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CISDI NEWSLETTER

March 2024

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CISDI

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 is transforming JISCO into the most influential quality steel base in Northwest China

JISCO's ground-breaking ceremony

Ground has been broken at the site of Jiuquan Steel's new melting and rolling plants in China's Guangxi Province.

CISDI is the EPC-based service provider for what is a highly significant project in Northwest China, and will greatly enhance standards of Jiuquan Steel's process, equipment and products.

Annual production will reach 2.30 million tonnes of acceptable slabs and 1.20MT of wide plates - products in high demand from sectors supplying new energy and new green materials.

Supplying these markets will increase JISCO's standing to that of the most influential quality steel base in Northwest China.

CISDI has master-planned the project in multiple stages to ensure final targets are smoothly achieved. It is undertaking the construction of a Kambara Reactor desulphurisation system, two 100-tonne basic oxygen furnaces, two ladle furnaces, a 7-strand billet caster and single-strand slab caster, a wide plate rolling line (specification 4,200mm) and a wide plate heat treatment line and utilities.

A host of leading CISDI tech and equipment will be featured:

- Expert mould systems for intelligent steelmaking and slab casting will achieve world-class casting productivity and slab quality
- A single ladle hot metal transport system will achieve key industrial sector energy consumption benchmarks
- A Lurgi-Thyssen dry primary dust collection system will meet ultra-low emissions targets
- An integrated, smart melting-rolling control platform will support intelligent melting operations and intelligent logistics equipment.

The CISDI team is pictured at the JISCO construction site

Another first: CISDI Engineering Consulting to supervise enclosed stockyard construction at TSK

CISDI is playing a key role in a project in India - which represents an important first for China.

The creation of an enclosed stockyard for TATA Steel Kalinganagar in India will be supervised by CISDI Engineering Consulting Company.

It is the first time a Chinese engineering company has been chosen to export its advanced construction management expertise.

CISDI Engineering Consulting operates under CISDI Group. Its construction methodology and sequence-consulting service is being called on to manage the entire project.

TSK and CISDI officially launched the project via video link.

Xianfu's new blast furnace 2 is smashing targets

Xianfu Steel's blast furnace 2 is pictured during construction

A new blast furnace 2 has been blown in at Xianfu Steel in China's Yunnan Province.

CISDI designed the entire plant and supplied and constructed the main facilities.

Since going into operation, the blast furnace has been outperforming its main design targets.

The 1,350-cubic-metre furnace and its new utilities were built in a tight and restrictive space previously occupied by an older and smaller 450m^3 blast furnace.

The projected annual pig output is set at 1.22 million tonnes. It will be charged into the downstream steelmaking plant.

The project was also successfully supplied with coke silos, a dry coal shed, truck unloading and raw material and fuel feeding systems, and a casthouse expanded compressed air station.

CISDI worked through numerous challenges posed by the limitations of space, a variation of elevations and complicated landforms. The team designed five platforms at elevations ranging from 1,100.70 to 1,136.00 metres.

Modifications were made to a number of existing facilities needing to be retained. BF2's raw material and utilities had to be interfaced with the older systems and those of the new Bf1.

Throughout the project, it was crucial that production remained unaffected at the site's neighbouring blast furnaces 2 and 3.

Throughout the project, the team's tech and management expertise was brought to the fore and close communications between the customer and the construction teams were maintained throughout.

CISDI staged frequent meetings to find and apply solutions to challenging situations, most notably overcoming the difficulties posed by the restricted construction spaces.

To transform complicated geographical conditions into usable spaces, the BF2's main belt conveyor was cut down and transfer stations were reduced in size at the raw material and charging areas.

These solutions also played an important role in cutting costs.

CISDI to build reclaimed water treatment station at JISCO

A deep-processing plant for reclaimed water is to be built by CISDI at Jiuquan Steel in China's Guangxi Province.

It is the second plant-wide water treatment order to be won by CISDI in the first quarter of 2024.

The year's first order was placed by Minyuan Steel in China's Henan Province.

Jiuquan's waste-water reutilisation project will encompass a dozen procedures, including highly-efficient sedimentation, tank filtering, multi-medium filtering, ultra-filtering, primary and secondary reverse osmosis and concentrate RO.

The EPC contract will see CISDI build a water treatment station with the ability to achieve a daily pre-treatment capacity of 21,600m^3 of reclaimed water and a daily deep-processing capacity of 19,200m^3.

It will produce 10,800m^3 of primary desalted water and 2,880m^3 of secondary desalted water per day.

Bigger and better – expanded melting plant at Lianfeng Steel will produce 1.8 million tonnes a year

The 170t BOF in operation at Lianfeng Steel

Lianfeng Steel Zhangjiagang in China's Jiangsu Province is set to produce 1.8 million tonnes of special grade steel billets a year following the expansion of its Melting Plant 3, which was carried out with support from CISDI.

The new plant's main units comprise of one basic oxygen furnace (170 tonnes), two Kambara Reactor desulphurisation stations, two dual ladle furnaces, one dual Ruhrstah-Heraeus vacuum degasser and two billet casters.

They serve the production of spring, tool, bearing, cord, cold-headed and automobile steels.

CISDI provided designs and a number of the supplies, including those for the BOF's thermal system. It features a 400m^3 spherical accumulator and an evaporative cooling system, which carried out the full cooking and cleaning of the boiler - an important step before commencing operation.

CISDI applied a three-dimensional engineering method which combined the tower building's structural design with its fire control, water supply and drainage, electric and dust collection designs.

The 2D (plane) drawings were not drafted until all 3D schemes had been verified. This prevented any clashing of design results from different majors. It also created a faster construction schedule and smoothed the boiler's cooling and cleaning processes.

The spherical accumulator is a star CISDI product. It is already performing strongly at Anshan Steel and Maanshan Steel in China.

Compared with similar products, this simpler and less costly system produces better quality steam and requires a smaller site area and less onward maintenance.

CISDI optimised its design deliverable timeframes to ensure all construction schedules were met.

The strong problem-solving and management skills of CISDI's technical assistance engineers were praised by Lianfeng Steel Zhangjiagang and its partners.

Challenges of a complicated regional pipeline were solved onsite

CISDI's team onsite

A CISAI global-first – AI+5G driverless BEV launches at Zenith Nantong

Outstanding results: higher hot metal transportation turnover rate, reduction in hot metal temperature drop, optimised workforce, and lower production costs

CISAI's global-first AI+5G driver-less BEV, now running at Zenith Nantong

CISAI Tech's invention iSmartONE has scored a world-first - its AI+5G driverless, electric battery vehicle is now operating at Zenith Nantong in China's Jiangsu Province.

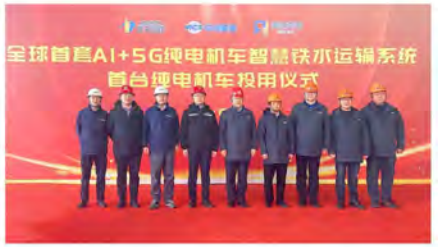
CISAI Tech was funded jointly by AInnovation and CISDI Group in 2019 and its intensive research and development work is now producing smarter, greener, safer and more efficient products for the steel sector.

Deeply integrating its digital, smart expertise with steel logistics, the iSmartONE features a smart hot metal transport system which has transformed Zenith Nantong's conventional BEVs.

Outstanding results are being recorded. A higher hot metal transportation turnover rate has been achieved, in addition to a reduction in the temperature drop of hot metal. Smart operation processes have optimised the workforce.

These achievements have substantially reduced production costs.

Ten iSmartONE driver-less BEVs will soon be up and running at Zenith Nantong, ushering in a new era for the new-energy, driverless electric locomotive.



Teams pictured onsite celebrate the maiden trip of Zenith Nantong's driver-less electric locomotive for transporting hot metal

Transport system highlights:

- Driverless and able to operate in all weathers, with fused positioning and tracking, precise parking alignment control, automated coupling and decoupling, auto hold, auto charging and auto-manipulation of the ladle cover
- Relies on an AI decision-making brain consisting of hot metal scheduling, locomotive scheduling and equipment security systems, and a data analysis platform
- Ensuring that the AI+5G-based driver-less electric locomotive meets full-process, all-factor production information integration and integrated management requirements at Zenith Nantong

CISAI - empowering mass industrial logistics

From 5G and AI to autonomous locomotive tech, CISAI's artificial intelligence developments are supporting steel manufacturing, the mining sector and the ports industry in their quest to become safer, smarter and more efficient.

Smart, driverless, all-weather transport throughout the production process

The world's first launch of iSmartONE at Baosteel Zhanjiang in China's Guangdong Province is achieving driverless transport of hot metal

To eradicate the restrictions on interfacial efficiency caused by conventional methods of hot metal transport in ironmaking-steelmaking, CISAI has developed the AI-based iSmartONE – a driverless, all-weather transport system for the ferrous and non-ferrous metallurgical sectors.

Since the launch of iSmartONE at Baosteel Zhanjiang, the team has created:

- Models for hot metal scheduling, distribution and route-planning which simulate the human brain's perception of complex problems
- Smart equipment - a locomotive-carried AI controller and smart sensing kit, the auto coupler and decoupler, and auto parking/hold and charging units.

These standardised optimum products have reduced China's reliance on imports.

The iSmartONE has now upgraded Zenith Nantong's conventional BEV to AI+5G driverless, boosting its green and low-carbon production targets.

Innovative tech route for improving the ports industry's logistical efficiency and cost performance

The world's first application of iSmartCSU is currently under construction at a port in China Implementing the PanGoLIP smart industrial logistics platform will achieve full-process, all-round digital control

At a conventional raw material port in China, a large workforce is required for the coordination of the continuous ship unloader's onsite operating, commanding and cabin cleaning posts.

Severe conditions often impact on workplace safety and operational efficiency.

CISAI's iSmartCSU, featuring AI and digital twin tech, will provide a smart operation system to alleviate these problems for the port. It will provide:

- Smart planning for production and operation
- AI-based dynamic sensing and recognition of ship profiles, cabins and material levels
- Smart decision-making on material reclaiming
- Smart remote driving
- Collision prevention
- A collapse early-warning system.

It will achieve:

- Smart operation, with less manpower
- A safer workplace
- Increased productivity
- Reduced labour costs and energy consumption.

Total solutions for autonomous railway locomotives

CISAI's iSmartLoco is an unmanned locomotive driving system with the BlitzerADP industrial autonomous locomotive-carried platform at its core.

The Chinese-made System on Chip is utilised for the research, development and testing of the BlitzerADP platform's circuit design and its sample proofing, interfacing function, environment and the system development kit's source code. Additionally, core control algorithms have been introduced into the actualisation of iSmartLoco.

In the meantime, an autonomous driving simulation platform has been set up for the research and development of a locomotive simulation model on the basis of a high-precision cartographic model.

The locomotive's physical properties and its running status are simulated to verify the driverless operating function, enable closed-loop flow control and to conduct offline testing.

These procedures have improved the driving flow's systematic function efficiency and its development and commissioning. More importantly, they ease the negative impacts of onsite testing and commissioning on production and transport.

Existing electric locomotives at Maanshan Steel Nanshan Mining in China's Anhui Province are being transformed to autonomous with iSmartLoco

The iSmartLoco total solutions create stronger functions, cleverer algorithms, a more flexible systemic framework and more reliable driverless operation.

These solutions offer bright prospects for the ferrous and non-ferrous metallurgy, mining, ports and special-purpose industries.

YUSCO to become Taiwan's first HM smart warehousing operator

Taiwanese enterprise YUSCO is already setting the pace with its remarkable enhancement of hot mill warehousing efficiency and cost performance.

Now CISDI Information Tech is to supply the company with a driverless overhead crane and intelligent warehousing systems, which will create a benchmark for the sector.

CISDI's solutions focus on warehousing logistics systems for heavy industry.

The YUSCO warehouse will be transformed with multiple critical technologies - smart management and smart control, machine vision sensing, smart equipment, facility self-diagnosis and big data analysis.

Services will operate with a smaller workforce, a more transparent management system and smarter decision-making. Higher productivity will be achieved and warehousing conditions will be cleaner and safer.

Over 10 large steelworks are already reaping the benefits of CISDI's smart warehousing, including Baowu's subsidiaries Bayi Steel, Ouyeel Blockchain and Baosteel Zhanjiang.

It was implemented at Bayi Steel in July 2019, a world-first. Bayi Steel has reported the following results:

- Over 50 per cent reduction of the workforce, particularly in high-temperature and dangerous positions
- A 50 per cent increase in delivery efficiency
- Maximum lifting capacity has increased by 10 per cent
- Zero scratched coils.

CISDigital AI Eyes - 'all-seeing' throughout Rizhao Steel's manufacturing processes

Improving operation to higher quality and safety and freeing workers from long watch

CISDI is to build a machine vision-applied demo at Rizhao Steel in China's Shandong Province.

CISDigital AI Eyes are designed to operate throughout all major manufacturing processes, from stockyard to ironmaking, melting and rolling. Over a hundred visual recognition points are set for stockyard and BOF particle sizes, flame, steel ladle temperature, hot-rolled camber and coil code.

The AI Eyes have achieved standout results at Baowu Shaogang and Chongqing Steel, Pangang, Baotou Steel, Yongfeng Steel, Maanshan Steel and Hanzhong Steel.

CISDigital AI Eyes products and benefits:

- The AI edge computing-based smart camera can automatically judge and recognise diverse manufacturing scenarios. It will help to stabilise operational quality and reduce lengthy screen-times for employees, ensuring a safer production.
- CISDigital AI Eyes generates moderate or high-definition images during complicated steel manufacturing processes. Its rendered video-streaming and deep-learning model can identify what images are required with high accuracy and to within 150 milliseconds.
- The Eyes algorithm gives highly accurate identification. As an example, flame's status identification has an accuracy rate of over 99.5 per cent.

The AI Eyes enable production line smart sensing, which aids decision-making

Belt conveyor's smart regular checking

TCM (1,750mm) passes category-A inspection for HBIS Yanyang

Teams from Yanyang Steel and CISDI Equipment celebrate the TCM's ex-works inspection

A 5-stand 6-hi tandem cold mill has been accepted by Yanyang Steel after its inspection at CISDI Equipment Co in Chongqing.

The inspection was jointly witnessed by teams from Hebei Iron and Steel Group-owned Yanyang Steel and CISDI, as defined for category A critical equipment.

The first Chinese-made TCM for a specification of 1,750mm, the mill is designed to produce strips 0.3 to 2.5mm thick and 1,000 to 1,630mm in width, and will have a maximum rolling speed of over 1,400m per minute.

CISDI's team overcame big challenges during the TCM's manufacturing and assembly:

- a tight project schedule
- sophisticated mill structures
- a large tonnage
- exacting dimensional requirements

They paid much attention to mill housing's planeness and symmetry and the safety coefficient requirements of the workshop building's crane and lifting tools. Every

dimension was thoroughly checked at each procedure, ensuring it matched drawings and met customer requirements.

CISDI's fitters persistently fine-tuned assembly dimensions until they met testing requirements.

Before the category-A inspection, stringent internal inspections were carried out by CISDI Equipment's manufacturing centre and its quality assurance and control department.

All inspections of the TCM's stand, its roll system and base plate assemblies were fulfilled. Yanyang's specialists and CISDI's design, technology, QA and QC and assembly teams participated.

The successful joint inspection and testing lays a solid foundation for the mill's onsite installation and commissioning.

Following the mill's delivery to Yongyang, CISDI Equipment will remain onsite to provide technical assistance and support Yanyang Steel as it creates a world-class benchmark for a wide-specification cold mill.

The 5-stand, 6-hi TCM (1750mm), pictured at CISDI's manufacturing workshop

CISDI's digital tech helps Binxin Steel become a smart manufacturer

Per capita crude steel output has increased by 300 tonnes a year and costs have reduced by USD 20.84 per tonne of crude steel