavy modular mill and innovative controlled cooler for this line. Installation is almost complete and preparations are being made for their commissioning.



Reheating furnace for 1,500mm hot strip rolling line



CISDI team celebrate the success of reheating furnace

Tsingtuo Special Steel's reheating furnace is hot tested



The reheating furnace at Tsingtuo, supplied by CISDI Thermal Engineering and Environmental Protection Co.

A reheating furnace for stainless steel high-speed wire-rod rolling line has been successfully hot-tested at Tsingtuo Special Steel.

It's CISDI's second project with Tsingtuo. It has previously built a reheating furnace for a stainless steel rolling line at Tsingtuo Industrial Co.

Facing a tight schedule, CISDI's team arranged for the steel structural pipes to be pre-fabricated in

advance, and delivered when onsite construction conditions could support.

The team stayed on-site at the plant, which is based in Ningde City in China's Fujian Province, to maintain schedules during the Chinese Lunar New Year holidays. Their dedication and responsive solutions won Tsingtuo's trust and appreciation.

CISDI Consulting

- ◆ We are expert at creating world-leading total solutions for full steel processes. Our unique master design model encompasses a complete general design indicator system and five-flow-based efficiency and economic analysis methodology.
- ◆ This consulting model enables a steel plant to be sustainably competitive.
- ◆ We have master-designed world-leading Greenfield projects at Baowu Zhanjiang Steel, Formosa Ha Tinh Steel in Vietnam, ASSB in Malaysia and LPS in Australia.
- ◆ We are one of two engineering consulting firms selected by the Asian Infrastructure Investment Bank.



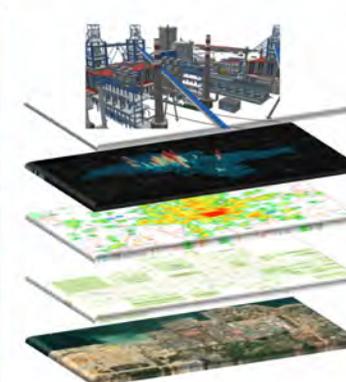
Formosa Ha Tinh Steel in Vietnam has an annual output of 10 million tonnes

We provide integrated consulting services for multiple plants at FHS, based on factual general design solutions and financial models.



Zenith Nantong Steel

A landmark green, intelligent steelworks, playing a major role in boosting the integrated development of China's Yangtze River.



CISDI AICON intelligent consulting platform

Integrating data, methods and models to create multiple services for data, master plan and management lines.