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CISDI

NEWSLETTER Vol. 2, 2017

Baosteel Stockyard Rebuilt, the world's largest stockyard upgrading program for environmental-protection pursuit

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CISDI

Full-Process Services

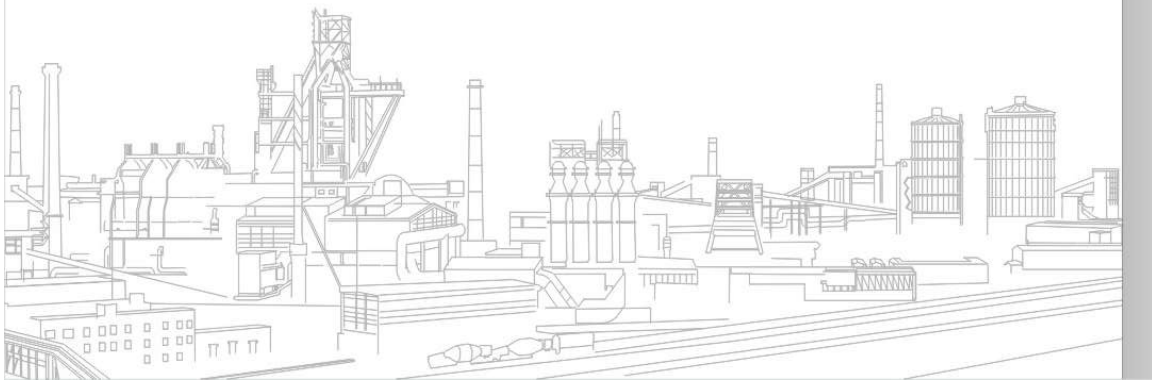
CISDI provides full-process services from the bulk material handling yard to the post-processing line of the hot mill.

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 Experts Share Their Latest Technology with Indian Steel Giant TATA

TATA Steel's top researchers and senior management were recently invited to China to benefit from a ground-breaking Steel Technology Leadership Training Programme as guests of CISDI.

TATA, India's largest steel enterprise and a global giant, sent 14 of its research scientists, chiefs and European managers on the fact-sharing mission.

The five-day intensive course was staged in Chongqing during March. Led by experts from CISDI's India and UK divisions, it focused on CISDI's most advanced steel technologies and its world-leading expertise in project management.

The delegation was also taken on-site to see CISDI's newest technology in action. The 14 visited CISDI's equipment manufacturing workshops, and visited the flagship Pangang Xichang Steel Plant, designed by CISDI that started up in 2012.

In his welcoming speech at the Training Leadership Programme, Xiao Xuewen, the Chairman of CISDI Group, said he hoped the event would enhance mutual understanding, encourage further cooperation between CISDI and TATA Steel and showcase CISDI''s forward-thinking and expertise, both in total solutions and as a technology provider.

TATA Steel praised the new scheme as enlightening and said it hoped to work with the Chinese steel giant in the future. A spokesperson for TATA commented: "We would like to thank CISDI for their hospitality and the opportunity to hear about their research and advancements in steel technology. The programme was well orchestrated and executed and its strong technical content gave a new perspective on the activities and innovations of a steel company operating outside of the US and Europe. We look forward to working together with CISDI on the future development of new technology''.

The TATA Steel TLP Delegation, pictured with CISDI's Senior Teams

TATA's TLP Trainees Get to Grips with the Latest Technology at CISDI's R & D Centre

Information Being Shared during the Training Course at CISDI

TATA's TLP Trainees on A Tour of CISDI's Equipment Manufacturing Workshop

CISDI Expands with Its UK Division Serving Europe and the USA

CISDI Group has created a UK division as part of its global expansion plans.

CISDI UK is based in Sheffield, South Yorkshire, a city with a worldwide reputation for its excellence in advanced manufacturing and engineering.

Its team acts as the purchasing hub for CISDI Group and serves the steel industry throughout Europe and the USA with sales, services, feasibility studies, engineering, project management, equipment supply, on-site services, after-sales and spare parts support. It is one of the most experienced divisions in the CISDI Group and covers products for material handling right through to final finishing.

In addition, the UK team oversees European QA/QC systems for the three CISDI workshops in China, thus enabling CISDI to produce/deliver high-quality, value-added equipment to the worldwide market, in line with its continuous improvement programme.

Since its opening, CISDI UK has had resounding success, doing business with some of the top steel producers in Europe, USA and Australia. Its ability to produce high level design with on-time delivery and cost optimization has led to it becoming a preferred supplier of engineering projects, manufacturing equipment and onsite installation for Tata Steel, whilst attracting the attention of One Steel, Arcelor Mittal and Liberty Steel.

The CISDI group has long supported the world's largest steels companies on a vast range of projects, from full turnkey EPC contracts to the supply of day to day running spares. And now, thanks to CISDI UK's leading role in its global sourcing policy, the company is able to provide a total solution for the global market - combining engineering, R&D and QA/QC management with premium brand US and European components and steel fabrication and assembly in China of the highest quality and value.

Undoubtedly, CISDI Group is now one of the most competitive engineering companies serving the global metals industry.

CISDI UK provides:

The full spectrum of steel plant engineering services and equipment, from material handling, iron and steel-making and continuous casting to rolling and finishing

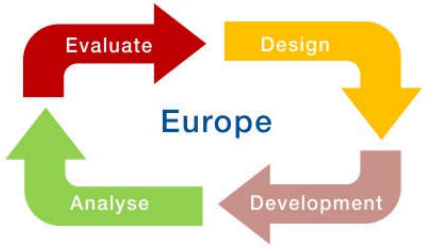
- Full turnkey EPC supply
- General Planning/Feasibility studies/Consultation
- Design and Engineering
- Equipment Manufacture
- Spares
- After Sales and Service

CISDI UK' Sheffield Office

The Team at CISDI UK, pictured with Headquarter VIPs

Based on China-UK coordination of Project Management and works, CISDI will provide high quality products and services made in China but according to European and American standards and quality requirement; create values for our global clients.

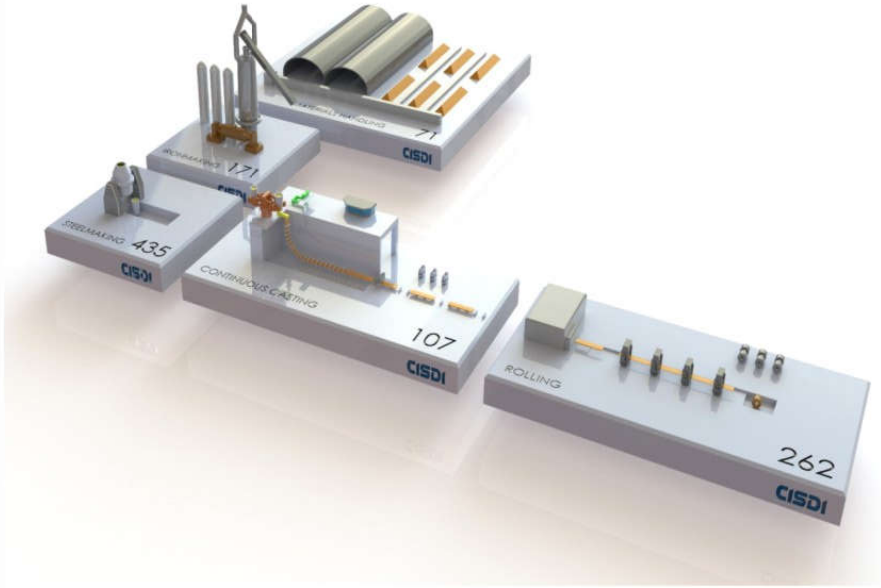
- Pre project discussions
- Understanding of the Project and Site
- RFQ review
- Technical and Commercial offer
- Technical and Commercial discussions
- Engineering
  - Design work
  - Material conversion
  - Equipment Improvement discussions
- Standards review
- Design reviews
- Project reporting and Tata Europe Liaison
- Europe importation taxes
- Local shipping and delivery
- Installation / on site supervision services



- Design Review
- Standards review
- Design reviews
- Project reporting and Liaison in China
- China taxes
- China shipping and delivery
- Workshop review
- Manufacturing time schedule review
- Standards
- Certification collection
- Progress monitoring
- Quality Pack
- Shipping and transportation

CISDI UK provides Engineering services and Equipment across the full spectrum of Steel Plant Equipment from Material Handling, Iron making, Steel Making, Continuous Casting, Rolling and Finishing. One of the largest Engineering companies in the world providing

- Full turnkey EPC supply of entire Steel Plant
- Feasibility studies
- Design and Engineering
- Equipment Manufacture
- Spares
- After Sales and Service



CISDI Builds Eco-friendly Super-silos for Baosteel's Coal Stockyard - A World-first

CISDI recently completed the design and build of a revolutionary new, eco-friendly coal silo plant at Baosteel Shanghai.

It is the world's largest stockyard upgrading programme ever carried out in the pursuit of environmental protection.

Technologically-advanced super-silos having a 24 metre inner diameter and a platform height of 46 metres have been created, each able to store up to 11,000 tonnes of coal. They operate automatically, without the need for manpower, and are the largest of their type within the domestic steel industry.

Baosteel Coal Silos

Baosteel Stockyard Rebuilt, the world's largest stockyard upgrading program for environmental-protection pursuit

Heralded as the industry's new benchmark, a major benefit of the huge gain in silo storage capacity is the reduction of coal in the stockyard itself, which brings a huge environmental gain to the locality.

The project focused on Banks E and F of the vast coal yard. CISDI's designers took onboard the plant's production requirements, safety and environmental objectives and utilised the latest advancements in technology to modify the open coal yard to 30 silos.

The conical section of the single silo was designed with hyperbolic structure, and the rotary reclaimer was selected under the silo which can take the material by traveling between different silos; thereby phasing out the conventional disk reclaimer, greatly reducing the maintenance burden under the silo. Construction began on December 29 in 2014.

This is the first stage in Baosteel's commitment to upgrade the entire stockyard into a highly efficient and eco-friendly facility.

Hot Commissioning of Anyang Steel CGL, Supplied by CISDI

China's Anyang Steel now has the capability to produce high-surface quality strip products for high-end household appliances.

A new 1,550mm wide Continuous Hot-dipped Galvanizing Line (CGL) supplied by CISDI was successfully hot commissioned on March 20, 2017.

This CGL has an annual capacity of 350,000t/a of high-surface-quality GI and GL strips for high-end household appliances, with a final product range of 0.25 ~ 2.0mm thick and 800 ~ 1,400mm wide. The line is highly automated and can reach entry speed of 270m/min and process section speed of 200m/min.

The plant features CISDI's self-developed technologies and automation control systems, including profile control, auto coating thickness, high surface quality process, CAL roller speed optimization, vertical looper inter-sheet tension loss compensation, precise material tracking and CAL combustion control model.

CISDI Applies Smart Heavy-duty Storage Technology to Baosteel

In June 2014, CISDI launched the research and development of unmanned cranes, the key technology for smart heavy-duty storage systems, an IPR-based technology titled as CISDI Unmanned Crane System (CUCS). Two years later, CISDI undertook the upgrade of the coil storage crane for the Baosteel hot strip mill to unmanned use.

A series of tests were conducted on the crane's coil positioning accuracy, anti-swing control, coil positioning machine vision, and other core functions. All the tests reached the desired objectives and the coils could be handled fully automatically in the storage area. CISDI kept strict control of the specification, design and construction; performing detailed site mapping to confirm all the external interfaces, this avoided any design-related modifications or corrections in the construction period. This ensured the smooth progress of the project, on schedule and within budget.

CISDI Unmanned Crane System (CUCS)


Unmanned Crane Applied to Baosteel HSM Coil Storage

CISDI applied 8 major technologies to the upgraded HSM coil storage at Baosteel, including the smart clamp (refractory), anti-swing control model, machine vision, smart storage management, optimized crane scheduling, automated equipment diagnosis, smart mobile plant control and big data analysis. These technologies have brought about systemic benefits in reduced labour requirements, higher efficiency, reduced material damage, improved safety, longer equipment service life and lower energy consumption. Through this project Baosteel recognized the significant benefits of the application of unmanned cranes to coil storage, and invited CISDI to offer intelligent technology to all their coil storages facilities.

Multiple patents have been awarded to these systems and the CUCS technology can be applied in iron and steel plants, ports, nonferrous plants, petrochemical plants, waste-to-energy power plants, mines, automobile factories and railways.

◎Highlights of CUCS:

1) Total solutions for smart heavy-duty storage systems

2) Unmanned operation, high efficiency, high availability and compact layout

3) Customized process and equipment design, automation control systems and smart storage management systems

4) Heavy duty (ranging from 2t to 50t), high speed (2m/s), and high accuracy (20mm)

CISDI Total Solutions Led by Consulting

CISDI embraces multi-discipline, full process and full functional services which are led by consulting and constitute total solutions to global clients. During its 60-year development, CISDI has grown into an incomparable provider of total solutions to the metals industry, embracing the full range of engineering disciplines. CISDI has served the entire iron and steel industry, covering consulting, design, construction, project management, production and operation management, and acted as an expert in R&D and application of core technology and equipment.

CISDI's enduring pursuit is to boost competitiveness and create sustainable value for clients.

Services

CISDI Consulting focuses on improving the overall competitiveness of metals industry companies across the globe. Its expert consultancy teams are on hand to assist in the following key areas:

◎ Industry and strategy consulting:

Providing specialized optimization proposals for urban development, industrial planning and strategic consulting, tailored to clients' needs using big data and other advanced analysis tools.

◎ Mid- & long-term development plan:

Providing tailor-made and practical mid- and long-term development plans on market and strategy, taking full advantage of the industry knowledge and data, by advanced management consulting concepts and tools, by developing leading market and strategic research and analysis technology based on the industry data.

◎ Financing feasibility study

Providing feasibility study reports in line with international practices that meet the evaluation standards of international large financial institutions, offering advice on decision-making for the direct investors and the 3rd-party strategic investors, by offering a better understanding of the metals industry than the universal consulting firm while doing deeper research in economic evaluations than the general metal engineering company, by developing the globally-leading financing feasibility study methodology, and from the perspective of an independent party.

◎ General design:

Providing cost-effective and competitive designs, by utilising the CISDI's years of experience in various general design projects, Greenfield and Brownfield.

◎ Project management consulting:

Providing professional project management consulting to implement effective control and management of project cost, quality and schedule in line with the project's targets, thanks to the accumulation of years of experience.

◎ Operation diagnosis and systematic optimization:

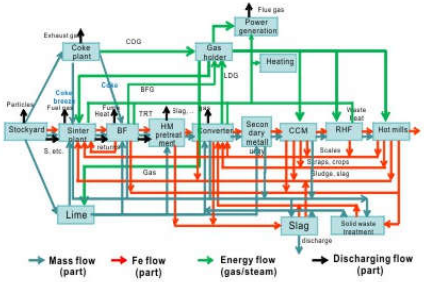
Providing realistic systematic solutions to enhance quality and efficiency while reducing OPEX, by using the data mining and expertise, by developing the globally-leading operation diagnosis, evaluation and optimization consulting technology, by thoroughly examining the management and technology issues in the whole system and individual unit.

Differentiated Consulting Methodology

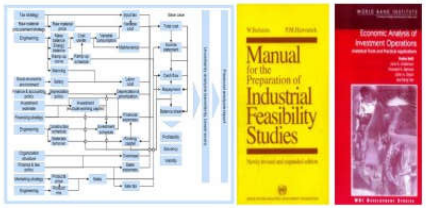
Based on systematic, economic and sustainable principles, the differentiated consulting methodology is established by the synergy of multi-disciplinary technologies with industry and strategic plans. The methodology combines project planning, design, construction and operation with technology and management.

Financial feasibility studies are oriented to the market demands and guided by technology. Built around international standards, a new package of models and tools were formed in line with the international practices and market trends. Such a toolkit contributes to the integration between front-end economy and technology.

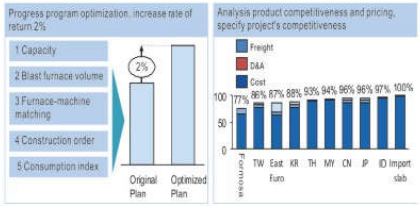
A top-down approach to general design and operational optimization is used to reach the economic performance targets. The multi-flow cost analysis (related chart shown below) is closely monitored to optimise the total solution to the full life cycle of the project, increasing competitiveness and the capacity for sustainable development.



Systematic Solutions based on Multi-Flow Cost Analysis



Economical and Risk Analysis Model in Line with International Practices and Standards

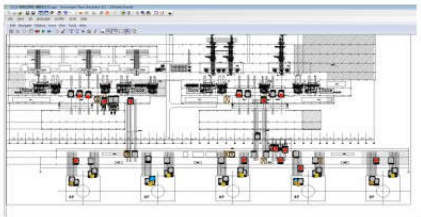


General Design for A Steelworks, realizing 10% down in total investment and 30% up in its internal rate of return

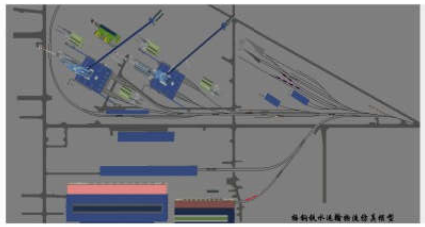
Supported by Simulation and Big Data

Incorporating the latest development of big data and internet technology, CISDI consolidates its combined dominance in consulting and smart platform. CISDI is ready to inject the new concept, new method and new tool in the common general design, and emphasizes on multi-disciplinary technological collaboration. The total solutions that CISDI provides are set with a target of integrated benefits and accommodating the overall optimization and coordinated balances. The computer dynamic simulation and big data mining are introduced to the technical proposal design. Simulation is preferred for solving complicated problems and making decisions in a scientific way; in fact, the simulation analysis models for procedure, interface and logistics and big data analysis platform have been developed and put into use.

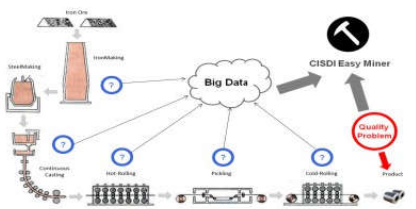
Simulation of Railway Interface Transport for a steelworks: reducing hot metal temperature drop by 24.3℃ and gaining an annual economic benefit of RMB 140 million yuan



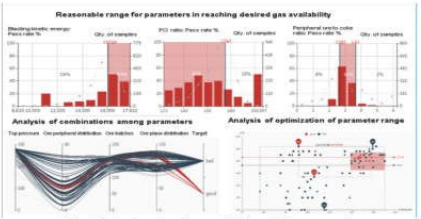
Simulation of Transfer Car Logistics for a steelworks: optimized general layout benefiting the land saving by about 200,000m2 and helping achieve the overall target capacity



Simulation of Logistics Optimization for a steelworks: analyzing the influential factors on temperature drop at the hot metal-liquid steel interface, addressing to optimize the ladle arrangement and transport organization, finding out the key to the solutions, i.e., improving the turnover rate of torpedo ladle car



Production Optimization by Math Model and Big Data Analysis



Big Data Analysis on A Blast Furnace in the volume of 5,000m³ level

Typical Greenfield References

◎ General Design of Formosa Ha Tinh Steel (FHS) in Vietnam

The only Greenfield steel complex outside of China in the last 20 years with a capacity of 10Mt/a:

Main technological features:

◆ Clearly-defined functional divisions: general layout in the form of U

◆ Sustainable overall planning: reasonable and far-sighted phased construction plans

◎ **General Design of ASSB**(full name: ALLIACNE STEEL (M) SDN BHD of MCKIP (Malaysia-China Kuantan Industrial Park)

The most competitive steel base along the route of "Belt & Road Initiative"

Main technological features:

◆ Highly-efficient energy utilization: plant-wide captive power generation ratio >90%

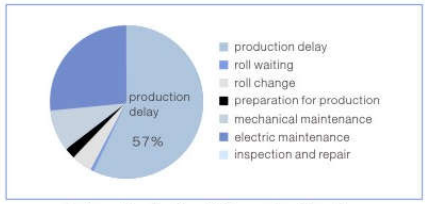
◆ Adjusting the design to the local conditions: reusing rainwater by a percentage of more than half of the total water demand

Typical References of Production and Operation Services

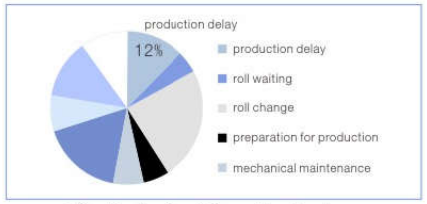
◎ **A Certain PL-TCM Production and Operation Services**

Providing productivity enhancement services for the PL-TCM by completing and improving the standards and regulations on technology, equipment, control and production organization as well as providing the proper onsite technical guidance

Ensuring a higher non-interruption rolling rate by improving the unit process control, procedure operation and onsite production coordination, reducing the stop rate by reason of production delay from 57% to 12%



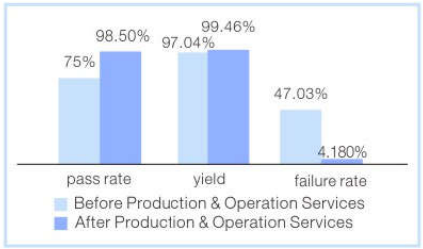
Before Production & Operation Services



After Production & Operation Services

◎ **A Certain CGL Production and Operation Services**

Providing CGL quality improvement services by optimizing the unit process and operating data, rendering on-site guidance and technical training and betterment of procedure duty coordination



CISDI world leading consulting and overall design competence and full-process systematic solutions guided by consulting.

Overall plans for Baosteel Zhanjiang and FHS

Brief of Baosteel Zhanjiang:
Client: Baosteel Group;
Location: Guangdong;
Construction period: May 2013 ~ July 2016 for Phase I;
Capacity: 8.75Mt/a for Phase I;
Main configuration: 5,050m³ BFs, 350t BOFs, 2,250mm HSM and 4,200mm wide plate mill;
Main products: High-end auto sheets, pipeline steel, cost effective.

Baosteel Zhanjiang Base in China, provides Baosteel with a world leading carbon steel plate base with modernized, eco-friendly and high-performance design from CISDI.

Orientation & services:

The biggest Greenfield steel complex in south China showcases CISDI's uniquely strong competitiveness;

CISDI Group has employed the combined tools of economic and technology consulting and simulation-based optimization, providing a reliable and advanced overall integrated solutions;

As of today, the economic and technical indicators at Zhanjiang Base have demonstrated to be the best of their kind in the world.

Brief of FHS
Client: Formosa Plastics Corporation;
Location: Ha Tinh Vietnam;
Construction period: Dec. 2012 ~ Apr. 2017 for Phase I;
Capacity: 7.0Mt/a for Phase I;
Main configuration: 4,350m³ BFs, 300t BOFs, 2,050mm HSM, combined bar & wire-rod mill, and wire rod mill;
Main products: Coils, long products.

Formosa Ha Tinh Steel (FHS) in Vietnam, the only Greenfield steel complex outside of China in the last 20 years with a capacity of 10Mt/a

Orientation and services:

CISDI Group has delivered the overall technological solution and the economic and financial models;

Considering the client's needs first, CISDI provides one-stop services throughout the whole life cycle of the FHS project by means of overall process management and technology consulting.