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CISDI and Masteel join forces to form Chinese steel powerhouse

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 post-processing line of the hot 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 through the entire project life cycle.

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CISDI AND MASTEEL JOIN FORCES TO FORM CHINESE STEEL POWERHOUSE

Chinese giants CISDI and Masteel have joined forces to become a formidable partnership in the quest to extend their country's intelligent steel manufacturing capabilities.

Leaders are celebrating the signing of a strategic co-operation agreement, which signals a pledge of mutual trust and collaboration.

The pledge will see the two companies working together to develop steel transformation and upgrading methods. Both parties will partner on a wide range of research and development projects covering engineering, manufacture, refined management, marketing and industrialisation.

Masteel Group is one of China's largest steel complexes and an A+H stock-listed company with an annual capacity of 20 million tonnes. Masteel's wheels and H sections are among China's most famous branded products and its plant in the Anhui Province has numerous world-class features.

It boasts the best production lines in the world for thin strip cold and hot-rolling, hot-dip galvanizing, strip colour coating and produces silicon steel, H-beam, high-quality wire and rod and train wheels. Its H section mill, high-speed wire-rod mill, bar mill and tire mill are also world-leading.

Its production of long products, strips and wheel axles has been upgraded significantly and the company owns the intellectual property rights and core technologies for producing wheels, H sections, cold heading steel and line pipes used for steel restructuring and transformation.

In the new era of steel manufacture, Masteel is developing into an ever higher-quality producer and is focussed on product upgrading, extending the industrial chain and boosting performance, energy conservation and emissions reduction.

Its new partner CISDI is going global with its highly advanced digital and intelligent technologies and its consulting-led total solutions are creating huge environmental and cost-saving benefits for its clients.

With a firm commitment to industrial upgrading, CISDI is employing and further developing methods of green and intelligent manufacture and new processes,researching new materials and new approaches to manufacture.

Leaders of CISDI and Masteel are pictured at the signing of a mutual strategic cooperation agreement

BUILD IT WITH STEEL - CISDI LEADS PUSH FOR NEW CONSTRUCTION METHODS IN WESTERN CHINA

An institute has been launched in western China to expand the market for steel-structured buildings and develop new techniques for their construction.

The CISDI-led West Institute, which is affiliated to China's National Steel Structures Engineering & Technology Research Centre, will combine skills from Chongqing University, MCC 5 and China Metallurgical Construction Engineering Group.

Steel structures are widely recognised as green and safe and are both swift to construct and recyclable. They are playing ever-increasing role in upgrading economic and living standards and are now used not only for industrial buildings but also for the construction of high rise apartment

The Innovation and S&T Incubation Building in the High-tech Zone of Leshan City, Sichuan, was created from a prefabricated steel framework and concrete core structures. It has a floor area of 108,000 square metres and featured curtain walls, inner walls with integrated decoration and rebar truss carriers free of bracing formwork.

buildings and public buildings, bridges, overpasses and urban over-bridges.

More and more applications are being found for them, however, in western China there are few steel-structured buildings to be found. This predominantly due to the fact that this area of China lacks expertise in steel structure technology and has a strong demand for capital construction and a high requirement on buildings' earthquake defense intensity.

Located in Chongqing in western China, the institute will provide systematic prefabricated construction solutions tailored to the geographical needs of the region.

CISDI is a pioneer in the field, with over 60 years of engineering experience and expertise in steel structures. It has poured its resources into their research and development and the exploration of their commercial reach.

As one of the founders of technological engineering applications for such structures, CISDI has been granted more than 40 accolades for excellence in their engineering and construction. The company is also involved in the compilation of national design manuals and instructions on materials for the sector.

With the help of the prefabricated construction research institute, which has over 300 staff, CISDI was contracted on an EPC basis for some 300,000 square metres of steel structure projects in the Sichuan and Chongqing regions.

The institute will become a centre of learning for technology studies into steel structures, an incubation hub producing the highly skilled technologists of the future.

CISDI has put in place over ten ministerial and provincial engineering research centres and platforms, all of which combine the brainpower of commercial enterprises, research institutes and universities.

CISDI Mansion

This grand office building is made from numerous steel structures covering a floor area of 63,000 square metres. The building won first prize for green building innovation in a national Chinese awards scheme and a two-star national green building label.

CISDI'S FIRST GREEN EAF PASSES HOT TEST

The CISDI-Green EAF going through its hot test at the Chengdu metallurgical pilot plant

CISDI's first green electric arc furnace has passed its hot test.

The EAF operated smoothly during the test, which was carried out at a pilot plant in Chengdu at the end of April.

The electrics system performed reliably, with a fast electrode lifting response. Its inclined rail charging system ran smoothly in a streamlined operation from the traversal car to the bottom-opening bin, inclined rail charge car, titling hopper, tooth rake, and discharging.

The CISDI-Green EAF is an innovative, energy-conserving and performance-optimising steelmaking facility.

Its unique features include automatic and enclosed charging, penetrative scrap preheating, cost-competitive dioxin control and digital electrode regulation.

Top-side-chute charging technology has been applied, an effective solution to cold zone problems for charge. The fume temperature control can achieve temperatures in excess of 850 degrees Celsius, a cost-effective technology to keep dioxin emissions in check.

Compared with the energy consumption of a conventional EAF, the new model can save 60 to 100kWh of power per tonne of steel, while increasing the metal yield by between one and three per cent.

China's National Science and Technology Programme is pushing for inventions which result in greener and more efficient steel production methods and the CISDI-green EAF is setting the targets for low noise, dust and carbon dioxide emissions, reduced maintenance requirements, attenuated grid impact and a world-class performance in electrode regulation and large-current busbar.

The 3D Model of CISDI-Green EAF

GOING GREENER—CISDI TO REBUILD TISCO'S SECONDARY STOCKYARD

TISCO has once again awarded a stockyard contract to CISDI.

The latest order for Taiyuan Iron and Steel is for the redesign and construction of a secondary stockyard.

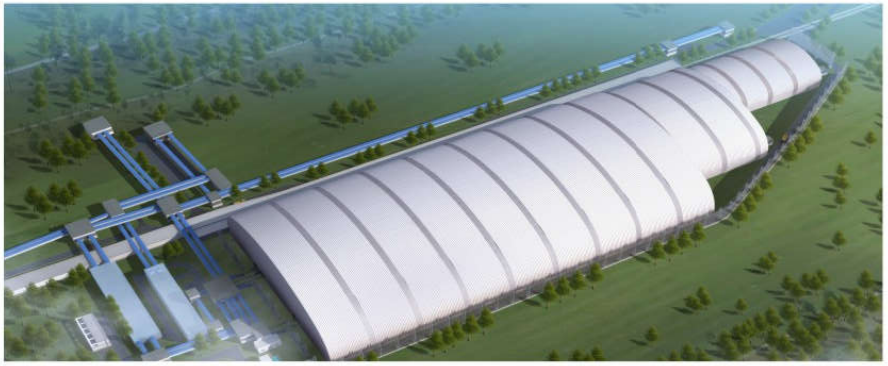
CISDI rebuilt the primary stockyard to much improved environmental standards and it was successfully started up in August 2017.

The secondary stockyard will mainly supply materials to serve the blending of Fe-bearing raw materials for the sinter plant. It covers a floor area of around 71,000 square metres and has a maximum span of 147 metres. The project will be challenging, as space is limited. The construction site is adjacent to the plant's thawing storehouse, blending and proportioning bins, belt conveyors, transfer towers and wind break.

The stockyard will be modified into a more environment-friendly enclosed structure. An area of 63,000 square metres will be under cover.

To cope with the largest of its single-span steel structures, CISDI will use pre-stressed beam string structures and a cumulative slip method of construction, enveloping the roofing with stainless steel boards.

The scope of work will include rebuilds of the technological facilities, yards and related utilities and will provide a new reference for CISDI's online modification expertise on an EPC basis.



An artist's impression of the TISCO blending stockyard, which is to be modified online to much improved environmental standards

REVAMPED HOT STRIP MILL RUNNING SMOOTHLY AT YANSHAN

Yanshan Steel's 950mm hot strip mill, rebuilt by CISDI on an EPC basis, has started up successfully and the first coil production has been unloaded from the coiler.

CISDI have been assisting in Yanshan's determined bid to make its plant greener, more economical and ever more productive for the last 5 years.

Its newly-built 1,780mm and 1,580mm production lines were carried out by CISDI in 2013 and 2016, respectively.

The 950mm production line had been in operation since 2007 and its automation system had been upgraded multiple times over the years. This latest rebuild will enable the mill to reach an annual capacity of 1.80 million tonnes.

CISDI faced numerous difficulties during the project, not least the complex task of co-ordinating 19 construction companies. The L1, L2 and L3 (MES) automation systems and mechanical and hydraulic equipment have been rebuilt.

A R0 roughing mill stand was added and the AWC electric drive was changed to hydraulic drive for operating the R1 roughing mill stand. In addition, the electrically-driven finishing mill looper has been switched to hydraulically-driven.

The first coil being created on the coiler at Yanshan Steel's rebuilt 950mm hot strip mill

The hot test was completed in just five days. Hot mill production was running normally immediately after the line ramped up its capacity within 10 days.

The daily quantity and final quality of coils have been greatly improved and 2.0mm thin specification product is now in mass production.

SFRE MANUFACTURES CHINA'S FIRST CONTINUOUS OIL PIPE SERVICE STATION

China's first continuous oil pipe service station is now in trial use.

It was delivered to Baoji Petroleum Steel Pipe Company by MCC-SFRE Heavy Industry Equipment Co. (SFRE: originated from its predecessor Shaanxi Forging and Rolling Equipment Plant and now named MCC-SFRE Heavy Industry Equipment Co., Ltd.)

This mobile service station features a service car, a lifting rotary platform, a pry platform, a hydraulic system, LV power distribution and electric control systems, plus a generator.

The station is designed to be a complete solution to the difficult issue of interfacing continuous tubes at oil fields. The service car will transport service tools to the operating side of an oil field and the welding platform can be raised to required operating positions.

This service station has passed national verification and been certified and has strong market prospects.

SFRE DELIVERS QUALIFIED EQUIPMENT FOR RIZHAO STEEL ESP4

The director of Primetals China's procurement and supply chain has applauded a CISDI Group subsidiary for its efficiency.

Sabine Bobek sent a letter of thanks to SFRE for its sterling contribution to the redevelopment of Shandong Rizhao Steel's ESP4 production line.

The ESP4 line started up successfully and rolled out its first coil in early April. It has run stably throughout its test run.

CISDI is the general contractor for the project and delivered its well-proven equipment and units, with Primetals from Austria undertaking the technological leadership for imported equipment.

SFRE delivered the traversing and pile-up device, entry and exit induction heaters, roller guides for the induction heaters, guide stands and entry guides.

Bobek commented that the manufacturing schedule and delivery of auxiliary equipment was well controlled and ran on-time, and that during commissioning CISDI's supervision engineers were always on hand to deal with site problems and any client concerns. There had been 'friendly and effective cooperation' with Primetals and this had contributed to the line's success.

The No.1 guide stand and entry guide at ESP4, manufactured by SFRE

The SFRE-manufactured traversing and pile-up device for ESP4

CISDI'S INTELLIGENT STOCKYARD AND INTELLIGENT BLAST FURNACE

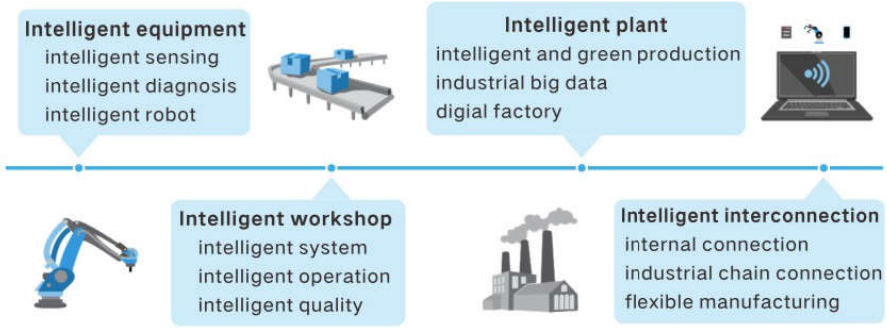
CISDI are expert providers of digital design and intelligent systems which incorporate information technology platforms, intelligent production and methodology, big data and cloud computation, and automation control into existing stockyards and blast furnaces.

CISDI is spearheading the development of intelligent and big data research and application, and the integration between sensing, intelligent control, information, internet plus and big data technologies into steel making processes, manufacturing equipment and production techniques.

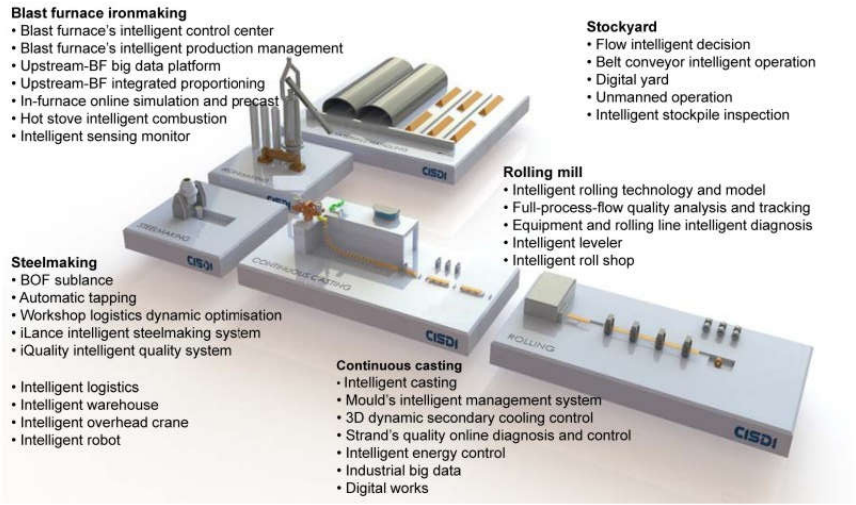
The company is also developing Industry 4.0-based core technologies and products for boosting intelligent industrial production.

CISDI's intelligent manufacture total solutions

Efficiency, cost, quality and safety are the focal points of CISDI's multi-tiered intelligent manufacturing solutions for the full life cycle of the steel industry.



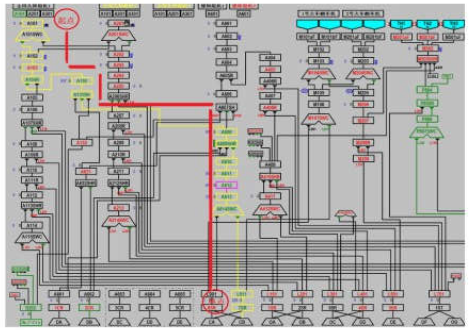
CISDI's intelligent workshop application



Intelligent stockyard

Intelligent operation

Flow intelligent decision and belt conveyor intelligent operation optimises material flow transport routes, which reduce the idling ratio of belt conveyors, save space and reduce energy consumption. A shortened transport cycle time improves productivity.



An illustration showing CISDI's flow intelligent decision and belt conveyor intelligent operation

Unmanned stacking technology

The unmanned stacking operation creates orderly stockpiles without the use of manpower, and is also effective at freeing up site space.

Raw materials for windrows and cone shells, stacked using CISDI's unmanned stacking technology

Unmanned reclaiming operation

The reclaimer automatically returns from its boundary limits and identifies the stockpiles it needs to stack. Stacking is carried out continuously, increasing reclaiming efficiency and labour productivity.

Pictured: raw materials with a constant volume being reclaimed on site using CISDI's unmanned reclaiming technology

Digital stockyard

The stockyard automatically generates high-precision three-dimensional stockpile position charts. Inventories are checked and updated in real time and the stockyard is controlled digitally.

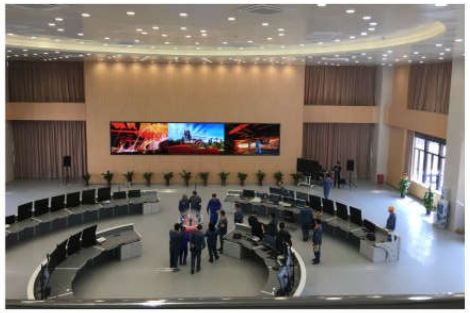
Screen shot of CISDI's digital stockyard technology generating high-precision stockpile positions

Intelligent blast furnace

Intelligent control centre

Four centres are created - the multi-plant centralised control centre, ironmaking plant data centre, multi-BF centralised control centre and multi-BF intelligent maintenance and inspection centre.

An integrated intelligent safety control system synergises safe power supply and distribution, safe operation and monitoring.



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

Intelligent production management system

Complicated process calculations are solved via this management system, which also visualises and intelligently controls the blast furnace smelting process. Results of the model calculations are used as the highly accurate basis for making operational decisions.

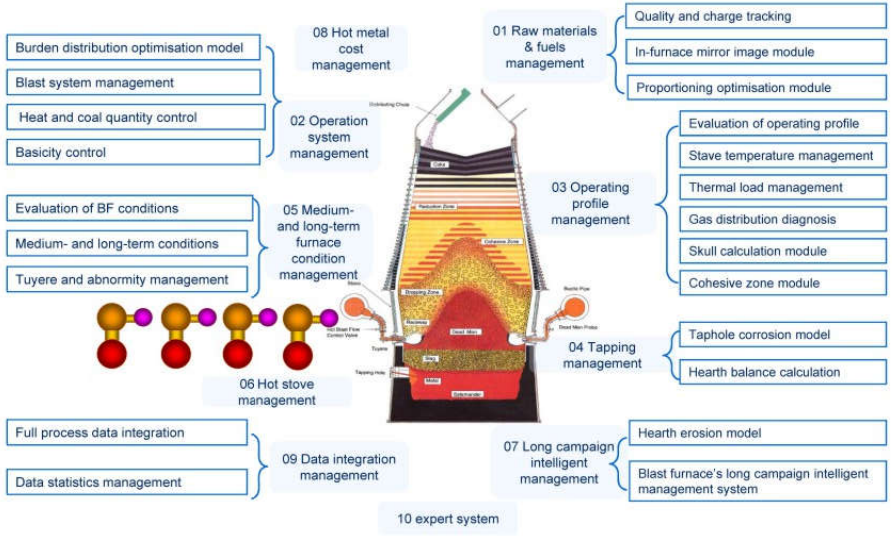


Diagram shows CISDI's blast furnace intelligent production management system (IPMS)

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.

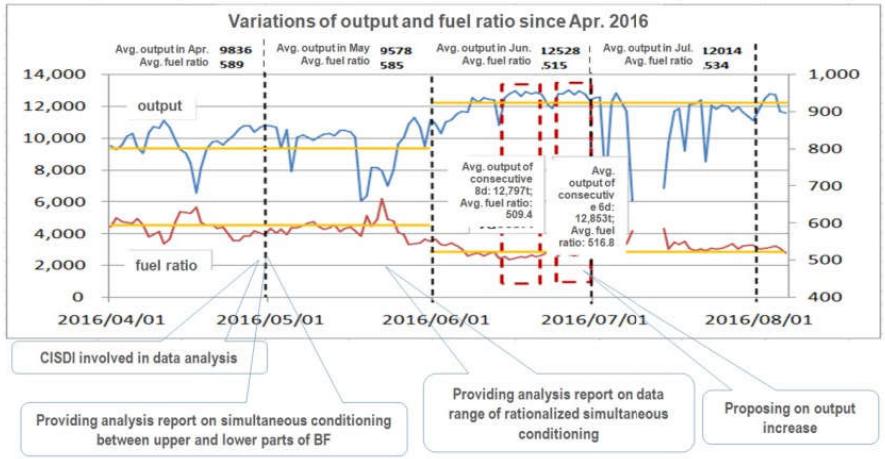
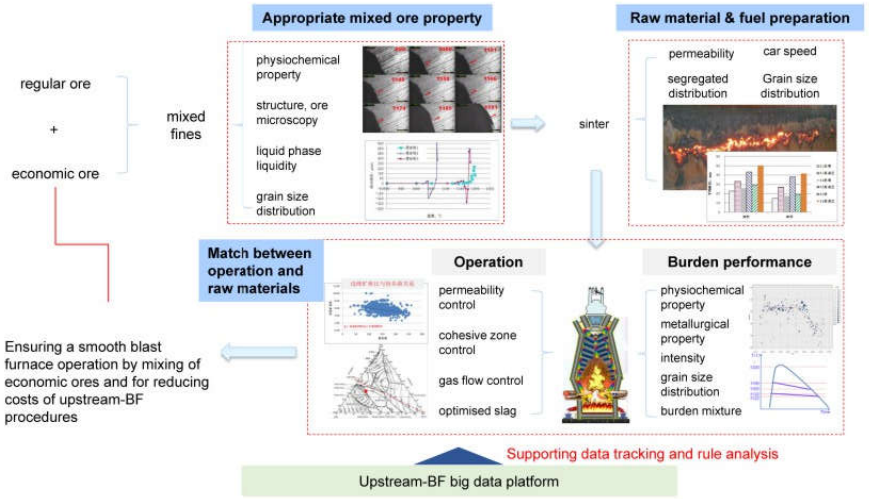


Chart detailing the application of CISDI's upstream-BF big data technology in a 5,000m^3-level blast furnace

Upstream-BF integrated proportioning expertise

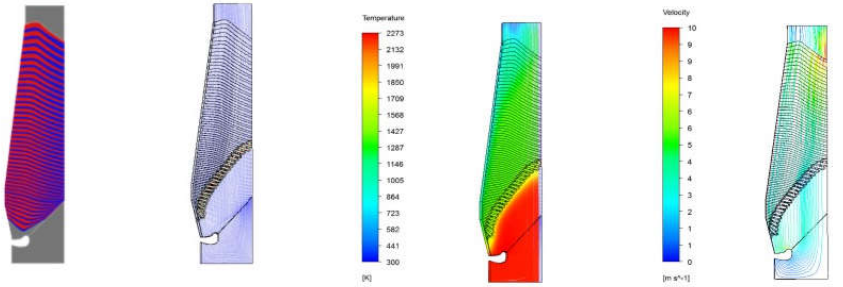
Comprehensive analysis and tracking of raw material purchase, blending and preparation, and blast furnace production are implemented. The ideal proportions of ore and coal are calculated, which reduces the cost of fuels and ensures fuel quantities are accurate. Smart proportioning also contributes to the smooth and stable running of the blast furnace, which reduces the cost of producing hot metal.



In-furnace online simulation and forecast

The numerical simulation model for the entire blast furnace gives an online simulation of production conditions.

It predicts the influences that raw materials and fuels and regulated operations will create in a smelting cycle. Simulations and predictions provide highly accurate references for fine-tuning production and operation.



Precast of the bed mixture

Forecast of cohesive zone

Precast of in-furnace temperature field

Forecast of in-furnace gas flow distribution

OFFICIAL RECOGNITION FOR CISDI'S 3-ROLL PIPE MILL TECHNOLOGY

CISDI's critical technology for producing the world's smallest calibre 3-roll pipe mill has received official recognition.

The three-roll, six-stand continuous mill can produce pipes with a maximum outer diameter of 89mm.

CISDI's IIPR-based know-how provides the missing link in China's 3-roll pipe mill core technology and is believed to be a global technological first.

An innovative green solution which can replace piercing cold drawing and skew rolling modes, it is being hailed as a major contribution to the upgrading of small-calibre seamless pipe mills in China, transformations which will greatly enhance the cost competitiveness of its steel companies.

Its application in China's Fengbao Pipe Industry in Linzhou in the Henan province has achieved world-leading technical indicators. Its high precision control of retaining system positions and reducing cutting losses are surpassing those of similar mills around the world.

The hi-tech system has now been evaluated by experts from Chongqing University and Chongqing Municipal Science and Technology Evaluation and Transfer Services Centre.

The expert team unanimously recognised its effectiveness.

The sophisticated technology guarantees rolling precision and allows the small calibre of 3-roll pipe to be created. It encompasses process model control, high-precision and fast-response hydraulic roll gap control, plus high-speed exact heavy-load retaining.

The world's smallest calibre 3-roll pipe mill at Fengbao Pipe Mill, which was supplied by CISDI on an EP basis and is the first Chinese-made lateral-roll-change 3-roll pipe mill

CISDI's WATER TREATMENT TECHNOLOGY

CISDI's Water Resources Business Division is committed to providing innovative industrial water treatment system solutions.

Its design, research and development and simulation platforms work together to conserve water resources, protect the safety of water environments and reduce water consumption.

Its methods optimise raw water and upgrade water supply structures, quality and volume.

TYPICAL REFERENCES:

Baosteel Zhanjiang's water resources comprehensive treatment project:

- The largest rainwater recycle in China and a world-leading seawater desalination system has been created
- Reclaimed water is recirculated and re-employed for cascade use
- Utilisation of water resources at the industrial park

Hebei Jingye Group's ZLD project:

- A combined means for testing, CAE plus lab test, pilot and commercialisation has been employed
- The comprehensive waste water treatment solution modifies biochemical treatment, preassembled/integrated facility treatment, deep processing and recycling
- The system is resulting in zero liquid discharge

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