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Baosteel Shanghai's renovated stockyard

IN THIS ISSUE

CISDI

TOTAL SOLUTIONS AND TECHNOLOGY PROVIDER PREFERRED BY GLOBAL METAL 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.

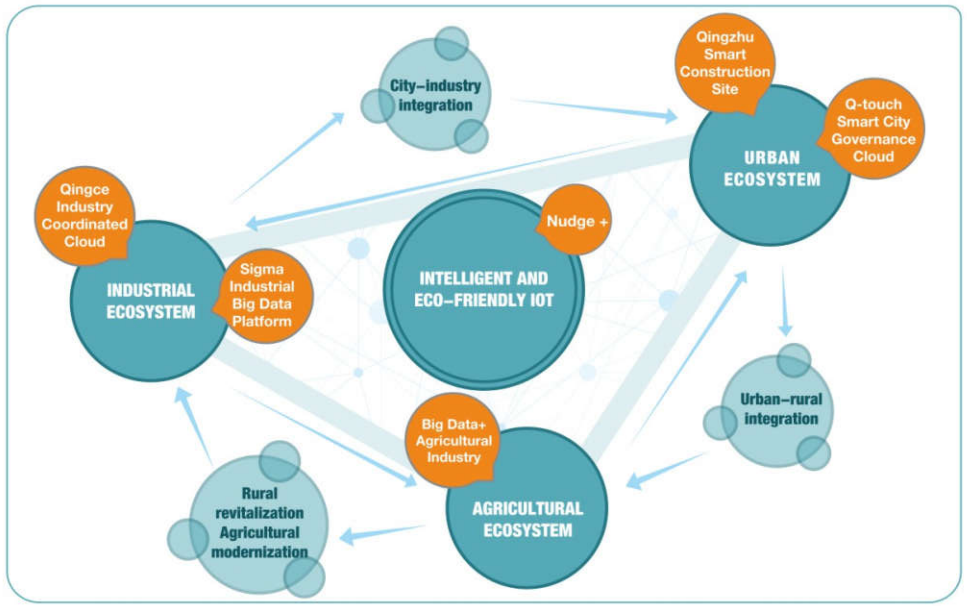
FULL-LIFE-CYCLE SERVICES

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.

TABLE OF CONTENTS

Leading the way with intelligent and IT applications

CISDI is making great strides in its intelligent manufacturing, particularly its developments for smart city management and intelligent agriculture.



Making great strides in intelligent manufacturing

The company has 60 years of experience in automation and big data for industry and was one of the first in China to adopt intelligent and information technology applications.

By integrating its abundant engineering experience with cloud computation, the internet of things, big data and intelligent technology, CISDI is now providing intelligent solutions and services for both steel and non-steel sectors.

The company has formed a five-pronged industrial system consisting of platform, big data, intelligence, automation and digital design and launched a new subsidiary, the CISDI Information Technology Co., Ltd.

Some of its technologies and products have already been successful in the marketplace and the company's mission is to become a world-leading intelligent technology company with platforms and eco-big data.


CISDI makes its mark at Smart China Expo

CISDI makes its mark at China's first smart technology expo

World-leaders Microsoft, Intel, Alibaba and Huawei were among the tech names at Smart China Expo, China's first intelligent technology exhibition.

The August 23-25 event, staged in Chongqing, was a declaration of the country's determination to build a digital China and a smart society.

Representatives from 28 countries attended the three-day event, themed Smart Technology: Empowering Economy, Enriching Life.

CISDI took three stands, covering 1,000 square metres, and employed augmented reality, virtual reality and artificial intelligence to showcase the cutting-edge technologies it has created to make cities, agriculture, industry and enterprise work smarter.

Visitors to the stand included representatives from Oracle, Huawei, UNISLAN, local government agencies and steel plants.

Many were impressed by one of CISDI's leading tech inventions, Q-Touch, a smart city management cloud platform which acts like a city's brain, collecting data and enabling city management teams to identify issues and respond swiftly.

To demonstrate the platform's ingenuity, CISDI set up a 30,000-square-metre smart town cloud.

Another winner with the crowds was CISDI's Nudge+, an office cloud platform which integrates internal communications between mobile offices, enhancing information-sharing and worker efficiency for small teams and large-sized enterprises alike.

CISDI also demonstrated how Qingzhu, its smart construction site cloud, enhances construction site safety and quality control by comprehensively monitoring and controlling manpower, machinery, materials and SHE (safety-health-environmental protection).

CISDI's partnership with Sinovation moves forward

Sinovation Ventures and CISDI are pictured at Zhongguancun Science Park, Beijing

CISDI and Sinovation Ventures are forging ahead with their joint commitment to developing AI.

Leaders of the organisations have had a second meeting since signing a co-operative agreement on artificial intelligence in June.

The two giants, plus Sinovation's AI Institute, are working together to develop intelligent projects and technical services for smart city management and agribusiness.

Sinovation Ventures is committed to speeding up the integration of AI+B2B technology and real-world applications by leveraging leading technological and research around the globe.

The AI Institute, founded in 2016, pursues AI eco-system technological research, transformational science and technology, talent cultivation and product development.

CISDI has created a complete industrial capability system and is able to provide total intelligent solutions and services.

During the meeting, CISDI's chairman Xuewen Xiao commented: "We have developed and put into use a series of core products for intelligent manufacturing, smart city management and intelligent agriculture.

"We and Sinovation can learn from each other and will be making concerted efforts to boost AI developments together."

Deepening the link with Oracle

Representative from Oracle meet with CISDI in Chongqing

CISDI is further strengthening its relationship with Oracle, the American multinational computer technology giant.

Chairman Xuewen Xiao and CEO Zhaohui Yu met with Oracle's vice president Neil Mendelson during August to firm up a strategic partnership and explore further opportunities for cloud and big data projects.

With 430,000 customers in 175 countries, Oracle specialises in developing leading-edge database software and technology, cloud-engineered systems and enterprising software products.

CISDI and Oracle have been working in a strategic partnership since 2012 and are developing a long-term commitment to create enterprising information technology applications together.

Thanks to Oracle, CISDI has become China's first engineering company with its own private clouds.

Mendelson commented: "CISDI has been both an important customer and a strategic partner for Oracle. Our Chinese business relies on CISDI and the like for support and we believe both parties can make sustainable and deeper co-operation in clouds and big data."

Hatch Metals visits CISDI

Teams from Hatch and CISDI discuss their future plans

Canada's global multidisciplinary management, engineering and development consultancy Hatch Metals paid a visit to CISDI recently.

A delegation led by the company's global director Ted Lyon and Asia Pacific director David Small travelled to Chongqing to meet with CISDI's chairman Xuewen Xiao and his team.

On the agenda were future plans for their year-old joint venture, Hatch-CISDI International Engineering & Consulting.

Registered in Hong Kong in October 2017, HCI provides a diverse range of services which boost the sustainable development of its clients. The two companies pool their expertise in technology, consulting, project management and the global business network.

Hatch, established in 1955, describes itself as "entrepreneurs with a technical soul." The company works in over 150 countries around the world in the metals, energy, infrastructure, digital and investments market sectors.

Its diverse teams have a vast knowledge of engineering and business, and work in partnership with clients to develop market strategies, manage and optimise production, develop new game-changing technologies, and design and deliver complex capital projects.

Their solutions pursue optimal environmental protection, economic prosperity, social justice and cultural vibrancy.

Xiao said: "Hatch and CISDI are combining competitive skills and references to provide optimal total solutions and operations management to steel companies going through transformation and upgrading."

Ted Lyon added: "We recognise CISDI's continuous progress in project management and engineering technology and improved brand awareness around the globe.

'We are encouraged to wield mutual complementary advantages and experience to develop wider and deeper co-operation."

CISDI visits Turkey's top companies

CISDI's team pictured during the visit to OYAK

CISDI made a highly successful visit to Turkey's leading industrialists this summer.

Led by CEO Zhaohui Yu, the team strengthened relationships at OYAK, the largest mining and metallurgy group in Turkey. A further meeting at TOSYALI, the country's first and largest private steel investor, also proved highly fruitful.

CISDI has previously delivered three rebuilt hot stoves to OYAK's subsidiary Isdemir in 2016 and one new hot stove to a second, Erdemir, in 2018, all on an EP basis.

At a meeting with Toker Ozcan, vice chairman and MD of the OYAK Group, and Salih Cem Oral, general manager of the Erdemir Steel Plant, CISDI highlighted its expertise in consulting and systematic optimisation.

"OYAK was highly impressed by CISDI's competence as a global-oriented engineering company and technology and total solutions provider," CISDI spokesperson.

TOSYALI agreed to explore with CISDI opportunities to develop Greenfield plants in Turkey and Phase IV projects at its plant in Algeria.

Headquartered in Hatay, İskenderun, its production facilities are based in Osmaniye, Istanbul, Izmir, Algeria and Serbia Montenegro, and the company is the driver of Algeria's steel sector.

The CISDI team toured TOSYALI HQ's EAF, CCM, HSM, welded pipe mill, CSM, CGL and CCL sites and Yu gave a detailed account of CISDI's expertise in energy conservation and environmental protection to TOSYALI's CEO, Suhat Korkmaz, and its project and investment director Mehmet Gezgin.

CISDI made the most of their time in Turkey, also paying visits to GLOMET, Mitsubishi Turkey and the commercial consul of China's Consulate-General to Turkey.

ASSB's blast furnace 2 blown in

ASSB's blast furnace 2 has been successfully blown in, a significant milestone in the completion of Malaysia's largest steel complex.

The plant, which will boast the highest levels of automation in the country, is being financed, built and operated by Chinese enterprises.

Designed and package-supplied by CISDI, it is expected to produce 3.50 million tonnes of steel a year.

Blast Furnace 2 was blown in on August 24 and as it enters pilot production stage, ASSB becomes a new reference for CISDI's expertise in creating overseas Greenfield full-process steel plants. Previous references are Baosteel Zhanjiang and Formosa Ha Tinh.

The two blast furnaces at ASSB, designed and supplied by CISDI

ASSB, the most advanced steel complex in Malaysia

The 60 years of engineering experience and package supply expertise won CISDI the contracts for ASSB's general design and plant engineering, the design and package supply of the stockyard, blast furnaces, rolling mills, BOFs, LF and CCMs.

CISDI is also responsible for the EPC-based services which cover all the steel production processes - reheating furnaces, procurement and equipment management.

Fact file

Malaysia's state-of-the-art integrated mill features:

- 530,000-tonne intelligent stockyard
- Two 1,080-cubic-metre blast furnaces
- Two 198-square-metre sintering machines
- Two 100-tonne BOFs
- One LF
- Three CCMs

ASSB milestones

August 16, 2018

Phase I completed as scheduled when BOF 2 started up, followed by CCM 1 a week later.

June 6, 2018

Blast furnace 1 was blown-in, along with the BOF 1 and CCM 2 five days later. Its CCM 3 was started up a week later.

December 28, 2017

Rolling mills were completed

November 21, 2016

Construction started

April 2014

ASSB was founded on a 288 hectare site.

One of CISDI's experts runs through site instructions with an ASSB worker

An aerial view of Formosa Ha Tinh Steel in Vietnam, CISDI's first systematic export for a 10-million-tonne new plant

Making an impact on the Belt and Road route

ASSB is the first major project at the Malaysia-China Kuantan Industrial Park.

Kuantan, the biggest city on East Coast in Malaysia, is expected to boom because of the new steel complex.

Malaysia's steel sector has mainly comprised of light section mills with a low degree of automation, limited techniques and product quality. The majority of medium and heavy sections and plates had to be imported.

The development of ASSB brings to Malaysia advanced technologies and high-level automation which will enable the country to produce 3.50 million tonnes of bars and wire rods and H sections a year and potentially world-class product quality.

CISDI has contributed its patented intelligent stockyard, SACS BOF and more core technologies and products to this game-changing steel complex.

Already the construction and production of ASSB have brought about the training of some 3,000 technicians. The direct economic contribution ratio will be $2 billion a year.

In addition, ASSB will create work for local support industries and connect upstream and downstream services.

The CISDI-SACS BOF being charged with hot metal, a successful appli cation of the patented four-point linkage suspension converter

CISDI's engineers at project site

CISDI - pioneers exporting China's technology and equipment

> “Of the world's top 50 steel enterprises, 41 are CISDI clients”

CISDI has opened subsidiaries and branches in Brazil, India, Vietnam, the UK, USA, Turkey and Malaysia, enabling the company to better understand the needs of each country's steel producers.

As a result, CISDI has undertaken a number of large projects in those regions – Formosa Ha Tinh Steel in Vietnam, ASSB in Malaysia, TATA Steel Kalinganagar's blast furnace 2, and TATA UK's Port Talbot finishing mill.

CISDI can fulfill full-process services export, from consulting to engineering, package supply, project management and operations management.

In line with the company's globalisation strategy, CISDI is committed to building more connections with the world's steel markets and providing competitive total solutions and technical services for new facilities on the Belt and Road Initiative and the rebuild of stock facilities for European and American plants.

An aerial view of ASSB's complex site

Progress at Zhanjiang Steel Phase II

Engineering work has now begun on Baosteel Zhanjiang's Phase II systems.

Phase II is applying advanced technologies to further improve the plant's competitiveness in intelligent manufacture, product restructuring and optimisation. The revamp will also cut production costs and boost the plant's green credentials.

CISDI is undertaking the general design for Phase II systems and the process unit design.

The company's far-reaching role involves expanding the plant's stockyard, creating a new blast furnace, which will have a volume of 5,050m^3, a new 1,650mm continuous caster and 1,780mm hot strip mill.

CISDI will also be expanding the plant-wide water treatment system, power supply and distribution system, the plant-wide lab and solid waste treatment system.

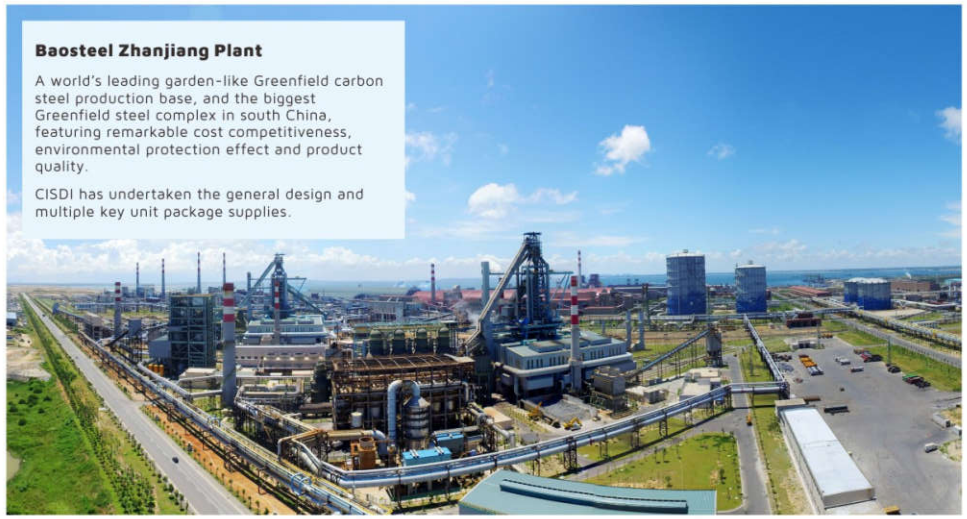
Two major milestones have been set. Piling of the 1,780mm hot strip mill on March 1, 2019 will mark the start of construction and the blow-in of the plant's blast furnace 3 on July 1, 2021 will mark the complete start-up of Phase II systems.

Zhanjiang's Phase I systems were completed in 2016 with CISDI as the plant's general designer and main service provider.

Phase I resulted in significant reductions on capital cost and has lowered energy consumption per tonne of steel and labour costs. Remarkable improvements have also been seen in technological contents, the amount of Chinese-made equipment, intelligence levels and product quality.

Since start-up, world-class energy conservation and environmental protection ratings have been achieved.

The Zhanjiang Plant will eventually be an energy-efficient, green and lean steel base.



Baosteel Zhanjiang Plant

A world's leading garden-like Greenfield carbon steel production base, and the biggest Greenfield steel complex in south China, featuring remarkable cost competitiveness, environmental protection effect and product quality.

CISDI has undertaken the general design and multiple key unit package supplies.

Better for business, better for the environment

Baosteel Shanghai's renovated stockyard

The renovated Baosteel C2 stockyard, created for greater environmental protection

Baosteel Shanghai is now hitting critical green targets following a major environmental overhaul of its stockyard.

The C2 yard, one of the biggest of its kind in the world, has been redesigned by CISDI and represents one of Baosteel Shanghai's most complicated raw material-handling revamp systems.

An enclosed yard now occupies the same site. Almost 800,000-square metres are enclosed, enabling all raw materials and fuels to be stored under cover.

CISDI's design has been able to save 280,000 square metres of land and reduces flying dusts by 95 per cent - a significant result for the surrounding ecosystem. Material losses have been reduced by 85 per cent.

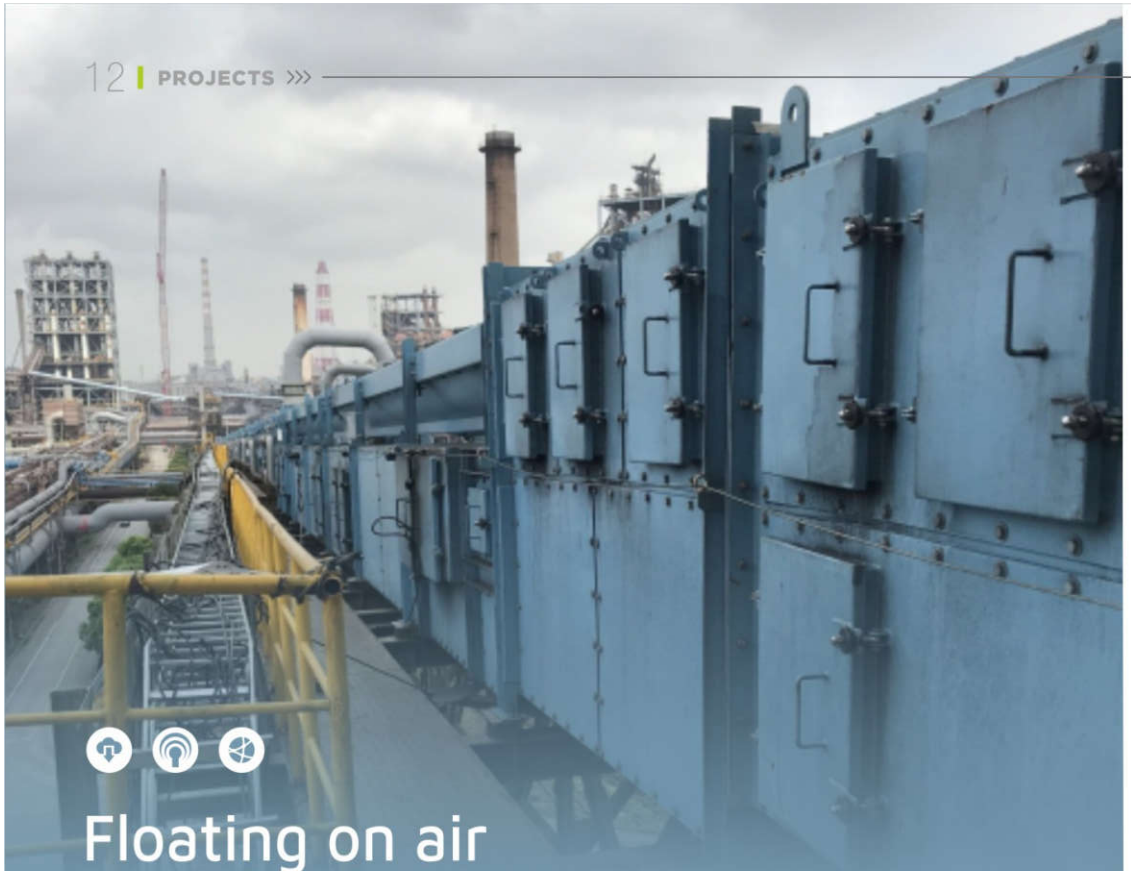
Some 50 metres high, it features a Model C yard with a span of 90 metres and a gantry yard spanning 47 metres.

CISDI has been creating enclosed yards for a number of years and has fine-tuned the design for Baosteel after feedback from steel clients whose stockyards are now in full production.

Its online renovation and clean production technologies were applied and the yard boasts an intelligent inventory system. Stacking, reclaiming and transportation of materials can now be operated without attendants.

Aerial view of Baosteel's revamped raw material handling systems

CISDI's technical assistance team was on-site for three years, ensuring smooth progress - from the initial construction of a temporary handling system to getting the whole yard operational.



Floating on air

CISDI designs an innovative solution for Baosteel

Baosteel's centralised coal supply system for its blast furnace ironmaking plant has been rebuilt and put into operation.

CISDI designed the system and the rebuild was completed in less than three months.

The technological process, transfer towers and belt conveyor corridors have been enclosed to benefit the environment, worn and corroded facilities have been replaced and upgraded and additional dust collection points have been added in the transfer towers.

To create a more environmentally-friendly transportation method, the belt conveyor V117 has been converted to an air cushion conveyor.

The conveyor has no carrier roller unit under the middle transport sections. Instead, a thin gas film supports the belt and materials. The result is a more efficient, quieter and less air-polluting transportation procedure. Materials are fully enclosed as they are moved, and equipment maintenance and operation costs are greatly reduced.

Air cushion conveyors are widely used for transporting grain and coal and in port and electric sectors, but this was a first for Baosteel.

A spokesperson for the ironmaking plant said: "The air cushion conveyor is working very well. It is much cleaner and requires less maintenance."

CISDI's cost-cutting solution for a descaling system

The high-voltage frequency converter at the descaling pump

A high-pressure descaling pump system supplied by CISDI-Electric is reducing maintenance costs at Shandong Shengyang's 1,700mm hot strip mill.

The upgraded descaling system rises from 15Hz to 50Hz in just eight seconds and can reverse in 20 seconds. Enhanced automation levels have cut maintenance costs dramatically.

Shengyang's outdated descaling system had five 710KW water pumps which worked in parallel and adjusted the outlet pressure by changing the quantity of pumps.

Problems included intermittent pressure control, pumps wearing badly and high maintenance costs.

CISDI rebuilt the descaling system by replacing the original five pumps with one 4,500KW water pump. A powerful MVC1200-10k/350 high-voltage frequency converter enables the pump's rotation speed to be controlled smoothly, which will extend its service life.

The converter, with a load motor of 10kV/4500kW and a nominal capacity of 5,650KVA, is the most powerful ever to be supplied by CISDI Electric to a water descaling system.

Technical characteristics of the MVC1200-series HV frequency converters:

A profile of CISDI's MVC1200-series HV frequency converter

- Highly-integrated digital control system (PECS controller)
- Modular design
- Stacked bus expertise
- Strong diagnosis on faults
- Ergonomics-focused HMI
- Small outline dimensions, easy maintenance
- Tailored design
- Small harmonic yet high power factor
- Good output characteristics
- Internet + field bus
- Superior energy efficiency

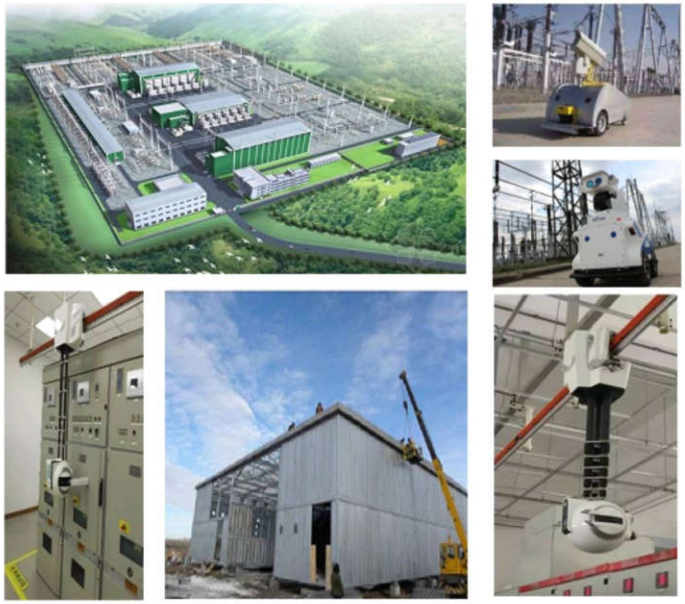
Shaogang 110KV intelligent substation starts construction

Shaogang's intelligent substation is now being built, with CISDI Electric as the EPC-contractor.

An indispensable part of the blast furnace's energy-conserving rebuild, the substation is in accordance with the client's green and intelligent manufacturing strategy.

Critical for energy transfer and control in the intelligent grid, its features include low carbon emissions, good interchangeability, high reliability and an intelligent operations management system.

CISDI Electric has built more than 300 substations in China and abroad and can provide total solutions to intelligent and modularised substations.



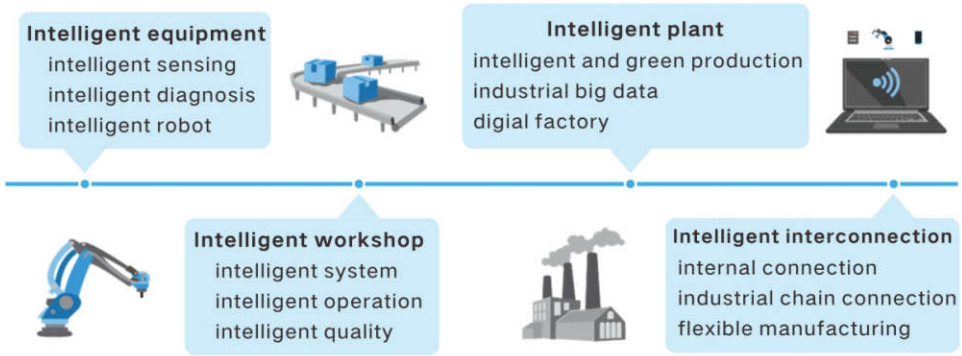
CISDI Electric's total solutions for intelligent and modularised substations are now operating at a number of steel plants

The main functions are symbolised below:

CISDI's Intelligent Expertise & Products

CISDI brings intelligence to the steel process

Multi-level and full life-cycle manufacture solutions are being transformed, enabling steel enterprises to become more efficient and cost effective, produce better quality products and become safer places to work.



Specialised Products

◆ Intelligent Stockyard

Unmanned stacking at the intelligent stockyard:

- Creates orderly and uniform stockpiles without the use of manpower
- Frees up site space
- Enhances productivity

CISDI's unmanned stacking with windrow stockpiles

Digital stockyard:

- Automatically generates high-precision three-dimensional stockpile position charts
- Inventories are checked and updated in real time
- Stockyard is controlled digitally

CISDI's digital stockyard system

◆ Intelligent Blast Furnace

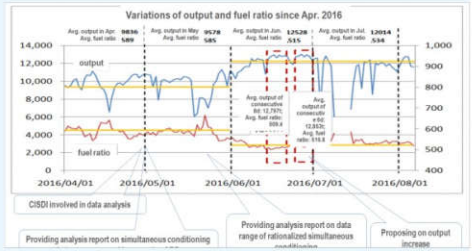
The blast furnace has four intelligent control centres:

- A multi-plant centralised control centre
- Ironmaking plant data centre
- Multi-BF centralised control centre
- Multi-BF intelligent maintenance and inspection centre

Baosteel's blast furnace control centre in Shanghai, designed by CISDI

Upstream-BF big data platform:

- An integrated big data platform enables blast furnace ironmaking to achieve the highest operation indicators and the lowest production costs per tonne of hot metal
- It encompasses all procedures during blast furnace ironmaking and provides a highly detailed plan of the optimal relationship between raw material, fuel indicators and critical operation data

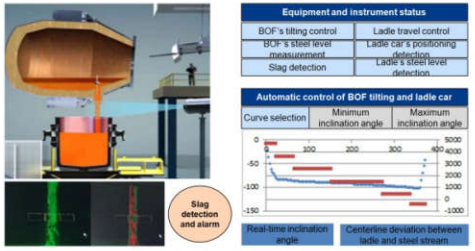


A chart detailing the application of CISDI's upstream-BF big data technology in a 5,000m^3-level blast furnace

◆ Intelligent SMS

BOF's automatic tapping system:

- Uses machine vision to track the liquid steel's falling position and stream shape
- Forecasts the taphole's status, monitors in-ladle level's variation
- Automatically controls the effective distance between steel/slag levels and the BOF's mouth with different inclinations
- Automatically defines the position of the ladle car
- Achieves fully automatic tapping



CISDI's automatic tapping system

iQuality:

- Automatically acquires production data
- Dynamically identifies critical parameters
- Analyses quality indicators in a multi-dimensional way
- Conducts real-time monitor and pre-alarm
- Sustainably improves quality standards

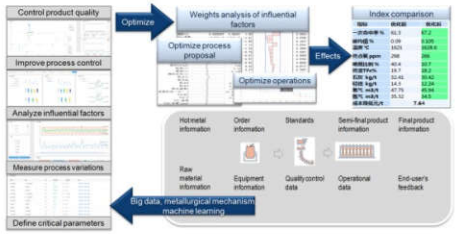


Diagram of CISDI's iQuality

◆ Intelligent Caster

The dynamic soft reduction model:

- Defines the reduction amount at the end of solidification according to the solidification characteristics of different steel grades
- Implements soft reduction on strand's solidification end by real-time tracking to improve strand's quality

Diagram of CISDI's dynamic soft reduction model

◆ Intelligent Mill

Full-process quality analysis and tracking:

- Follows an integrated quality assurance and control system
- Supports complete data acquisition from steelmaking to casting and rolling
- Keeps on track of quality issues between procedures
- Responds quickly to quality issues
- Makes real-time monitoring and diagnosis on quality defects

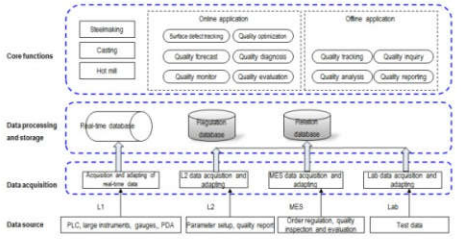


Diagram of CISDI's intelligent quality analysis system

◆ Intelligent Warehouse

- Employs unmanned cranes in high-temperature and complex working conditions and implements an intelligent control on warehousing operations, reducing the need for manual operators by over 50% and enhancing productivity by 30%
- Plays an effective role in extending service life of warehouse equipment and improving workforce safety
- Particularly effective at hot mill coil warehouses and slab warehouses, intermediate warehouses and final product warehouses

CISDI's unmanned crane and intelligent hot-rolled coil warehouse

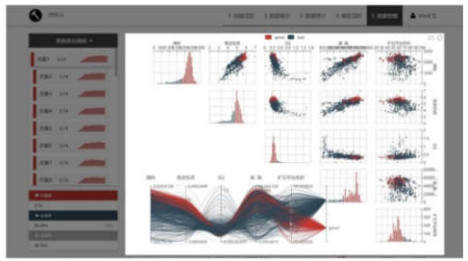
◆ Intelligent Logistics

- TransBrain is created on the basis of 4.5G/5G and IoT and utilises big data, cloud computation, AI and MR
- Follows the trend for unmanned equipment and intelligent logistics

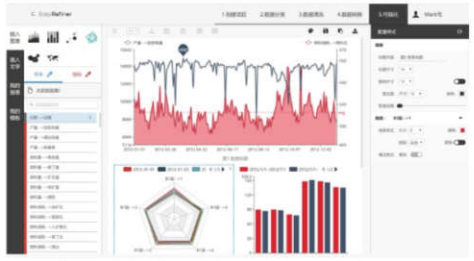
◆ Big Data Analysis

Big data analysis tools:

- Easy Refiner: a one-touch and visualised AI product for data classification, cleaning and integration
- Easy Miner: a deep data mining product for optimising performance indicators and providing quantified solutions



Pictured: CISDI's big data analysis tool: Easy Miner



Pictured: CISDI's big data analysis tool: Easy Refiner