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CISDI NEWSLETTER

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CISDI transforms Baosteel Meishan's caster

IN THIS ISSUE

- China's first smart scrap plant - safer and super-efficient
- At the double - CISDI to build new green stockyards at Fushun New Steel and JISCO
- CISDI's upgrades at Yieh Hsing's Special Steel will boost production
- CISDI's star product wins more orders



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.

TABLE OF CONTENTS

● News

China's first smart scrap plant - safer and super-efficient	02
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● Events

Upgrading Desheng's blast furnace 1 boosts green standards	05
Anyang Steel's new gas holder set to be a gamechanger in China	06
CISDI wins second blast furnace revamp at Maanshan Steel	07
CISDI transforms Baosteel Meishan's caster	08
At the double - CISDI to build new green stockyards at Fushun New Steel and JISCO	09
CISDI's upgrades at Yieh Hsing's Special Steel will boost production	12
Xinda's new stainless steel line will hit 800,000 tonnes a year	12

● Equipment Manufacturing

SFRE's new-generation TCM goes on stream	13
CISDI's star product wins more orders	15



China's first smart scrap plant - safer and super-efficient

CISDI has created a reduced-manpower plant at Baowu Ouyeel



A wide-angle shot of the centralised control centre at Ouyeel's smart scrap plant

China now has its first smart scrap plant.

Baowu's Ouyeel Blockchain Finance and Metal Recycling Resources Co teamed up with CISDI on the project.

Ouyeel is China's largest recycling centre for metal resources. Based by the Yangtze River at the Cihu Hi-tech Zone in Maanshan City, and close to Maanshan Steel, it is playing an invaluable role in boosting urban and regional green and smart credentials.

The Anhui Province scrap plant serves integrated businesses with a range of scrap services - from production, warehousing and transportation to its facility.

A demo for the intelligent manufacture of scrap, it features a compact and efficient workforce, transparent management and smart decision-making systems.

To achieve these advancements, CISDI has applied automation and information tech-based internet of things and artificial intelligence expertise and equipment - important methods for enhancing business processes and increasing operational efficiency.

Remarkable achievements have been recorded since the smart scrap plant launched since March:

- 30 workers are no longer required at the plant's warehouse, transportation, metering and inspection and judgement posts
- Over 20 per cent higher operational efficiency
- Each pre-inspection and metering operation is over 10 minutes faster
- 20 per cent growth of maximum delivery quantity
- Greater management and decision-making efficiency
- Workplace safety levels improved.

Digital application to integrated, super-efficient management

Local and decentralised management has been transformed to centralised, smart control.

All production and operations data is displayed on an integrated screen at the plant's centralised control centre. This enables all duties and posts to deeply fuse, horizontally and longitudinally. Data crossing multiple dimensions are utilised and controlled in a coordinated way.

Smart applications across planning, production and appraisal sectors converge at the centre, forming closed-loop management. As a result, operators receive more visible, real-time information of the process.

The scrap's procurement, storage and transportation is well coordinated and is dynamically responsive to its manufacturing, enhancing manufacturing standards and efficiency.

Reducing manpower ensures greater workplace safety

China's first unmanned scrap plant crane is running successfully at Ouyeel.

Industrial AI-based smart scheduling, machine vision and digital twin tech has been applied, enabling a safer and more efficient scrap warehouse.

The overhead crane has no driver while running on automaton and is unaffected by challenging weather, process and site conditions, achieving greater workplace

safety. Savings in labour costs amount to USD125,800 per annum.

An intelligent warehousing system, developed specifically for this scrap plant, creates dynamic zoning and automated distribution, greatly enhancing warehouse availability. Laser scanners and deep-learning expertise create accurate, targeted inventories of stored goods.

The scrap plant has been made even safer

and greener thanks to a safety and environmental protection module. It implements intelligent identification of

onsite workers and equipment status and enables self-adaptive control of environmental protection facilities.

Intelligent control drives higher productivity

Scrap's transportation relies on trucks. Reducing a truck's idle time is crucial to improving transport efficiency.

A dedicated smart logistics system has been developed for the scrap plant.

Trucks are identified automatically and can be fully controlled right across the plant, thanks to smart tracking, labour-free metering, dynamic pre-inspection and smart scheduling. There are no blind spots.

As a result, truck waiting time has been greatly reduced, efficiency of the plant's logistical operations has increased by 30 per cent and 12 workers have been removed from their posts.

Quality inspection is one of the most important factors in scrap recycling. An assisted inspection and judgement system,

developed for Ouyeel, achieves quality traceability of all procedures by tracking and monitoring.

It ensures technical integrity and impartial quality judgement, has a 99.18 per cent accuracy rate and reduces quality inspection-incurred losses by USD 0.8 per tonne of scrap.

An equipment health management module executes full life-cycle status and performance control of the plant's equipment and facility. Thanks to its planning and optimisation of equipment maintenance, the scrap plant is expected to save around USD 125,800 a year by reducing unplanned production stoppages and double this amount - USD 251,600 - on equipment maintenance costs.

Upgrading Desheng's blast furnace 1 boosts green standards



CISDI's team celebrate success at Desheng's blast furnace

Baosteel Desheng Stainless Steel Co has upgraded its Blast Furnace 1 as part of the plant's bid to improve its environmental indicators.

CISDI was the rebuild designer and supplier and the blast furnace has now been blown in.

The steelworks, based in Fuzhou City in China's Fujian Province, is upgrading its main equipment to ultra-low emissions standards.

CISDI is tasked with rebuilding blast furnace 1's

stockhouse, top, proper, tuyere platform and casthouse, slag granulating and raw gas cleaning systems, its fuel gas, water treatment and HVAC facilities, and electric and automation system.

A host of CISDI new tech and units have been applied to enhance performance and green credentials:

- ▶ Innovative cooling staves installed at the furnace proper and the addition of a heat load measurement system will ensure safer and longer production
- ▶ Rebuilding the old casthouse to flat, with taphole areas at the casthouse enclosed, creates a cleaner working environment
- ▶ Addition of a chimney at the slag granulating system improves the environment surrounding the slag runner
- ▶ A gas relief and recovery system added at the furnace top, and setting more dust collection positions, will result in greener indicators
- ▶ More dust collection positions set at the stockhouse will maximise dust cleaning

"We worked against a tight schedule, long-lead time for supplies and manufacture and delivery issues caused by the pandemic. Our team ensured major resources were in place and reused existing equipment to get around the fact that new items were unavailable", said a CISDI spokesperson.

"We optimised all procurement plans and dispatched our manufacturing supervisors to workshops for schedule control."

Desheng has praised CISDI's relentless work over a four-month period to ensure smooth coordination between client and construction company.

Anyang Steel's new gas holder set to be a gamechanger in China



CISDI's team at the ground-breaking ceremony

Piling work has begun on a Chinese first being created by CISDI at Anyang Steel in China's Henan Province.

Foundations for Anyang's new gas holder, and rebuilds of existing steam-driven blowers and a 220kV substation, will be completed on schedule.

The entire project will result in power generation from recovered gas, which will enhance the steel plant's overall energy utilisation ratio and accelerate its green development.

The CISDI team is pulling out all the stops to refine the design and construction and hit each production milestone as it creates the first efficiency enhancement project of its kind in China.

The new gas holder will be fitted with China's most advanced power generator unit which will feature sub-critical parameters.

The existing three steam-driven blowers and one 220kV substation will be upgraded to give higher operational efficiency.

CISDI wins second blast furnace revamp at Maanshan Steel

Bound of trust developed during revamp of plant's BF A

CISDI has won the contract to modernise Baowu Maanshan Steel's blast furnace B.

The furnace will shut down in September for a 3.5-month conversion to safer, greener and smarter operations.

BF 'B' had its first blow-in in 2007.

CISDI carried out the feasibility study report for the rebuild, focussing on creating favourable conditions for applying fast revamp expertise and the offline assembly of a new dry dust collection system.

A highlight of the general layout solution is the relocation of the casthouse's elevated passage and optimising existing water pump houses by creating a centralised arrangement.

Advanced tech and equipment has been designed for achieving transformative targets:



Operational BF 'A' is showcasing marked performances at Baowu Maanshan Steel, thanks to CISDI's tech and supply

- Optimised blast furnace profile
- Upgrading the existing casthouse to a flat casthouse
- Installing a smart slag collection unit which will operate without manpower
- Installing ultra-low emissions systems.

Link

Blast furnace A at Maanshan Steel, supplied by CISDI, was blown in at the end of 2021.

It has achieved an average daily output of 10,488 tonnes of pig iron, featuring a productivity of 2.622t/(m³·d).

Additional advanced indicators are being

achieved during operation - a fuel ratio of 500kg/t, composed of 340kg/t of coke and 160kg-plus/t of coal, and an enrichment ratio of 5 per cent.

CISDI's leading technology and fulfilment skills gained praise from Maanshan Steel, who had no hesitation in entrusting CISDI with the contract for its furnace B.

CISDI transforms Baosteel Meishan's caster



The CCM1 takes Baosteel Meishan's slab quality to top-ranking in China's precision manufacturing sector

Baosteel Meishan's refurbished continuous caster 1 has passed hot commissioning four days ahead of schedule.

Low-carbon steel AP1360C1 was hot tested, with a casting speed of 1.2 metres per minute and strand cross section of 230mm in thickness and 1,070mm in width.

The caster was built in 1999 and its layout was unfavourable for the designed upgrade.

CISDI, the project's package supplier, set up a tech breakthrough team to conduct offline integrated testing and BIM-based

Multiple patented CISDI technologies and equipment were applied:

- Online thermal width adjustment system for the mould
- Second-generation hydraulic oscillation system
- 3D dynamic secondary cooling and soft reduction model.

designs.

As a result, part of the existing civil foundations and equipment have been reused and solutions were found to enable rebuilding around site conditions complicated by the old caster's process, layout, facility, utilities, pipeline and cable routing.

The upgraded caster now produces ultra-low-carbon, fine blanking, pickling and high-strength structural steels.

Its projected production capacity is 1.90 million tonnes of qualified slabs a year.

At the double - CISDI to build new green stockyards at Fushun New Steel and JISCO

CISDI boasts over 70 per cent of the global market share. It has built over 100 green, smart stockyards and its technology has been awarded almost 200 patents worldwide

ECIA-M stockyard at Fushun New Steel

CISDI's patented ECIA stockyard creates green, smart and super efficient yards.

Model M will be built at Fushun New Steel, a private company in Fushun City in China's Liaoning Province.

Its construction will enable around 270,000 tonnes of raw materials and fuels to be stored. The yard's footprint will take up only 22,000 square metres, a 70 per cent reduction of land used for a conventional mechanised yard.

Storage capacity will be greatly increased. CISDI's ECIA-M solutions will make the best use

of Fushun's limited land availability, fitting in the new yard and also earmarking further space for future development.

A highlight of the stockyard's construction lies in the building of photovoltaic power generators on the roof to an EPC mode - the first of its kind created by CISDI.

ECIA-M stockyards have also been applied at Ruifeng Steel, Taihang Steel's phase I and II, and Baosteel's Desheng and Meishan plants. Their remarkable performances are showcasing CISDI's unique competitiveness in green, smart stockyards.

ECIA-C stockyard at Jiuquan Steel

CISDI will build three ECIA model C stockyards at Jiuquan Iron and Steel Co in Jiuquan City in China's Gansu Province.

Each yard building features a single span of over 100 metres.

CISDI is creating an ever deeper strategic relationship with JISCO.

Contracts for three model C green, smart

stockyards were awarded in early 2022 and are being designed, supplied and constructed at the Hòa Phát Dung Quất Plant in Vietnam.

CISDI's model C is dominating the market in China, where the company is now a pacesetter for state-of-the-art metallurgical stockyards, and in addition its green, smart solutions are delivering outstanding solutions in a wide range of specifications around the globe.



Artist's view of the ECIA-C stockyard to be built by CISDI at China's JISCO

Link

Technology highlights of CISDI's ECIA stockyard:

1) Patents

ECIA stockyard has been granted patents from China, Japan, the USA, Brazil and EU.

A winner of China's outstanding patent, it's the only technology to achieve eco-friendly, super-efficient storage of bulk materials in multiple varieties and high volumes, enabling integrated material blending and proportioning and intelligent controls.

It has been top of the list for Chinese steel producers wanting to increase their green credentials while conserving energy.

2) Space availability

ECIA products more than double material storage capacity per unit area and reduce material losses by over 85 per cent.

Compared with a conventional stockyard with the same floor space, spatial availability is increased dramatically.

The reclaiming facility gives double the operational efficiency of a conventional stockyard.

As a result, ECIA tech offers far more competitive overall costs.

3) Environmental protection

A fully enclosed process is applied.

Different materials are stored by category.

Dry fog (atomised air) or mechanical dust collection measures are taken to aid suppression of flying dusts onsite, preventing them from dispersing.

Zero liquid discharge targets are achieved at an ECIA stockyard, as industrial waste water is fully recycled.

Compared with a conventional open yard, the ECIA stockyard reduces material losses incurred by wind and storm by over 90 per cent. Materials stored and handled inside ECIA yards contain less moisture and conserve their heat energy.

ECIA application helps downstream production plants consume less energy.

4) Intelligent tech

ECIA's intelligent expertise constitutes an intelligent logistics system, a digital yard system, unmanned stacker-reclaimer operation and an intelligent blending and proportioning system.

The intelligent logistics system creates optimal plans for process routes, saving energy while enhancing operational

efficiency.

The digital yard makes automated inventories of materials, refining onsite management.

ECIA's stacker and reclaimer ensures operations can be performed onsite without any manpower requirements, creating a safe, super-efficient and standardised environment.

The intelligent blending and proportioning system enables blended or proportioned ores to be more stable in quality.



CISDI-built green, smart stockyard at Baosteel Zhanjiang in China's Guangdong Province

CISDI's upgrades at Yieh Hsing's Special Steel will boost production

CISDI is currently transforming a special steels wire-rod and bar-in-coil production line at Pingdong County in Taiwan.

The existing line dates back to 1995, when its critical equipment was imported from Germany by Yieh Hsing Co, under the E United Group in Taiwan.

CISDI is installing a new reducing and sizing mill for wire-rod rolling and BIC production units, in addition to reusing existing facilities.

Upgrades are also being made to the existing water cooling and temperature control system, the pinch roll and laying head unit, coil finishing and collection system.

A modernised, combined production line will be created for the high-speed rolling of special steel wire-rods and bars in coil. Its annual production capacity is projected to hit 450,000 tonnes - an increase of 150,000 tonnes on current production.

Steel grades produced will include quality carbon steel, structural alloy steel, free cutting steel, and austenitic, martensite and ferritic stainless steels. Product specifications will feature a diameter range of 5.5 to 20.0mm for wire-rods and 14 to 38 mm for bars in coil.

A host of CISDI's core tech and equipment is being applied, including:

- NHCD standardised high-rigidity short-stress path rolling mill
- SRSCD standardised high-speed wire-rod reducing and sizing mill
- LHCD standardised large-inclination laying head
- WCS high-precision, closed-loop water cooling and temperature control system
- FHSCD standardised flying shear.

Xinda's new stainless steel line will hit 800,000 tonnes a year

CISDI is to build a groundbreaking wide-strip stainless steel annealing and pickling project in China.

A supply order has been placed by Xinda New

Metal Materials Tech Co, which is based in Taishan City in the Guangdong Province.

The lines will produce 800,000 tonnes of series 200, 300 and 400 annealed and pickled

stainless steel coils a year.

Strip specification ranges will be 1.8mm-8mm thick and 800-1,600mm wide and the process section should achieve a maximum speed of 120 metres per minute.

A number of CISDI's core equipment and products are being supplied for this important Chinese demo project:

- ⊙ Multi-stage expanding-drum payoff reel
- ⊙ Fully automatic uncoiler
- ⊙ Speed-adaptive leveller
- ⊙ Car-carried automatic steering system and looper
- ⊙ Wet tension leveller featured scale breaker
- ⊙ Automatic jaw drum re-coiler

CISDI is contracted to carry out the design, supply and technical assistance.

Link

Xinda New Metal Materials Tech Co is one of China's largest producers of stainless steel annealing, pickling, rolling and deep-processing.

Its cold rolling projects should see a total annual output of 2.80 million tonnes, with the first stage of annual production capacity reaching 1.40 million tonnes.

SFRE's new-generation TCM goes on stream

Four single-stand, 6-hi reversing cold rolling mills have been successfully hot commissioned for the production of quality coils at Zhongpu Precision Cold Rolling Co under Puyang Steel Group in China's Hebei Province.

A subsidiary of CISDI in Xi'an, MCC-SFRE Heavy Industry Equipment Co supplied the tandem cold mills, which feature a new-generation innovative product.

The TCMs are now achieving their maximum designed rolling speed of 1,250 metres per minute.

SFRE is an expert manufacturer of 6-hi reversing cold rolling mills. They have established a research and development system for standard specification products.

Zhongpu's TCMs will achieve a high rolling speed and a super-heavy screw-down ratio.

The representative mill products cover the specification 1,000mm, 1,050mm, 1,150mm, 1,250mm, 1,380mm, 1,450mm, 1,500mm and 1,780mm.

SFRE TCM's technology highlights are:



SFRE's team celebrates the TCM's successful first coil at Zhongpu Precision

Green ▶▶▶

An oil-mist super cleaning system is applied to the TCM, which operates with a closed hood and multi-stage mechanical filtering and purification.

The result is a much lower exhaust emission than the national standard.

Energy conservation ▶▶▶

TCM's electric and automation system features world-leading, state-of-the-art hardware. Reliable, advanced algorithms and optimised control programmes based on project experience enable the E&A to implement energy conservation, safe and precise drive and control.

High efficiency ▶▶▶

The TCM is a high-efficiency production facility. It performs intelligent accelerating and decelerating and precise stop functions during its high speed rolling process. Operation and maintenance is easily accessible.

Stability ▶▶▶

TCM's equipment type sizing focusses on a high safety coefficient. SFRE provides the TCM products with a top global brand supply chain.

They ensure the rolling mill train operates stably and durably.

Ultra-thin specification rolling ▶▶▶

The TCM is able to continuously and stably produce ultra-thin strip to 0.11 millimetre. To achieve these specifications, a 3.0-millimetre-thick feedstock is rolled through only one schedule of 6 passes.

Fast track of construction ▶▶▶

SFRE, one of CISDI's main manufacturing bases, is dominant in cold and hot rolling and processing.

Its full-process manufacturing expertise - from feedstock charging to final product delivery - is accredited to its refined, efficiently coordinated procedures.

Its core products are standardised, thanks to regulated processes from design to manufacture.

These strong foundations ensure equipment lead times and construction projects are delivered on schedule.

SFRE has become China's leading brand for the single-stand TCM, continuing its drive to develop ever greener and more efficient technological innovation.

CISDI's star product wins more orders



CISDI's core product - the NHCD short-stress path rolling mill - has become a market favourite in China. It is designed and manufactured by CISDI Equipment Co in Chongqing.

Assembly of the NHCD short-stress path rolling mill has now been completed at CISDI Equipment Co.

New order from Qingdao Steel

Qingdao Steel has chosen CISDI's NHCD mill for the technological upgrade of its high-speed wire-rod rolling line.

CISDI Equipment Co made multiple visits to Qingdao's plant to analyse and propose the best high-tech, quality-first and refined

management solutions. Appreciating CISDI's efforts, Qingdao Steel ordered the NHCD mills required for the line upgrade and placed a contract for future spare parts.

CISDI has now supplied 428 sets of NHCD mills for Qingdao Steel.

New order from Yongfeng Steel

CISDI's NHCD mill is set to transform the performance of high-speed bar and light bar rolling lines at Yongfeng Steel in China's Shandong Province.

The Dezhou City-based company operates under the Laiwu Steel Group.

Despite the pandemic, CISDI team arrived at the plant the day after receiving the customer's request.

Its technical and commercial experts worked in coordination to assess and find solutions

for problems being encountered at Yongfeng.

The existing mills are difficult to upgrade and a tight schedule poses further challenges.

CISDI's long reference list for NHCDs performing with outstanding results won Yongfeng's custom.

CISDI's work for Yongfeng Steel dates back to 2020 when it supplied 62 sets of disk feeders for the plant's stockyard, sintering and pelletising production. Yongfeng has been delighted with the performance of the products and CISDI's after-care service.

Link

NHCD's technology highlights:

A wide range of specifications

CISDI has formed 13 specifications for its standardised NHCD products, from 300 to 1,000 millimetres. They cover all required specifications for the Chinese market.

High rigidity and precision

It features a high rigidity and performs stable rolling. Rolled products are produced with remarkable dimensional precision.

Advanced mechanical designs

A reliable anti-axial shifting system is applied, strengthening the mill's balance.

A simplified, well functioning sealing system and an integrated guide support contribute to the mill's safe and stable operation.

Patent

Granted 10 plus patents in China.

Long reference list

To date, around 3,100 sets of NHCD mills have been supplied to over 100 long product rolling lines at home and abroad.

Their performances have been unanimously applauded by all of the 40-plus steel enterprises with NHCD mills.

World's first IGBT-based green EAF is up and running

CISDI's innovative AutoARC™ is a major breakthrough for Mini-mills

The groundbreaking green energy CISDI-AutoARC™ is operating successfully at Pangang Changcheng Special Steel in Sichuan Province.

This super-efficient and green electric arc

furnace is the world's first for applying an IGBT-based flexible DC power supply. Its melting operation at Changcheng Special Steel is stable and hitting smooth tapping targets.

The IGBT flexible DC power supply expertise has solved the following problems experienced with existing EAF systems:

- Large impact on the grid
- Output voltage and poor current regulation and weak resistance against impact
- Failure to recover busbar's capacitance
- Inadequate protection for power supply over-voltage and over-current.



CISDI-AutoARC™, operating stably at the plant

The conventional 40-tonne AC EAF has been transformed to a cost-effective, green production unit, with the benefits:

- Reducing tap-to-tap cycle time by 15 minutes per heat
- Reducing electricity consumption by around 50kWh per tonne of liquid steel
- Decreasing electrode consumption by 1.7 kilograms per tonne of liquid steel
- Reducing carbon dioxide emissions by over 40 kilograms per tonne of liquid steel.



The air-cooled, feeler-pin bottom anode, to be installed at an EAF