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CISDI

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A view of rebuild stockyard at Baosteel in Shanghai

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CISDI

TOTAL SOLUTIONS AND TECHNOLOGY PROVIDER PREFERRED BY GLOBAL METAL INDUSTRY

Full-Process Services

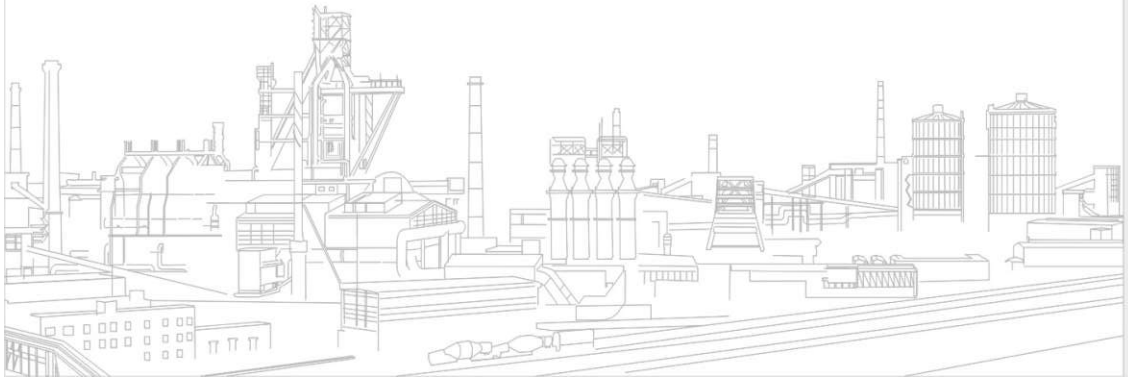
CISDI provides full-process services from the bulk material handling yard to the post-processing line of the hot mill.

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 Rockwell renew pledge for joint global market dominance

CISDI is proud to announce a continuing relationship with Rockwell Automation, the world's largest company dedicated to industrial automation.

Headquartered in Wisconsin, USA, Rockwell Automation works worldwide to make its customers more productive and the world more sustainable. Its flagship product brands are recognised for innovation and excellence.

The two giants first joined forces in 1998, initially concentrating on joint projects, cutting-edge technology applications and the co-development of innovative new products.

The successful liaison has resulted in valuable information-sharing and the development of a wider international marketing platform for CISDI, thanks to Rockwell's assistance in ensuring its Chinese products meet European and American standards.

One highly successful project which resulted from the union was the co-development of an intelligent Motor Control Centre (MCC) product which is now in operation at the Formosa Ha Tinh Steel Corporation's Blast Furnace 1.

Yu Zhaohui, CISDI's CEO, and Tom O'Reilly, vice president of Rockwell's global business development division, signed a strategic cooperation agreement on November 29.

CISDI's chairman, Xiao Xuewen, witnessed the signing and the group took the opportunity to discuss new developments and achievements in big data, automation and IT.

Both parties now plan to explore wider and deeper cooperation in steel, big data and IT applications to further the expansion of CISDI's global market share.

Yu Zhaohui, CISDI's CEO, and Tom O'Reilly, vice president of Rockwell's global business development division, sign the new strategic cooperation agreement

Technology-sharing takes place at the meeting

CISDI's environment-friendly stockyard is awarded domestic patent

CISDI's revolutionary bulk materials handling and enclosed stockyard technology has been awarded a domestic patent with a rating of 'excellent.'

The core technology and equipment, which now bears the patent number 201310681919.7, is at the heart of CISDI's innovative second-generation environment-friendly stockyard, which integrates first-generation Model B, C, D and E enclosed yards.

It is capable of resolving technical bottlenecks regularly experienced in iron and steel industry stockyards, greatly improving the space utilisation ratio and the capacity, variety and properties of materials to be stored. It costs less to construct and less floor space is needed.

In addition, the patented system is better for the environment, as less dust can escape.

CISDI is seeking applications for its stockyard technology in India's JSW Dolvi plant and at China's Ruifeng Steel, site and provided consulting for such equipment in TATA KPO project.

Since 2009, CISDI has been awarded seven patents, covering a vast range of steel industry processes. Almost all of CISDI's major core technologies invented over the last decade now enjoy the honour, including most notably, the no-bell Blast Furnace top distributor and the SACS suspension system for the BOF.

CISDI's revolutionary bulk materials handling and enclosed stockyard technology

CISDI report successful dry-off of high-speed wire-rod mill at ASSB Malaysia

ASSB's planned new steel plant in Malaysia, set to be one of the largest and most advanced in the world, is going to schedule reports CSIDI, the plant's core technology provider and general designer.

The CISDI-commissioned reheating furnace at the combined bar and high-speed wire rod mill workshop has gone through a successful dry-off and has been running smoothly since its startup on November 25 only 12 months after order placement.

The achievement marking another success for CISDI's creation of long product reheating furnaces overseas.

The RHF for the No.2 bar mill at ASSB is now under commission and is scheduled to be dried off in December.

All of ASSB workshops under CISDI's remit have met the very tight scheduled targets and in some cases are surpassing them.

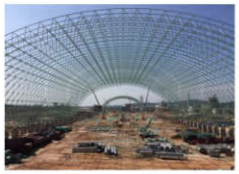
Some 55 per cent of the ironmaking plant is now complete and the installation of the main building housing the steelmaking and continuous casting shop is only 20 per cent off completion.

The alloy refractory warehouse is 90 per cent complete; the construction of the primary dedusting and bag filter system is mid-way through and the tower building has been covered.

Equipment installations at the rolling mill are almost complete, with individual commissioning of the mill reheating furnaces, main rolling lines and water treatment systems all progressing. ASSB's aim is for this to be the first workshop to start up, most likely by the Year End.

In addition, CISDI reports the coking coal yard's web shell is 20 per cent complete and 40 per cent of the ore yard is finalised.

Aerial view of the ASSB blast furnace site



ASSB's ore yard is rapidly approaching installation

CISDI's reheating furnace commissioning team at ASSB's combined bar and wire-rod mill

Baosteel stockyard modification completed without halting production

Baosteel's newly covered B1/B2 stockyard in Shanghai, designed by CISDI, started up at the end of November.

The two-year project saw CISDI apply online rebuild technology to enclose the plant's traditional open yards, an area of 130,000m2. No exposed ore is now in view and the site has been attractively landscaped.

Enclosing stockyards has strong economical and environmental benefits. It reduces emissions of dusts and sewage into the atmosphere and lessens the need for water sprinkling during production, which will conserve water and lessen the levels of moisture in bulk materials.

Work at the Baosteel yard, which includes blending yards BA and BB plus flux and miscellaneous yards OA and OB, required the sealing of major facilities - blending and proportioning bins, screen building, transfer towers and the belt corridor. The Stockyard's production remained constant throughout the installation as continuous supply to the sintering plant was essential.

The resounding success of the project is a testimony to CISDI's online rebuild concept and technology skills.

A view of rebuild stockyard at Baosteel in Shanghai

New stove dome is closed for Erdemir BF1 in Turkey

CISDI has won another major contract with Gerdau Açominas, a subsidiary of Brazilian steelmaker Gerdau.

The company specialises in the production and sale of steel plate, blocks, billets, structural profiles and wire rod for the industrial, civil construction and agribusiness sectors.

The contract, won in November, follows on from CISDI's package supply of blast furnaces 1 and 2 to Gerdau Acominas and an indication of the company's trust in CISDI's expertise, delivery and quality.

CISDI is to supply core equipment - copper staves, auxiliaries and refractories - for its blast furnace 2, and means the blast furnace is the first of its kind to be exported from China as a complete package.

Anfeng Steel BOF starts up its dry dedusting system

The CISDI-designed dry degusting system has been successfully started up at Anfeng Steel's BOF 1 in Hebei.

This is now the 40th application of CISDI's converter dry system, an optimised cleaning technology which operates on the Bishoff's basis and is particularly suited to larger 200t + level BOFs.

The first application was created at Shaanxi Hanzhong Steel's BOF shop in 2011 and its success led to the development, via CFD and CAD simulation, of 50t~300t BOF series' design software. Its features include evaporative cooler constant-pressure variable-flow supply and explosion-avoidance and relief technologies.

The system's non-uniform flow field, temperature control and alternating load of evaporative cooler and vibration control model of electrostatic precipitator have attained world leading levels.

Zunyi Changling's special steel plant is started up

Zunyi Changling Special Steel's EAF and LF package supply project passed hot commissioning and started up in mid November.

CISDI undertook the equipment design and package supply of the 1x70t EAF and 1x70t LF, plus the design of the steelmaking workshop and it auxiliary facilities. It was also responsible for pipeline and process optimisation, and the design of the relevant energy media data.

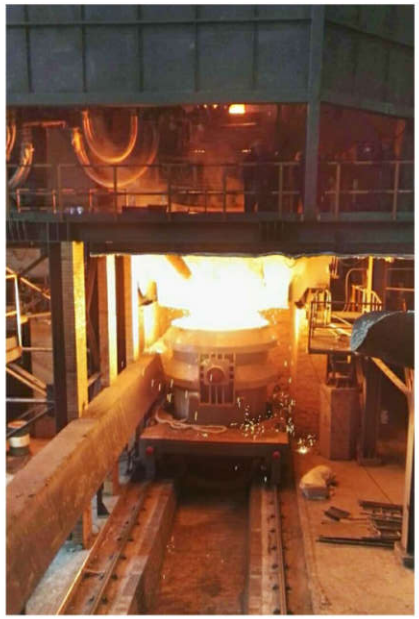
The task was made more complicated by the unusual geographical position of the site. It is located on a slope and its steel-making, casting and rolling shops are in a cascade arrangement.

CISDI carried out a number of studies to find the optimal solution; an EAF-centred layout.

This design was deemed the most efficient process arrangement, the smoothest for logistics and the best utilisation of space.

Further intense challenges were posed by a tight schedule, and the soaring price of steel.

Through painstaking co-ordination of equipment manufacture and delivery schedules, and tight controls on cost, CISDI kept the project to time and to budget.



CISDI's 2017 highlights

2017 saw CISDI make major inroads into the international market.

During the year, the company pursued wider connectivity with global clients and partners and further advanced its technology and services.

CISDI became one of the most competitive steel engineering service providers, oriented to its clients' exacting requirements and needs.

CISDI is now

The total solutions and technology provider preferred by the global metals industry

A full life-cycle engineering service provider committed to providing total solutions for steel industry restructuring and upgrading, and greener and more intelligent manufacturing.

An expert in the provision of state-of-the-art technology which results in lower costs and greater efficiency.

Strategy Forums in 2017

2017 also saw the launch of CISDI USA in Pittsburgh, America's Steel City.

The U.S. division joins CISDI UK as the company's western platform for the promotion of its multi-disciplinary, full-process and systems expertise to western steel industries in need of restructure and upgrades and infrastructure construction.

Said a CISDI spokesperson, "We have a foothold in all the main global hot spots for steel production. Alongside our UK and USA presence, our companies and branches in India, Brazil, Turkey, Malaysia and Vietnam are providing tailored solutions to their local markets.

We employ local staff at our operations and seek local partners and further localisation will be one of our next priorities; ever-greater understanding of the markets will enable us to provide a more responsive and optimal service. "

CISDI's global reach

In 2017 CISDI strengthened communications with global clients

(I) The company visited the leaders and technology divisions of ArcelorMittal HQ, TATA Steel HQ, USS and Liberty House Group, acquiring a more in-depth understanding of clients' expectations while demonstrating our total solutions strengths.

CISDI is also strengthening our relationships with Hatch, Rockwell and TIMKEN joining our global resources to work collaboratively for clients.

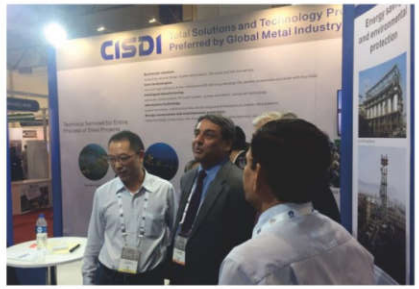
TATA Steel staged its Technology Leadership Training Programme at CISDI Chongqing

CISDI representatives are pictured on a visit to USS HQ

CISDI experts attending the ArcelorMittal USA Technology Forum

(ii) This year CISDI also participated in a number of major international conferences and exhibitions; we spoke at AMM & WSD Steel Survival Strategies XXXII, India Steel 2017, ABM Week Brazil, ASEAN Expo and the 6th International Iron & Steel Forum Turkey, enhancing the world's opinion of our brand.

Team members from CISDI HQ, CISDI UK and USA are pictured at the AMM & WSD Steel Survival Strategies XXXII



The CISDI team at India Steel 2017

CISDI attending the Turkey I&S International forum

In 2017 CISDI strengthened its reputation for total solutions and technology systems expertise

(i) CISDI was contracted to deliver the master design, planning and engineering of EPC services for Formosa Ha Tinh Steel in Vietnam including stockyard, blast furnaces, reheating furnaces and gas holders.

Formosa Ha Tinh Steel is a greenfield 10mt/a steel plant, the biggest in Southeast Asia, set to play an important role in rationalising global steel distribution.

CISDI is contracted to deliver the master design, planning and engineering of EPC services for its stockyard, blast furnaces, reheating furnaces and gas holders.

Under CISDI's process, equipment, project management and operational management expertise, FHS's blast furnace 1 commenced production achieved higher technical indicators than world-leading blast furnaces of the same volume (4,350m^3).

Equipped with CISDI's high-efficiency, low-consumption mega BF core technologies - including a no-bell top distributor and slag granulation drum - it is achieving a substitution rate of over 90%.

Baosteel Zhanjiang, with CISDI general design and main process units engineering and construction

(ii) Baosteel Zhanjiang, a 10mt/a steel plant, has been running for two years.

CISDI is the main contractor, from the plant's stockyard to blast furnace, continuous casting, hot strip mill, gas holder, plant-wide water treatment, solid waste treatment and utilities.

This project focuses on implementing innovative, green, coordinated and sustainable development concepts, including eco-friendly intelligent stockyard, a new style of serial-hopper no-bell top, the world's largest tonnage ladle turret (520t) and other core technologies and equipment – All provided as part of CISDI's innovative, green, coordinated and sustainable

The FHS blast furnace project, which was developed by CISDI on an EPC basis

development concept.

The plant is achieving a 97% localisation rate providing tangible economic returns and aiding development of the region, and is a strong demonstration of China's steel supply-side structural reform.

Other world-leading statistics being achieved at the plant include a hot metal transport distance of less than 1.0km at the ironmaking-steelmaking interface, a plant-wide Fe primary utilisation ratio of over 97% and a solid waste re-utilisation ratio of up to 99.93%.

Industrial fresh water consumption is just 1.5m^3 per ton of steel and 98% of industrial water is being recycled.

(iii) Blast furnace 2 at India's TATA Steel, set to be one of the world's biggest, is being designed by CISDI and is now at the detailed engineering phase.

(iv) Major global projects in 2018

The company will be supplying the equipment and materials for ASSB's stockyard, blast furnace, steelmaking, continuous casting and long products.

CISDI will continue the execution of JSW Dolvi Phase II BFG dry dedusting system, India's Aarti Steels special bar mill and reheating furnace, Formosa Ha Tinh Steel's CDQ power generation, Hoa Phat reheating furnaces and ESM engineering consulting in Bolivia.

In addition, CISDI will be package-supplying core equipment to TATA UK, Dolvi, Aarti Steels, Gerdau Acominas and Erdemir.

An aerial design view of ASSB's plant at Kuantan MCKIP, Malaysia

Application technology, foresight technology and technological innovations

(I) Systematic optimization

CISDI combines multi-disciplinary design with management consulting and big data analysis to optimize plant-wide integrated systems for its clients.

In the pursuit of greater economy and sustainable development, CISDI's designs integrate system and individual units for balanced optimization.

(ii) Intelligent manufacture

CISDI's intelligent manufacturing solutions combine advanced IT, internet +, big data and cloud computation into steel-making equipment, process and production.

The company is currently developing common research platforms for industrial big data, smart sensing, smart actuators and smart decision systems.

(iii) Green manufacture

CISDI's studies are focused on developing new technologies which will reduce energy and water consumption, increase the waste-to-energy capabilities of the production process for both water and solid matter.

(iv) New process

CISDI's technological research teams are developing new methods for low-carbon production and BF slag heat recovery.

(v) New flow

High-efficiency green EAF mini-mill and endless strip casting and rolling processes are being researched.

(vi) New material

The company is pushing forward with high-end material research with nano as the base technology.

(vii) New manufacturing method

CISDI achievements:

(i) The eco-friendly, intelligent stockyard

The world's most innovative technology for the eco-friendly storage and clean transfer of bulk materials is now in operation at the sites of a number of CISDI's clients.

The technology delivering intelligent stockyard production utilises CISDI's advanced 3D scanning, ultrasonic ranging and RFID positioning.

Case study: Baosteel Zhanjiang stockyard has an annual receiving capacity of around 34.70mt. The implementation of CISDI's eco-friendly, intelligent stockyard technology has resulted in a reduction in loss of materials, making an annual saving of up to USD 13.60 million, and achieved ideal emission figures; particles are discharged from the bulk material handling area with an average flow of 3.8mg/m^3.

The eco-friendly and intelligent stockyard at Baosteel Zhanjiang

(ii) EAF mini-mill

- Achieving scrap automatic continuous charging and penetrating preheating
- Accommodating control of dioxin
- Increasing metal yield by 1%~2%
- Reducing power consumption to (300~340)kWh per ton of steel
- Shortening tap-to-tap cycle
- Improving EAF productivity

The VINAKYOEISTEEL 90t EAF in Vietnam was exported as an EAF package by CISDI.

(iii) The key technology in its mega blast furnace results in higher efficiency and lower energy consumption.

Application of developments created by CISDI's R&D team complete system of process, design, core equipment and intelligent control

As a result, over the last three years, the 21 blast furnaces built globally by CISDI have saved a total of 3mt of standard coal and reduced carbon dioxide emissions by 8.80mt.

Synergising design and manufacture and delivering top quality products and performance

(I) A typical reference:

Linzhou Fengbao Φ89mm seamless pipe mill

- 6-stand 3-roll continuous pipe mill with the world's smallest calibre
- CISDI undertaking the full line design, manufacture, supply, commissioning, pilot production and operational management
- Applying self-relied developed 3-roll pipe mill, tension reducing mill, pointing and upsetting control

Pipeline network simulation for intelligent gas energy management in the steelworks

The large amount of gas steelworks produce as a byproduct is the most important source of secondary energy.

During the expansion of a steel plant and with the improvement of gas recovery technologies, the upgrading of the gas pipeline network is often a key area of plant modernisation.

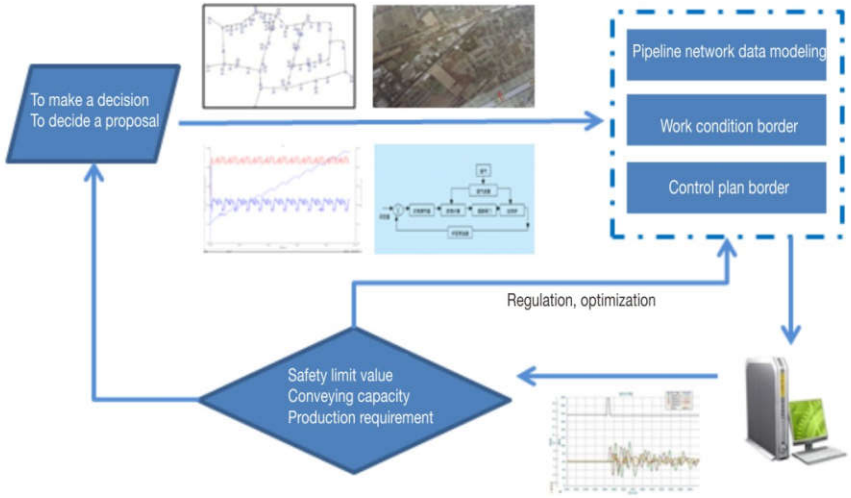
Such modification to enhance the gas conveying capacity results in more complicated pipeline structures.

Attention has to be paid to the pressure fluctuations at each pipeline interface, which occur due to the varying production demand of the steel plant.

Severe fluctuations can cause gas leakage incidents. Failure to provide reasonable scheduling of plant demand and/or adequate pipeline arrangements may lead to the additional gas bleeding, which wastes energy, or lead to an unstable gas supply, which negatively affects production quality.

Steelworks often conduct their gas energy and pipeline management via the Energy Centre, which acquires energy consumption data and equipment running data into a centralised digital platform, where the energy system is monitored and controlled.

This operational data information is often converted into statistical analysis, which assists their scheduling strategy. In essence, this management model creates a planned, static balance.



The sketch of gas pipeline network simulation

But it lacks a clear understanding of the general situation and fails to clearly identify the dynamic variations of the complicated pipeline network.

As a result, it can only make decisions on gas scheduling, regulation of gas pipeline pressure for operation and modification, and expansion proposals of the line network, based on past experiences.

CISDI has a dedicated team for researching the safe production and optimization of steelworks gas pipeline networks.

The team has studied the operation rule of the network system, established a reliable network simulation model and developed pertinent functional modules for key equipment and process and a recognition programme for CISDI continues to conduct deeper research on this subject and proposes to combine with steelworks energy center's for data fusion, providing an aid for intelligent management of gas energy system.

Its pipeline network simulation technology can be modelled on gas line real data, and find the setup values of each line interface, including the gas volume, pressure and flow rate.

It works as a quantitative foundation for the steelworks to determine safe operation of the gas line system and optimized scheduling and to measure the network expansion or modification effect.

Baosteel and NISCO have applied pipeline network simulation for their calculation and consulting services.

Their line expansion and modification safety and effect prediction, prejudgment of gas system incident conditions, decisions on gas balance and optimization scheduling have been implemented in a scientific way.

CISDI continues to conduct deeper research on this subject and proposes to combine with steelworks energy centres for data fusion, providing an aid for intelligent management of gas energy system.

CISDI Equipment Co., Ltd.

- A subsidiary of CISDI Group, dedicated to equipment manufacture
- Established as CISDI's R&D pilot centre, core product manufacturing base and equipment manufacture and integration base
- Annual production of more than 30,000t of equipment and products
- Providing a life-cycle support for total equipment solutions
- Synergising the process from equipment research, development and design to manufacture, incorporating smart, information and control technologies in core equipment

CISDI's equipment manufacture center

Guofeng Steel's 5-stand tandem cold mill, designed, manufactured, installed and commissioned by CISDI

Jiangsu Chengde Steel 3-roll multi-stand pipe mill incl. sizing mill, a world first designed, manufactured and commissioned by CISDI