



Steelie Awards
WINNERS 2023

Introduction

The Steelie Awards recognise World Steel Association (worldsteel) member companies for their contribution to the steel industry over a one-year period. The selection process for nominations varies between awards. In most cases, nominations are requested through the appropriate membership committee and the worldsteel extranet. Entries are then judged by selected expert panels using agreed performance criteria. The winners of the 2023 Steelie Awards were announced on Monday, 16 October 2023.



Nominations overview

Excellence in low-carbon steel production

Aço Verde do Brasil (AVB) Scrap pre-heating for BOF charging

ArcelorMittal ArcelorMittal's 'Forest to Steel' strategy: bioenergy as a driver for greener steel production

China Baowu Steel Group Corporation Limited Development and application of low-carbon metallurgical technology based on HyCROF

Emirates Steel Arkan CO₂ synergy: transforming Emirates Steel Arkan emissions into enhanced oil recovery solution for ADNOC

HBIS Group Co., Ltd. Unique coke oven gas zero-reforming DRI process combined with EAF

POSCO HMR70 steelmaking technology in combined blowing converter

Innovation of the year

Ansteel Group Corporation Limited Integrated design of single chemistry of multi-grade AHSS and industrial application

Big River Steel, a US Steel Company Development of a high-strength, high-formable, lean, single-phase, nano-precipitation strengthened sheet steel for automotive applications with a minimum tensile strength of 780MPa

China Baowu Steel Group Corporation Limited Technology and development of Fe-Ni-based alloys wide and heavy plates in the photovoltaic industry

JFE Steel Corporation Water-quench type 1.5GPa ultra-high strength cold rolled steel sheet and new cold pressing technology for automotive parts

voestalpine AG Tailormade functional steel (tfs)

Excellence in sustainability

China Baowu Steel Group Corporation Limited The complete set of process, equipment and demonstration of green and efficient rotary hearth furnace collaborative treatment of solid and hazardous waste in iron and steel plant

JSW Steel Limited Waste plastic injection in blast furnace

Mobarakeh Steel Company (MSC) 'Sustainable Water Management by Creating Shared Value with Local Communities'

POSCO Fe-enhanced slag silicate fertilizer: How application of blast furnace slag reduces methane emissions in rice farming

Ternium and Tenaris ProPymes: Ternium and Tenaris value chain strengthening programme

The 2023 winner is highlighted in blue.

Nominations overview

Excellence in Life Cycle Assessment

Baotou Iron & Steel (Group) Co., Ltd Develop green steel with LCA and jointly carry out eco-design with mine vehicle enterprises

China Baowu Steel Group Corporation Limited Application of Baosteel online detailed LCA platform

China Steel Corporation (CSC) Green transition in the steel industry: CSC leads carbon footprint inventory and innovation based on LCA

CITIC PACIFIC Special Steel Group Co., Ltd Innovation practice in China's first Product Category Rule (PCR) for special steel used in automotive components

JSW Steel Limited Using LCA in new Advanced High Strength Steel product development and promotion

POSCO LCA-based case studies on avoided emissions measurement

Excellence in education and training

China Baowu Steel Group Corporation Limited Rotation training programme for frontline employees

Gerdau S.A. Culture path – openness with truth and respect

JFE Steel Corporation Achieving a smooth skill transfer method by systematising work standards

JSW Steel Limited Action Learning Projects at JSW by cross-functional teams: new ideas for business and strategic optimisation

POSCO Technician Level Designation and Master Title Programme (TL Programme)

Tata Steel Schools of Excellence

Ternium From conventional classroom training to high-engagement immersive training for operators using virtual reality – development of a continuous casting simulator

Excellence in communications programmes

ArcelorMittal 'Futurising' podcast (series two)

Gerdau S.A. Infinite stage: with Gerdau, steel becomes key attraction at world's largest music and entertainment festival

JSW Steel Limited Earth Care Awards 2022

POSCO 'Miracle of 135 Days'

Tata Steel Tata Steel on campus - connecting with the makers of tomorrow

Tenaris Tenaris for Energy Transition

United States Steel Corporation Steel Stories by U. S. Steel Podcast

The 2023 winner is highlighted in blue.

Excellence in low-carbon steel production

WINNER: HBIS Group Co., Ltd.

Unique coke oven gas zero-reforming DRI process combined with EAF



Although developing electric arc furnace (EAF) processes can effectively reduce the carbon emission intensity of steel production, scrap resources are the main limiting factor for China to increase the proportion of EAF steel (currently, approximately 90% of the 1 billion tonnes of steel production in China is produced by BF-BOF processes). The development of direct reduced iron (DRI) combined EAF processes is an optional path, but the lack of resources (natural gas, NG) and higher costs have always been the limiting factors that are difficult to solve in China. HBIS Group, together with technology, engineering, and academic partners, took the lead in exploring the use of China's rich coke oven gas (COG) resources to carry out an industrial-scale DRI-EAF production project, which has set a model for China's steel industry.

This project is the world's first industrial scale production of DRI using COG zero-reforming technology. It can make full use of the rich COG resources of the Chinese steel industry and independent coking plants, which makes it cost-effective; COG contains about 60% H₂, and after self-reforming, the H₂: CO can reach 8:1, which provides a research foundation for exploring pure hydrogen reduction in the future; A CONSTEEL EAF steelmaking line has been constructed simultaneously, considering production efficiency the DRI charging ratio was 30% to 40%, the production of high-quality special steel bars has been achieved and in the near future it will produce low-carbon emission and high-quality automotive slabs through the upcoming slab casting line. With the cooperation of HBIS and its partners, phase I of the demonstration project with an annual output of 550,000 tonnes has now achieved stable production, with a daily output of 1,500 tonnes of DRI.

The completion of this project (COG based DRI - EAF) significantly reduced the carbon emission intensity of crude steel by about 65% compared to the original BF - BOF process (based on the worldsteel CO₂ data collection methodology). This process sets an example for China's integrated steel plants to transit into EAF processes that meet their own resource conditions, while it will also provide the foundation for further exploration of green H₂ DRI production. This project has received widespread attention from the China Iron and Steel Association (CISA) and the Chinese steel industry, and has also received a special funding from the National Development and Reform Commission because of its demonstration effect.

Excellence in low-carbon steel production

Aço Verde do Brasil (AVB)



Scrap pre-heating for BOF charging

Brazilian integrated long steel producer, AVB has a production capacity of 600.000 tonnes per year and generates more than 2,700 direct jobs.

The melt shop's scrap pre-heating system, using blast furnace renewable process gas, has as the main objective to increase the amount of scrap loaded in the BOF (basic oxygen furnace), in addition to increasing safety, production capacity and reducing CO₂ emissions.

This system was developed by the AVB team and consists of equipment where the scrap to be loaded in the BOF is stored in a box absorbing all the sensible heat of the hot gases coming from the controlled combustion of blast furnace gas in a special chamber coated with refractory material. An automated blast furnace gas combustion control system was developed to eliminate smoke and emissions into the atmosphere. A carbon monoxide (CO) meter and a thermocouple are placed to measure and control the scrap temperature next to the preheater.

The implementation of this technology only makes sense for plants where gas is available, cheap and generated by a renewable source, such as biomass.

The scrap preheating process allows:

- The increase in the scrap surface temperature to be loaded (greater thermal input) inside the BOF from 25 °C to 500-600 °C;
- The increase in the percentage of scrap loaded in the BOF from 12% to 30% (average 27%) with a focus on increasing the recycling (circular economy);
- The increase in steel production capacity of more than 100,000 tonnes per year due to the greater use of scrap in the BOF and, consequently, higher casting weight (tonnes per heat);
- Increased operational safety by reducing the risk of reactions inside the BOF with liquid steel projections due to the loading of wet scrap.

AVB has achieved the milestone of low-carbon emissions steel production based on the long term strategic vision of the shareholders, who predicted the production of green and sustainable steel as a fundamental and differentiated value for the future growth and perpetuity of the company.

Excellence in low-carbon steel production

ArcelorMittal



ArcelorMittal's 'Forest to Steel' strategy: bioenergy as a driver for greener steel production

Aware of the importance of decarbonising the entire steel value chain, ArcelorMittal started in July 2022 substituting heavy fuel oil consumed in its Port-Cartier iron pelletising plant (in the province of Quebec, Canada) with pyrolysis oil: a renewable biofuel produced locally from residual wood biomass. ArcelorMittal's pelletising plant has become the first in the world to replace heavy fuel oil with pyrolysis oil on a permanent basis, marking an important milestone in the iron and steel industry's energy transition.

As of this day, the consumption run rate is of 12 ML/year and plans to increase this rate are in motion. Ultimately, ArcelorMittal aims to substitute 15 to 19 ML of heavy fuel oil every year by 32 to 40 ML of pyrolysis oil a year. This could generate GHG emission reductions in Canada of around 60,000 tonnes a year.

This project is the first step of a broader strategy within ArcelorMittal called 'From Forest to Steel', aiming at reducing steel's environmental footprint at the source by making bioenergy made out of renewable biomass (e.g. pyrolysis oil, biochar, biogas) a central input of ironmaking, instead of fossil fuels.

The 'From Forest to Steel' strategy relies on a close collaboration with local community leaders to ensure that it not only improves the steel industry's environmental performance, but also generates significant social and economic benefits. The pyrolysis oil consumed by ArcelorMittal in Port-Cartier is produced by the Canadian company BioÉnergie AE Côte-Nord Canada (BioÉnergie AE), which uses a local sawmill's residues as raw material. By substituting some of its heavy fuel oil by pyrolysis oil, ArcelorMittal enabled the reopening of BioÉnergie AE's plant, whose operations had been put to a halt. BioÉnergie AE is now the largest pyrolysis oil producer in Canada. The use of the local sawmill (Arbec)'s residues also relaunched its operations at a time when it could no longer find outlets for its by-products. The relaunch of those two companies was an important need expressed by the local community.

The pyrolysis oil project will have put in place the foundations of a strong energy ecosystem – linking ArcelorMittal, the local forest industry and energy developers – that opens the way to the integration of various bioenergies in the steelmaking process.

Greener steel starts with greener ironmaking.

Excellence in low-carbon steel production

China Baowu Steel Group Corporation Limited

Development and application of low-carbon metallurgical technology based on HyCROF

As a highly energy and resource intensive industry in China, the steel industry accounts for about 16% of the country's total carbon emissions. The research and development of new low-carbon metallurgy technologies is not only needed for the national eco-environment conservation, but also for the sustainable and healthy development of the steel industry worldwide.

Xinjiang Bayi Iron and Steel Co., Ltd. (Bayi Iron & Steel), as one of the three low-carbon test bases of China Baowu, has undertaken the heavy mission of developing low-carbon technology of blast furnace ironmaking process in accordance with the objectives and requirements of China Baowu's 'Carbon peaking and Carbon Neutrality' development strategy.

After seven years of technical exploration and research, the world's first 400m³ industrial-grade hydrogen-enriched carbonic oxide recycling oxygenate furnace (abbreviated HyCROF) was built in 2022, and a major technological breakthrough was made. Top gas recycling injection under pure oxygen blowing conditions has been realised. Production capacity has increased by 30% to 40%, and solid fuel ratio has reduced by more than 30%. Carbon emissions per tonne of hot metal have been reduced by more than 20%. From July 2022 to July 2023, CO₂ emissions of the 400m³ HyCROF have decreased by 85,021 tonnes.

At present, the 400m³ HyCROF technology has been commercialised and applied on the 2,500m³ Bayi Iron & Steel blast furnace, and after it is put into operation at the end of 2023, it will achieve an annual carbon reduction of 600,000 tonnes (equivalent to reforestation of 813km² in Xinjiang). If this technology is promoted and implemented in China Baowu Group in the future, it is preliminarily estimated that CO₂ emissions will be reduced by more than 40 million tonnes per year.

As the largest steel enterprise in Xinjiang, Bayi Iron & Steel will continue to contribute to the green and sustainable development of Xinjiang and provide practical solutions.



Excellence in low-carbon steel production

Emirates Steel Arkan



CO₂ synergy: transforming Emirates Steel Arkan emissions into enhanced oil recovery solution for ADNOC

Emirates Steel Arkan, a leading steel manufacturer, joined forces with Alreyadah and ADNOC in 2016 to address the pressing issue of carbon dioxide (CO₂) emissions. Their collaborative effort aimed to capture CO₂ from Emirates Steel Arkan's direct reduction plant 1 and 2, purify it through Alreyadah's advanced processes, and then supply it to ADNOC for enhanced oil recovery. To achieve this, Emirates Steel Arkan strategically installed two carbon removal facilities on their premises, effectively capturing CO₂ from the process gas with a carbon capture capacity of 800,000 tonnes of CO₂ annually. This innovative approach resulted in a significant reduction of 22% in Emirates Steel Arkan's CO₂ emissions.

The collaboration between Emirates Steel Arkan, Alreyadah, and ADNOC showcases the potential of cross-industry cooperation in tackling global environmental challenges. The deployment of carbon removal facilities demonstrates a proactive approach towards sustainable manufacturing practices, aligning with the global efforts to achieve net-zero emissions. Moreover, this initiative aligns with the United Arab Emirates' (UAE) commitment to the Paris Agreement and its national goal of reducing greenhouse gas emissions.

The exhaust gas from steel is introduced into a CO₂ removal unit, where the first stage involves capturing CO₂ using an amine solution in a packed column called the absorber. As CO₂ is captured, the purified gas exits from the top of the system. Subsequently, the CO₂ is released from the solution in another column known as the stripper. In the stripper, the solution is heated to release the CO₂ in a concentrated form. This concentrated CO₂ is then sent to the Alreyadah plant for additional cleaning and purification before undergoing compression and being transported to ADNOC. It is worth noting that the success of this collaboration relies on the utilisation of Alreyadah's advanced purification processes, which play a critical role in ensuring the quality and purity of the captured CO₂.

In conclusion, the partnership between Emirates Steel Arkan, Alreyadah, and ADNOC represents a significant step forward in addressing the challenge of CO₂ emissions in the steel manufacturing industry. By capturing, purifying, and utilising CO₂ for enhanced oil recovery, these companies demonstrate a commitment to sustainable practices and contribute to the global efforts to combat climate change. This collaboration serves as a remarkable example of how cross-sector partnerships can drive environmental innovation and accelerate the transition towards a more sustainable future.

Excellence in low-carbon steel production

POSCO



HMR70 steelmaking technology in combined blowing converter

One way for steelmakers to reduce their carbon footprint is to lower the ratio of hot metal (HMR); another means to lower emissions is to introduce electric arc furnaces (EAF), which we are scheduled to adopt from 2026. To meet growing automaker demands for low-carbon steel, it is imperative to develop low-HMR solutions that can be applied prior to EAF installation.

The company has developed two HMR reduction solutions that compensate for heat loss while making use of existing facilities. The first solution, called POSLEAD, involves the reuse of molten steel that remains after the casting process. The second solution utilises high-silicon (Si) pig iron or scrap.

POSLEAD is our proprietary technology that collects residual molten steel from continuous casting and repeatedly pours it into the ladle in order to add heat. Through POSLEAD, HMR is reduced to approximately 68% and CO₂ intensity to 1.78 tonnes per tonne of steel.

We have also identified ways to leverage the advantages inherent in high-Si molten iron and scrap. At Steelworks P, where FINEX is available, we optimised processes and patterns for BOF with high Si-containing molten iron. At Steelworks G, where high-Si molten iron is not available, we utilise high-Si electrical steel (e-steel) scrap.

Both high-Si molten iron and e-steel scrap can serve as heat sources, and the use of e-steel scrap mitigates quality risks owing to its low impurity content. From late 2022, we have been able to reduce HMR down to approximately 70% (HMR 70). Our carbon footprint decreased from 2.06 tonnes to 1.84 tonnes per tonne of steel.

HMR 70 technologies allow us to meet the growing need for low-carbon steel. As an interim solution prior to introducing EAFs, we expect to supply about 600,000 tonnes of HMR 70 steel annually, removing 440,000 tonnes of CO₂ emissions.

Innovation of the year

WINNER: Big River Steel, a US Steel Company



Development of a high-strength, high-formable, lean, single-phase, nano-precipitation strengthened sheet steel for automotive applications with a minimum tensile strength of 780MPa

The present invention provides a technological breakthrough in new product innovation through electric arc furnace (EAF) steelmaking and crude steel production (CSP) mini mills using 100% steel scrap in EAF for steelmaking and continuous production from casting to hot rolling and coiling.

The product is a single-phase, lean-alloyed ferritic steel with uniformly distributed nano precipitates of TiC (2-4nm in size), deriving a tensile strength of minimum 780MPa in the final hot rolled steel. The sheet steel manifests high formability indexes such as a hole expansion ratio of more than 40% and forming strain limits compared to equivalent strength Dual-phase 780, Multiphase 780 and Ferritic-Bainitic 600 steel grades.

The steel can be supplied in both uncoated and coated conditions with similar product properties. The strength guarantee in hot rolled coil itself eliminates the need for cold rolling and high-temperature annealing. Performance trial at customer sites indicated outstanding steel and edge retention capability formability in stamped parts that outsmarts highly costlier AHSS steels e.g., Dual phase 780.

High formability is imparted by a single-phase ferrite matrix, absence of second-phase Fe-carbides at grain boundaries, extreme cleanliness of the matrix and absence of chemical segregation at the centre and microstructural banding. The weldability of the steel is outstanding due to the very low carbon equivalence value of the composition (CIW <0.30).

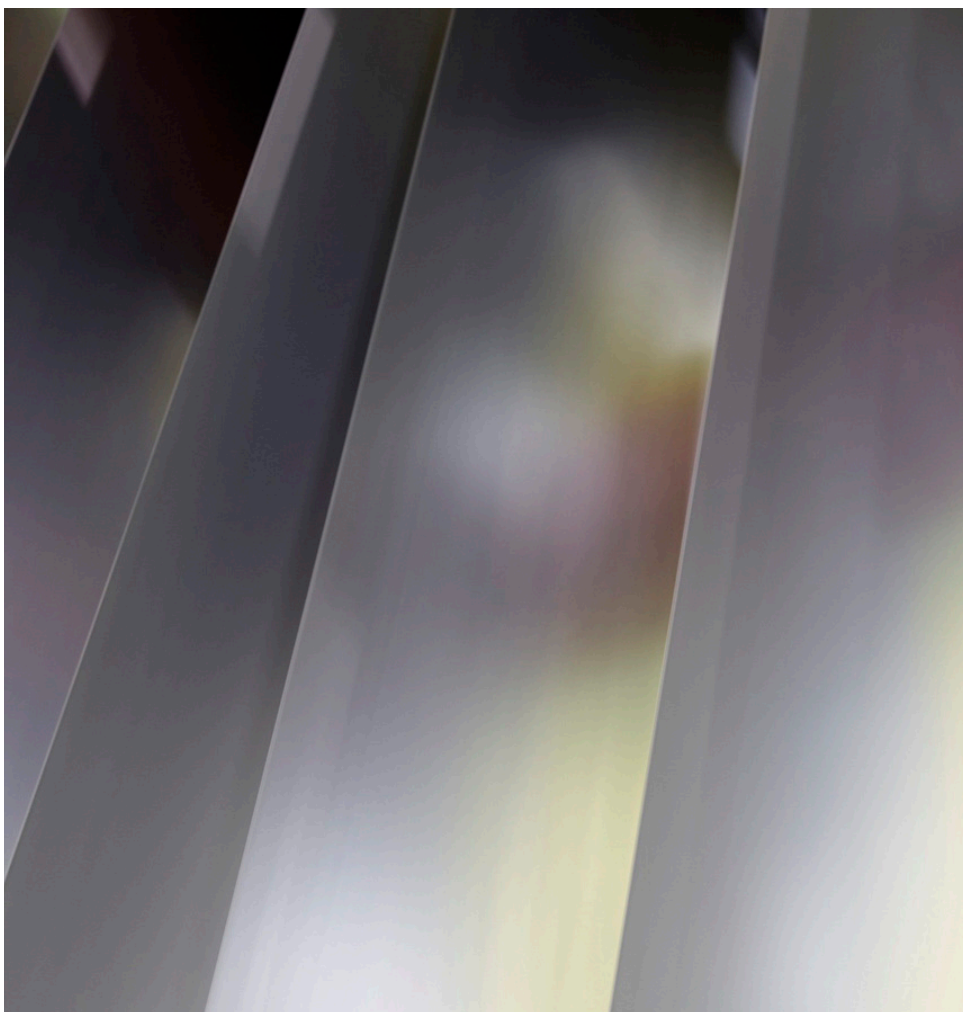
The steel has nano-sized TiC in the matrix, which also imparts great resistance to hydrogen-induced cracking in H₂-containing atmospheres. The steel composition is 0.06C-1.5Mn-0.30Si-0.15Ti-0.03Al (wt.% max).

The steel is made in EAF with almost 100% scrap and then continuously cast in a thin slab caster at high casting rates of 4.0-4.8m/min and then continuously hot rolled into coils.

The processing thus generates the lowest CO₂ emissions per tonne of hot rolled steel made (scope 1 + scope 2) and is calculated to be a mere 410kg per tonne of hot rolled coil made, which is almost 83-85% lesser than that emitted by other conventional steel manufacturing.

Innovation of the year

Ansteel Group Corporation Limited



Integrated design of single chemistry of multi-grade AHSS and industrial application

The widespread application of advanced high-strength steel (AHSS) is a critical way to lighten automobiles, which is conducive to energy conservation, emissions reduction, and improved safety.

However, in order to meet the different requirements (such as high formability, easy welding, high surface, and liquid brittleness resistance), the production process of high-strength steel for automobiles often faces complicated component design, high energy consumption and low efficiency, which not only leads to high production and manufacturing costs, but also significantly increases CO₂ emissions per tonne of steel.

Therefore, Ansteel launched a revolutionising steel manufacturing technique based on the 'plain material' concept. More specifically, the technique first designs a unified alloy composition of targeted products by material integration calculation. Then it constructs multiple microstructures with process adjustments to achieve the final mechanical properties of the steel products with multiple strength levels.

With the successful application in AHSS, the technique makes the material's genetic engineering technology be applied in industrial production, building a brand new integrated design platform for the entire process and opening up a new path of 'low-carbon, low-cost, high-performance' green and intelligent manufacturing in the steel industry.

The technique has been conducted at Ansteel, and more than ten types of XPAsteel® products in the 590, 780, 980, and 1180MPa grades have been produced. With an output of over 34,900 tonnes yearly, over 6,980 tonnes of crude steel are eliminated, and 11,590 fewer tonnes of CO₂ are emitted annually, and the revenue reached 38,606,170 euros.

This technology was shortlisted for the 2022 Scientific Innovation China Pilot Technology (low-carbon green manufacturing field).

Innovation of the year

China Baowu Steel Group Corporation Limited



Technology and development of Fe-Ni-based alloys wide and heavy plates in the photovoltaic industry

Fe-Ni-based alloy wide and heavy plates are in large-scale demand from the rapidly developing worldwide photovoltaic (PV) industry and are designed to solve constraints, such as limited product size, low production efficiency, low qualification rate of ultrasonic tests, low yield and so on. Compared with the currently widely used die casting and non-commonly used vertical continuous casting processes, in 2022, TISCO originally put forward innovative schemes, i.e. alloy N08810 being cast to 200mm large slabs with wide vertical bending continuous casting and vacuum sealing welding bonding to thickness 400mm billets process, and then rolled into 97mm of thickness wide heavy plate with unit weight of 13 tonnes; as well as alloy N08120 being cast to 200mm large slabs with wide vertical bending continuous casting process, and then rolled into 67mm wide heavy plate with unit weight of 8 tonnes.

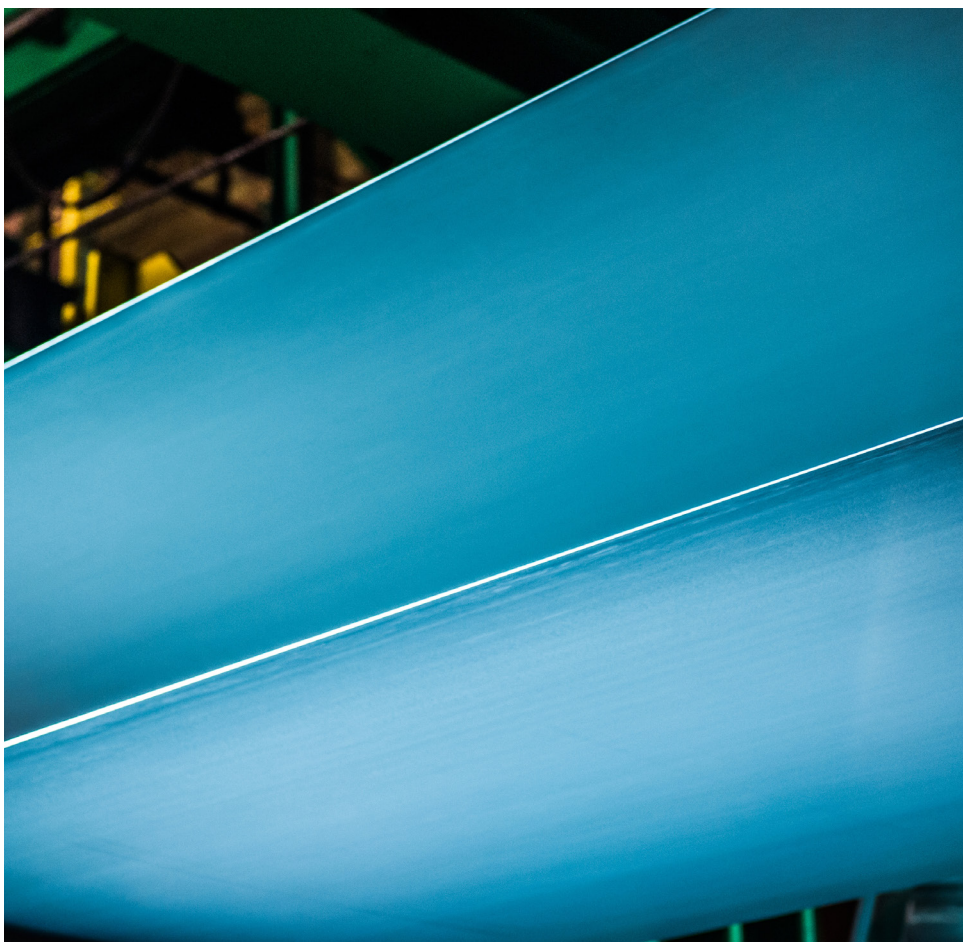
In both schemes, the plate weight and width enjoy a leading position globally. The innovative solutions reduce the number of welds in poly-crystal silicon reactors, cut the consumption of expensive welding materials, lower the emissions during welding, and realise the short-process manufacturing of Fe-Ni-based alloy wide heavy plates. The energy consumption per tonne of steel and the emission intensity to air are reduced by about 9% respectively. Within 2 years of mass production, nearly 20,000 tonnes of wide heavy plates were delivered to more than 100 poly-crystal silicon reactors, which produced poly-crystal silicon for the PV industry that reduced CO₂ emissions by about 1 billion tonnes per annum compared with coal-fired power generation industry.

Compared with the die casting process, the new schemes improve yield by about 18%, the qualification rate by about 46%, and shorten the product delivery cycle from nearly 3 months to less than 2 months. The traditional operation time of the die-casting process applied by other suppliers is generally about 100 days due to the life limit of the ingot mould, while the innovative process scheme can realise quasi-continuous operation. The Fe-Ni-based alloy wide heavy plate produced with the new scheme has better ultrasonic test results, improved high-temperature performance and more uniform grain size.

Besides being widely used in poly-crystal silicon reactors in the PV industry, the plates have also been applied extensively in chemical and environmental protection industries, such as PVC reactors and metallurgical waste acid regenerative roasters. The project has achieved outstanding social and economic benefits and contributed considerably to sustainable development.

Innovation of the year

JFE Steel Corporation



Water-quench type 1.5GPa ultra-high strength cold rolled steel sheet and new cold pressing technology for automotive parts

With the aim of reducing CO₂ emissions, gasoline engine vehicles are improving fuel efficiency by reducing body weight, and sales of electric vehicles are increasing.

Additionally, the protection of occupants and the battery during a collision is also important, and therefore, in recent years, the number of parts with strength exceeding 1.5 GPa has been increasing. Hot stamping is widely used to produce these parts. It has excellent formability compared with the conventional cold press but has problems with material properties and CO₂ emissions in the heating process.

In order to overcome these problems, JFE Steel has developed a full-martensite type 1.5 GPa steel (1.5G-MS) and cold press forming technologies that can produce parts with complex shapes. 1.5G-MS is produced by a unique water-quench with a cooling rate exceeding 1,000°C/s based on a continuous annealing process and has superior delayed fracture properties due to high uniformity of microstructure and low alloy design, and superior crash-worthiness due to higher yield strength compared to hot stamped parts.

On the other hand, in the cold press using 1.5G-MS, fractures during pressing and poor dimensional accuracy of parts due to springback are major challenges. In response to these problems, JFE Steel proposed a 'pre-forming concept', and then developed a 'stress reverse forming™' for long curved parts for which it is difficult to ensure dimensional accuracy.

This technology utilises the Bauschinger effect (the phenomenon whereby yield stress is reduced when stress is reversed), which occurs remarkably in high-strength steel sheets. In this technology, the stress at the press bottom dead centre, which is a factor of spring back, is greatly reduced, and therefore, the dimensional accuracy can be greatly improved.

Substitution of cold press-formed 1.5G-MS for parts that had been produced by the hot stamping process until now is progressing. In addition to the world's first use in roof centre reinforcements, 1.5G-MS has been adopted in many structural parts of the Toyota Prius.

JFE Steel believe these technologies will contribute significantly to the spread of electric vehicles in the future.

Innovation of the year

voestalpine AG



Tailormade functional steel (tfs)

For the first time, tailormade functional steel (tfs) technology offers the possibility of 'digitising' steel as a material and thus the possibility of recording data directly on the steel surface and forwarding it in real-time. Thus, steel becomes a 'smart product', completely opening up new application opportunities and market fields. Steel, the material, becomes part of the Internet of Things.

The tfs product is a hot-dip galvanised, organic-coated steel with conductor tracks embedded in the coating layer. These printed conductive structures on steel surfaces were not state-of-the-art before this initiative. This made it possible for voestalpine to apply for several patents in this field. Printed conductive structures existed at that time in the field of plastic films or wood, but not on steel surfaces. Screen printing technology was used to print designs, i.e. different colours, but no functional layers of silver.

This enabled voestalpine to move from purely optical effects to active functional layers. Conductive structures are printed on the hot-dip galvanised steel strip surface, insulation layers and a top coating complete the layer structure. In combination with a power source and appropriate contacting, tfs can take on a variety of functions.

One possible functionality of the integrated conductive tracks is resistance heating, both in the low-voltage range and with 230 V. Due to surface temperatures of up to 100°C, tfs also reaches the infrared range, i.e. a pleasant radiant heat. In addition, there is a wide range of possible applications in preventing condensation and ice formation at ambient temperatures down to -40°C (in refrigerators). Warming shelves for food are already successfully in use. Detection of the load status of shelves or lockers. This can be used, for example, to avoid a loss of turnover due to "out-of-stock" situations in retail or to increase the 'rotation' of parcel and locker systems. The integrated sensor technology turns a surface of any size into a control element. The capacitive sensors react to every touch and control, for example, the lighting or open doors. Another tfs functionality is 'Structural Health/Condition Monitoring'. This means the detection of changes or damage to structures, e.g., burglary detection and the detection of vandalism by triggering an alarm.

tfs is not a ready-made product, but a technology that can be optimally applied to different areas of application. The conductor paths are designed individually for the customer and adapted to the functional requirements.

Excellence in sustainability

WINNER: POSCO



Fe-enhanced slag silicate fertilizer: How application of blast furnace slag reduces methane emissions in rice farming

Rice is the staple food in South Korea. Every year, 3.8 million tonnes of rice are harvested, accounting for a staggering 87% of the national crop production. However, in our country, rice farming has inherent challenges.

First, soil that lacks calcium and magnesium has poor nutrient retention capacity, creating an unfavourable condition for crop growth. Second, the constant presence of water in flooded rice paddies interferes with the passage of oxygen into the soil. Lack of oxygen in soil is an ideal condition for anaerobic microorganisms that produce methane through the decomposition of organic matter. Silicate fertilizer can be a solution for these two obstacles.

Since 1973, we have supplied 14 million tonnes of blast furnace (BF) slag, a core ingredient of silicate fertilizer, to the farming industry. Thirty to forty percent of the slag generated during the BF ironmaking process is composed of calcium and magnesium, nutrients that prevent soil acidification. In addition, silica, a key rice stem nutrient, makes up 35% of BF slag.

Rice cultivation impacts the environment. In our country, flooded rice paddies are responsible for 21% (230,000 tonnes) of the annual national production of methane. However, collaborative research with a university revealed that iron ions (Fe^{3+}) found in BF slag can inhibit the activity of methanogens and reduce methane emissions in rice farming.

Additionally, the research has found that, 1.5 tonnes of slag-based silicate fertilizer can slash methane emissions by 14% per hectare of rice paddy (27,000 tonnes of methane avoided from 2018 to 2022). Furthermore, by developing Fe-enhanced slag fertilizer, we achieved the dual benefit of recycling steelmaking by-products and enhancing avoided GHG emissions. With 2.5wt% iron content increase, this premium fertilizer cuts methane emissions by 33%, more than twice that of conventional slag fertilizers (14%). With the goal to maximise avoided GHG emissions, we intend to export Fe-enhanced fertilizers to other rice-producing Asian countries.

Excellence in sustainability

China Baowu Steel Group Corporation Limited



The complete set of process, equipment and demonstration of green and efficient rotary hearth furnace collaborative treatment of solid and hazardous waste in iron and steel plant

China produces about 100 million tonnes of iron and steel metallurgical dust every year, including about 25 million tonnes of iron and zinc dust with a large amount of zinc, iron, carbon, and other elements.

Returning to sintering will enhance the smooth operation of the blast furnace. The direct reduction technology of the rotary hearth furnace is used to effectively recycle valuable elements such as iron, zinc, and carbon. The metallised pellets are used for ironmaking or steelmaking. Zinc oxide powder is sold to zinc smelters, and by-product steam is incorporated into the plant pipeline network or directly generates electricity. All of these enable the recycling and harmless disposal of metallurgical solid waste, helping to achieve the global goal of peak carbon and carbon neutrality.

This project has enabled the coordinated treatment of multi-source solid and hazardous waste in the steel plant, and the integration and innovation of key equipment such as a new types of powerful mixers, double-roller briquetting machines, metallised pellet cooling cylinders, and super-strong belt driers, reducing the complete machine investment and spare parts cost, and the time of maintenance. The optimised process such as oxygen-enriched combustion and frequency conversion fan transformation can reduce energy consumption.

Big data, 5G and other technical means have been employed to build an intelligent operation and control platform for information interconnection and data sharing of one headquarters and multiple bases of the rotary hearth furnace, to ensure its lean, efficient, and stable operation.

In the project, nine production lines are set up respectively in Zhanjiang, Shaoguan, Guangdong, Jiangsu Yonggang, Hubei Wuhan, Shanghai, Baosteel and Jiangxi Xinyu. It features the largest-scale rotary hearth furnace production line in the world with a cumulative processing capacity of 2 million tonnes per year, which contributes to solid waste of steel plants' not leaving the factory, and effectively promotes the cycle of the global economy and efficient resource utilisation.

Excellence in sustainability

JSW Steel Limited



Waste plastic injection in blast furnace

According to reports (UNIDO Report - Recycling of Plastics in Indian perspective by Dr. Smita Mohanty and cpcb.nic.in), the Central Pollution Control Board (CPCB) has estimated that India generates approximately 9.4 million tonnes per annum of plastic waste, (which amounts to 26,000 tonnes of waste per day), and out of this approximately 5.6 million tonnes per annum of plastic waste are recycled (i.e. 15,600 tonnes of waste per day). 3.8 million tonnes per annum of plastic waste is left uncollected or littered (9,400 tonnes of waste per day), which possibly ends up in landfills. This renders the energy in plastic waste useless whilst causing significant soil and water pollution.

We successfully demonstrated the injection of waste plastic in a blast furnace through lance setup in the tuyere. We are the first in India to have done this successfully. Our team at JSW Steel utilised mixed grade waste plastic in the form of 3 to 5 mm granules with and without PCI. The plastic was injected using a coaxial lance set up in one of the 36 tuyeres in blast furnace 3 at our Vijayanagar facility.

This comes after multiple trials conducted over the past year using various types of plastics, injection setups and feeding mechanisms. The team leveraged their previous learnings to make active adjustments to the set up and make this trial successful. As we move forward, we are actively engaging with local municipal corporations and waste plastic vendors. Through these collaborations, we aim to establish a reliable and sustainable source of plastic for injection. We remain committed to scaling up our plastic injection rate to higher levels, further reducing our carbon footprint.

As a result of the project trials and the development work at our Vijayanagar facility, the following benefits are estimated to be achieved:

1. Usage of 5 kg/thm of waste plastics resulting in about 50,000 tonnes of waste plastics being avoided in landfills in the current production scenario and ramping it up to 50 kg/thm subsequently post successful injections.
2. The avoidance of equivalent tonnage of coke in blast furnace resulting in avoidance of ~14,000 tonnes of CO₂ and ultimately to 140,000 tonnes of CO₂ avoidance at 50 kg/thm plastic injections.
3. Creation of 9 new jobs within the local community.

Excellence in sustainability

Mobarakeh Steel Company (MSC)



'Sustainable Water Management by Creating Shared Value with Local Communities'

The management of water and its consumption has emerged as a prominent global topic in sustainable development. In regions like central parts of Iran, where climate change has resulted in prolonged droughts, water has become an essential resource. The local communities in these areas have developed a heightened awareness about the importance of water and are concerned about their future prospects. Simultaneously, various industries, including steel manufacturers, operate in this region and rely heavily on water for their survival and business operations. Hence, it is crucial to establish a delicate equilibrium between the consumption of this invaluable resource by both the local communities and industries operating there. Achieving such balance holds significant importance for all stakeholders involved.

In recent years, the management of water consumption has emerged as a significant concern for MSC. In alignment with its management philosophy of being a responsible company that strives to create a better future, MSC is actively seeking approaches to meet its water supply needs while considering the needs and expectations of local communities. Through the implementation of these approaches, MSC guarantees a better future for those involved. To achieve this goal, MSC has developed and implemented the Sustainable Water Management by Creating Shared Value with Local Communities' project, which focuses on utilising industrial and urban wastewater as well as recycling water in the production process. By adopting this program, MSC aims to address the issue of sustainable water management effectively.

In this project, sustainable water management is carried out through development and improvement of the wastewater system of the neighbouring cities of the company, and the transfer and treatment of their wastewater for using in the production process. This includes recycling and retreatment of industrial wastewater, and storage of excess treated wastewater and rainwater for use in water shortage conditions. It also includes the design and implementation of a smart water distribution network monitoring and control system (SCADA: Supervisory Control and Data Acquisition) to manage water consumption, use of low-quality water (RO water) for processes that do not require high quality water, and use of blowdown water from one unit for cooling slags.

Excellence in sustainability

Ternium and Tenaris



ProPymes: Ternium and Tenaris value chain strengthening programme

Over the last two years, ProPymes has focused on developing the capabilities of company supply chains, and has reinforced the key sustainability axis of environment, industry 4.0, and quality technical education. To achieve this, training courses were offered to the different SMEs within the companies' value chain. As a result, over 5,300 participants, attended 94,462 hours in class during 2022.

The programme's achievements are communicated internally and externally through:

- LinkedIn, Facebook, Twitter, and Instagram
- Radio, newspapers, and specialised magazines and publications
- ProPymes webpage
- Internal newsletter
- Media events and conventions

Leadership and replicability:

- ProPymes is a replicable programme launched in 2002 in Argentina, from 72 participants to more than 2,000 in Argentina and México.
- Connects SMEs with government entities and industry chambers by promoting participation in events and conventions to discuss the sector's economic context.

Relevance and criticality - ProPymes is a complete programme across the three sustainability approaches:

- Economic: with the strengthening and improvement of competitiveness of the value chain.
- Social: ProPymes is involved in each region where it is located, through its customers and suppliers by empowering local technical schools in their knowledge and future.
- Environment: where promotes and leads, in an integrated way, the environmental performance of the steel industry and its value chain.

A fortified value chain ultimately promotes the development of a strong local industrial infrastructure in the company key markets, driving increased steel demand and improved competitiveness.

Excellence in Life Cycle Assessment

WINNER: CITIC PACIFIC Special Steel Group Co., Ltd

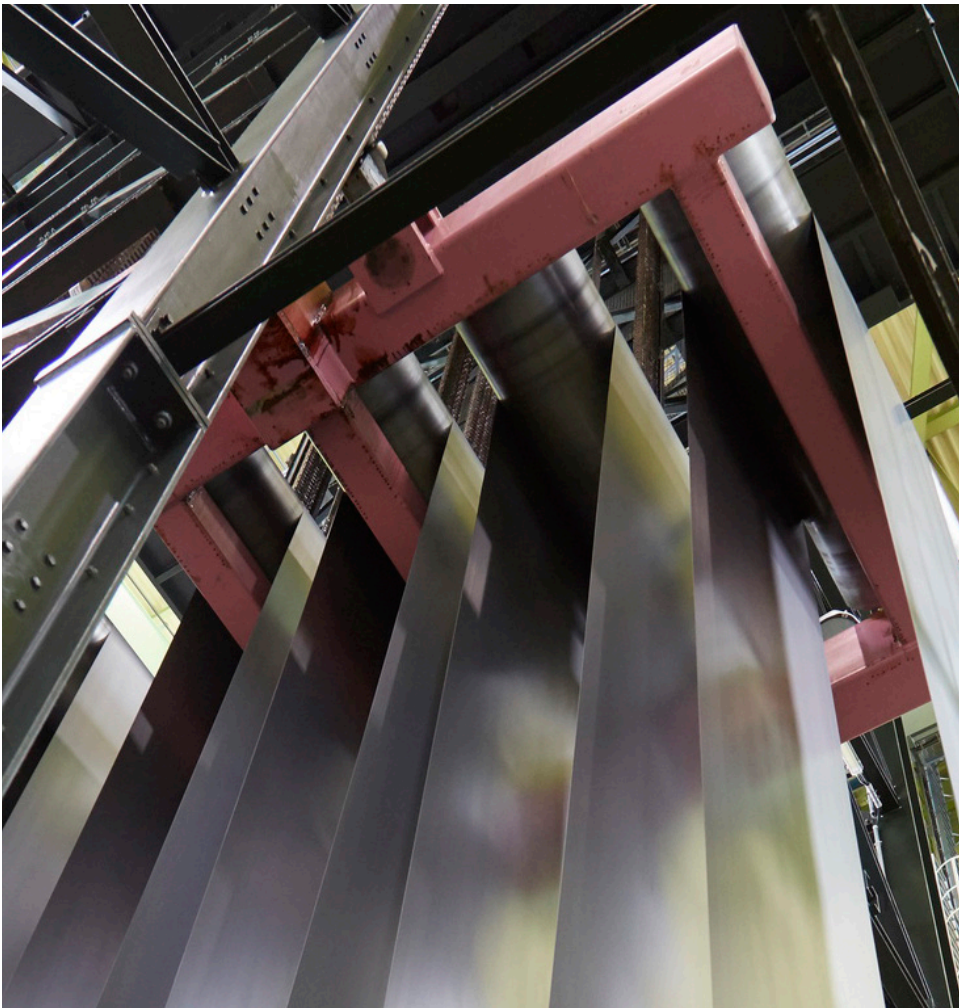
Innovation practice in China's first Product Category Rule (PCR) for special steel used in automotive components

CITIC PACIFIC Special Steel has developed the Product Category Rule (PCR) for special steel used in automotive components in China. In this PCR, it introduces a new environmental benefits quantification model, which can be used to provide quantitative assessments of material characteristics.

The project aims to facilitate and promote the development of green, low-carbon special steel materials, significantly reducing steel consumption, lowering energy usage during auto part making and car operation, and ultimately decreasing costs throughout the automotive industry chain while reducing pollutants and CO₂ emissions.

This project has set a model for China's low-carbon policymaking, and it will guide the release of low-carbon policies in more areas and the creation of scientific and quantitative methods to enhance China's carbon reduction participation.

CITIC PACIFIC Special Steel has created the environmental benefit related to remanufacturing, which is one of the important areas of the circular economy, with a quantitative evaluation model and will guide the rapid development of related industries with huge economic and social benefits in store.



Excellence in Life Cycle Assessment

Baotou Iron & Steel (Group) Co.Ltd

Develop green steel with LCA and jointly carry out eco-design with mine vehicle enterprises



Baotou Steel has implemented LCA to investigate the environmental performance of ordinary wear-resistant steel and rare earth wear-resistant steel. The eco-design research has been carried out together with manufacturing enterprises of mine vehicles.

It found that the wear resistance of rare earth wear-resistant steel (BTNM450) is improved by 26.4% compared with ordinary wear-resistant steel through inspecting of manufactured rare earth wear-resistant steel. The product performances are improved, and the service life is significantly prolonged.

The improvement of wear-resistant properties helped to lightweight the mine car bucket with the rare earth wear-resistant steel. Take the large mine car as an example; the weight of the mine car bucket with rare earth wear-resistant steel is 20% (about 9 t.) lighter than that of a mine car bucket with ordinary wear-resistant steel, which could reduce about 34.2 L. fuel consumption per 100 kilometres and the energy consumption and costs for the users could be significantly reduced as well.

The excellent performance and low-carbon properties of rare earth wear-resistant steel increased their sales enormously. From June to July of 2023, their sales have already reached 7,000 tonnes, which is 2,000 tonnes more than the annual sales of 2022. This steel product also benefited the mine vehicle enterprise and reduced their cost by RMB 3.52416 million yuan.

Excellence in Life Cycle Assessment

China Baowu Steel Group Corporation Limited



Application of Baosteel's online detailed LCA platform

Baosteel's LCA team has built an online detailed LCA platform for steel products, which can implement a prompt and consistent LCA study in a similar way as mechanical performance testing. The LCA platform has been used to evaluate the low-carbon product needs of 48 users in automobiles, home appliances, construction, energy industries, etc., of which 10 have entered the technical requirements negotiation stage.

This LCA platform enables:

1. Carbon footprinting of each product (steel coil). The carbon footprint of any product range can be obtained based on the platform, such as specific grades, given batches, end users, etc;
2. Environmental footprint calculation and LCA reporting of products for third-party verification and disclosure to customers;
3. Online analysis of environmental impacts of products under different production paths and processes, providing optimisation suggestions to the research department.

Based on the analysis model, process engineers compared the intermediate product data of the same standard cold product from Baosteel's Baoshan and Dongshan and discovered an opportunity for improvement, which ended up resulting in a 3% reduction in CO₂ emissions of the product by adjusting the heating process.

The platform has also been used for supporting its low-carbon strategic cooperation project with the automotive manufacturing company.

Excellence in Life Cycle Assessment

China Steel Corporation (CSC)

Green transition in the steel industry: China Steel Corporation leads carbon footprint inventory and innovation based on LCA



China Steel Corporation (CSC) has been actively implementing the concept of product lifecycle to calculate the carbon footprint of its products. CSC conducted product footprint inventories in 2012, 2017, and 2022, and all of them were verified by third parties.

Combining the existing comprehensive Enterprise Resource Planning (ERP) system and greenhouse gas inventory experience, CSC built the “Standard Product CO₂ Emission Intensity System” (SPCO₂)” with an innovative approach and expanded the carbon calculation function in the existing system, which will not only help CSC choose low-carbon production paths to produce products, but will also have opportunities to calculate the lowest production cost when carbon pricing occurs in the future, which will help improve the company’s profitability.

In addition, CSC established the Carbon Management Advisory Team in 2022, sharing advanced carbon reduction experiences with customers and the concept of LCA. Based on the customer’s on-site equipment and energy usage conditions, CSC proposes customised improvement suggestions that consider budget and site constraints, identifies carbon reduction hotspots, and creates energy-saving effects.

It is estimated that the total potential reduction in carbon emissions for companies under advisory reaches 2,624.3 tonnes of CO₂e, the potential electricity savings amount to 4,874 kilowatt-hours per year, and the economic benefits amount to 15.26 million NTD per year, leading the industrial chain to reduce carbon and create economic benefits.

Excellence in Life Cycle Assessment

JSW Steel Limited



Using LCA in new advanced high strength steel product development and promotion

JSW Steel has implemented LCA to validate the sustainability claims of their new steel products - AHSS CRCA 980 -for automotive steel application. The LCA has been used to quantify the environmental footprint of AHSS CRCA 980 and identify areas for improvement.

Compared to the baseline product (CRCA 590 and 780 grade), AHSS CRCA 980 enables a significant reduction in steel consumption (12%) in various auto parts. By using AHSS CRCA 980 for various automotive parts (frame front seat back, reinforcement front body, pillar, lower inner, reinforcement front floor panel), it reduced the weight of the steel production part from 33.23 kg (base steel CRCA 590 & 780) to 29.67 kg. After stamping and cutting in the part production, 27.08 kg AHSS CRCA 980 finally goes into the vehicle as against the previous weight of 30.33 kg, which helps to reduce the environmental performance through the life cycle.

In FY 2022-23, JSW Steel has replaced ~700 tonnes of CRCA 590 & 780 with AHSS CRCA 980, thus delivering benefits to the customers. It helps customers reduce 11,165 tonnes of CO₂ scope 3 emissions in FY 22-23.

Excellence in Life Cycle Assessment

POSCO



LCA-based case studies on avoided emissions measurement

POSCO has collaborated with external partners to develop the 'Accounting and Reporting Guidelines for Avoided GHG Emissions along the Value Chain of Steel Products and By-products' (hereafter "the Guidelines") (KBSCD, KOSA, 2021) and has performed 8 case studies on avoided emissions.

The case studies cover 8 eco-friendly products that contribute most to emissions reduction throughout their lifecycle. Product sales volumes, GHG reduction effects, and substitution effects on an LCA basis were used as indicators for quantifying the contribution.

According to the project, they found that by increasing production of low-carbon steel, their sales increased dramatically across their eco-friendly product portfolio in 2022: 655% in high-strength automotive steel plates, 118% in high-efficiency steel plates, and 182% in granulated slag cement. This project also helped to set synergies across the value chain.

The case studies were shared with industry stakeholders at an international seminar that they hosted on the theme of sustainable steel and industry competitiveness in the context of low-carbon supply chains.

Excellence in education and training

WINNER: Ternium



From conventional classroom training to high-engagement immersive training for operators using virtual reality – development of a continuous casting simulator

A modern continuous casting operation must strive constantly for operational excellence to succeed in a complex and competitive business environment. Operational errors, especially in the mould area, may result in operational incidents with severe implications for personnel safety, production losses and maintenance costs. Overcoming these critical situations requires essential abilities like knowledge of the operational procedures and hands-on skills as well as physical and mental capabilities, which need to be developed and evaluated on frequently in a controlled and safe environment.

Through a truly innovative approach, the established low-engagement classroom training utilising written procedures and videos of past occurrences was replaced by a high-engagement training method, designed as a serious game based on virtual reality technology. The continuous casting simulator designed by Ternium, which provides an immersive training experience, was built using commercial off-the-shelf VR hardware and a physical stopper lever as a joystick input. The developed software running on a PC workstation inside the game engine comprises the virtual 3D model, a mathematical model for the steel flow and a module for evaluating the standard operational procedures in real-time.

The simulator is used today for training newly contracted operators before operating the actual continuous caster, frequent checks of the capabilities of operators in dealing with critical situations as well as a tool for evaluating the emotional, mental and physical condition of operators. By integrating this innovative technology, Ternium is convinced of making a considerable step to develop a safer and more skilled workforce.

Excellence in education and training

China Baowu Steel Group Corporation Limited



Rotation training programme for frontline employees

With the continuous expansion of China Baowu Steel Group and the deepening of the intelligent manufacturing transformation, it is becoming increasingly urgent to accelerate the integration of corporate culture and the cultivation of composite technical and skilled talents that adapt to the development trend of technology. To this end, Baowu launched the rotation training programme for frontline employees on July 23, 2021.

By creating a “cohesion+service+empowerment” learning platform, Baowu has helped consolidate the consensus on the concept of “One Shared Baowu” among frontline employees, has guided employees to establish the sense of transforming and developing towards composite talents with the feature of interdisciplinary, cross-process, and cross-interface, and has effectively driven employees to transform into learning employees.

As of now, a total of 26 training sessions have been implemented, with 298 shifts being carried out. Nearly 17,000 frontline employees from 531 subsidiaries of 35 tier-I subsidiaries participated in the programme, 78.94% of which came from newly merged units. Baowu’s training hours per capita in 2021 and 2022 were 120.20 hours and 138.02 hours, an increase of 18.31% and 38.85%, respectively, compared to 2020 (101.6 hours).

Excellence in education and training

Gerda S.A.



Culture path – openness with truth and respect

The Culture path aims to train the company's entire leadership in Gerda Culture behaviours to achieve our aspiration:

We will be, within 10 years, one of the safest, most profitable and admired companies in the global steel value chain, and one of the most important in the Americas.

The three behaviours that underpin our culture are:

- Openness with truth and respect
- Raising the bar every day
- Ownership mindset

To disseminate our practice of 'openness with truth and respect', the following learning tools were developed:

- Pre-workshop, i.e. two online courses on Gerda Culture: Gerda climb and tools that leverage our culture
- Workshop on openness with truth and respect

The aim of the six-hour workshop is for leaders to reinforce the concept of openness with truth and respect, and for attendees to engage in activities such as case resolution, discussions and role playing that involve practical situations for applying this Gerda culture behaviour. One innovation involved leaders in delivering the workshops, together with an HR professional.

The objective is for the results to be reflected in opinion surveys, attracting and retaining talents and applying the behaviour to the organisation's routine conversations, thus generating innovation, critical thinking, continuous improvement and expansion of business results.

4,196 company leaders with global reach participated in the training

99% of participants rated the workshop as very good or good.

92% of participants rated the content as highly applicable to their work.

82% of participants rated the workshop as a 9 or 10.

Excellence in education and training

JFE Steel Corporation



Achieving a smooth skill transfer method by systematising work standards

Many steel mills handle flammable gases, and a worker's error can lead to serious accidents such as explosions and CO poisoning. In the past, experienced operators carried out such gas handling operations with the skills and know-how accumulated through years of experience.

However, a generational shift in employees has progressed, and the personnel structure has become extremely young. (As of April 2022, the ratio of employees who have worked less than 10 years was approximately 45%.)

We have developed an online and tablet-based technology acquisition support system and a task support system that enable inexperienced employees to reliably learn tasks. We named the system J-SOAS (JFE's Safety Operating Assistance System).

Work standards, which were previously paper documents, have been digitised to make work procedures visible on smartphones and tablets.

- It has become possible to guide work procedures using smartphones and tablets at work sites.
- During the actual OJT training, it has become easier for instructors and colleagues to manage the work's progress and look back after the work.

As a result, it has become possible to use this system to teach safe and efficient work procedures to less experienced workers. It works effectively for skill transfer in gas handling operations, which are infrequent and often unsteady.

At present, its use has expanded to include periodic inspections of equipment and condition-setting work. As of April 2023, this system has been deployed to all of the company's steel mills.

Excellence in education and training

JSW Steel Limited



Action Learning Projects at JSW by cross-functional teams: New ideas for business and strategic optimisation

Action Learning Project (ALP) at JSW involves the identification of topics, planning and implementation of the project geared towards achieving a desired outcome. These ALPs have the potential for organisational change, as a successful project may lead to new processes, systems, or strategies that can improve the organisation's overall performance.

The process involves determining the project goals and the team composition, which is heterogeneous in nature. The members in the group are spread across functions, location and grade seniority. Over a period of time, our ALPs have evolved and are mostly around sustainability, digitisation and the enhancement of people practices, knowledge and competencies.

Most ALPs have been implemented, and some also have a wide range of possible business impacts. In the year 2022, 132 projects from the Technical Leaders Programme, FutureFit Leaders Programme, Summer Internship and Management Internship Programmes have resulted in potential annual savings of INR 1683 Cr.

So far, year on year through our internship programmes we had more than 200 new projects and ideas and innovative ways of working ideas generated with 50% of them being utilised. The Technical Leaders Programme, which kick-started last year, is also a year-on-year programme to develop at least 1,000 technical leaders in the next five years, potentially resulting in overall estimated savings of INR 3188 Cr.

This is a continuous process at JSW. The identified leaders will be taking up future technical leadership roles at JSW spearheading technical projects.

Excellence in education and training

POSCO



Technician-level designation and Master Title Programme (TL Programme)

Every year, the Technician Level (TL) Programme measures the technical skills proficiency of our operators and technicians. On a scale from TL1 to TL5, the highest level (TL5) is eligible for the title of master, an honorary recognition bestowed upon only a select few. Level designation motivates staff to seek continuous professional development and helps to bridge the widening skills gap, an outcome of mass retirement.

On the TL scale, TL1 and 2 work under supervision to acquire theoretical knowledge and skills. TL3 can complete most tasks without supervision to make necessary improvements to prevent quality issues or mechanical malfunctions. They take intermediate-level training, draft patent applications and archive technical know-how obtained on the job. TL4 and 5 are nationally acknowledged professionals or world-class experts with official certifications; they are responsible for on-site risk identification and mitigation.

Launched in 2015, the programme has recognised 10,759 employees with cash awards. Twenty-three have gained the title of master, eligible for prize money and job promotion. The master's name and photo plaque is entered in the company's Hall of Fame. While the TL Programme encourages employees to develop job skills and to record and transfer knowledge, a master trains staff and troubleshoots issues on-site. In 2022, when a massive flood inundated our steelworks, the professional masters were instrumental in restoring operations from the total devastation in 135 days.

The impact of the programme is widely recognised, evidenced by numerous manufacturers who benchmark our scheme to promote professional workforce development and encourage technology transfer.

Excellence in education and training

Tata Steel



Schools of Excellence

Tata Steel has introduced a pioneering learning initiative called 'Schools of Excellence (SoEs)' to structurally enable the 70:20:10 model of learning, with special emphasis on involving learners actively in the learning process for effective skill development.

SoEs are aimed at developing critical bench strength in core technical and digital domains through a 3-stage learning journey (Basic -> Intermediate -> Advanced). It combines classroom/online sessions, mentorships and action-learning projects (ALPs).

Learners' proficiency levels are evaluated as Silver, Gold or Platinum based on assessments and ALPs reviewed by our SMEs (Subject Matter Expert).

The initiative has already shown significant business impact with improvements in productivity and cost reduction. Over ~2800 employees have undergone the learning journey in the past year with more than 100 employees completing the 'Advanced' level programme across various domains. ~1150 have been silver/gold/platinum certified after a rigorous assessment process and evaluation of ~500 ALPs submitted as assignments.

These ALPs have resulted in multi-faceted benefits for the organisation along with an unaudited saving of ~ USD 3.7 Mn. The expertise gained by learners has resulted in increased productivity in various processes at the workplace.

The initiative can be applied to other organisations and has been extended to external clients successfully.

Excellence in communications programmes

WINNER: Gerdau S.A.



Infinite stage: with Gerdau, steel becomes key attraction at world's largest music and entertainment festival

Gerdau, Brazil's largest steel producer, has one of the production models with the lowest environmental impacts in the world, with 70% of its steel production being recycled. However, the reputation of Brazil's steel industry has often been negatively affected by incidents involving tailing dams. Additionally, the industry has struggled to appeal to new generations as an attractive and modern career choice.

To dissociate itself from this image and reinforce its reputation as a sustainable, modern, and inclusive company, while promoting steel as a key material in society, Gerdau implemented a robust 360° communication plan, which included a unique partnership for a B2B company, while also aiming to connect directly with the general public.

Gerdau supplied steel, a 100% recyclable material, to build the World Stage at Rock in Rio Brazil 2022, the world's largest music and entertainment festival, which hosted over 700,000 people and was broadcast in Brazil by major television and internet networks.

The stage, standing at 30 meters high and 104 meters wide, utilised 200,000 tonnes of steel and featured performances by 28 renowned artists, including Coldplay and Guns N' Roses. It was the largest stage ever built since the event was first launched in 1985, and it is designed for infinite reusability.

To announce this partnership, Gerdau adopted an innovative press conference model and maintained massive media mobilisation and digital actions for over five months. Gerdau invited Brazilian superstar Ivete Sangalo, the vocal artist who has the record for most performances on the World Stage, to serve as the sustainability ambassador for Gerdau. Leveraging her visibility among her 25 million followers on social networks, this highlighted Gerdau's low-carbon steel production model.

The strategy of associating Gerdau steel with Rock in Rio, an event with over 140 million spectators, solidified Gerdau's position as an industry leader while humanising and decommodising the company's and steel's image.

Gerdau became one of the ten sponsors of the festival with the most unprompted mentions in the media, and the company had two spokespersons among the top five with the most appearances in major media outlets, ahead of brands like Coca-Cola and Heineken.

Excellence in communications programmes

ArcelorMittal

Futurising

Hosted by Tom Cheesewright

Author & Applied-Futurist

Season 2 coming soon



Available on Spotify and YouTube, search 'ArcelorMittal.'

'Futurising' podcast (series two)

ArcelorMittal's purpose is to create smarter steels for people and planet. Leading our industry's efforts to decarbonise and help the world reach net-zero by 2050 has an important role to play in ensuring we are true to that purpose. Our climate action strategy and progress is therefore central to our communications strategy. We regularly share updates on our initiatives and the progress we are making on our journey to net zero. Much of this communication takes the form of written, visual or motion assets. However, given the complexity of the topic and our objective to educate and reach a broad audience, we decided to communicate our strategy and progress - but also the opportunities and challenges that we see decarbonisation brings - via a series of podcasts. We felt that podcasts would be the right medium to use to bring to life our approach to the decarbonisation challenge and spotlight some of the fantastic talent we have working behind the scenes at ArcelorMittal, individuals who are driving our climate action agenda.

Podcasts have become increasingly popular over the past few years. There are around 400 million podcast listeners around the world. When sharing a podcast on platforms such as Spotify, your story is placed in the hands of millions of new potential listeners of any age - this reach to a mass audience is a key reason why we decided to create a series of podcasts.

'Futurising' is a series of podcasts featuring ArcelorMittal experts who are deeply involved in the future of steel. The first series of 'Futurising' was launched in 2020. The second (and current) series of 'Futurising' was launched at the end of November 2022 and features our executive management team in conversation with Applied Futurist Tom Cheesewright. The four-part podcast series, focused on different aspects of climate action and decarbonisation - not limited to ArcelorMittal but the challenges and opportunities faced by the industry as a whole.

'Futurising' series two, released once a week over a four-week period, differed in approach to series one which featured a four-part discussion around what the future holds for steel by ArcelorMittal experts from four sectors: mobility, sustainability, manufacturing and construction. All four episodes in series two were created as educational content that would position ArcelorMittal as innovators by focusing on our strategic priorities and the challenges the industry faces while also showcasing experts in the industry working for ArcelorMittal.

Our objective of effectively communicating our decarbonisation efforts within the steel industry and exploring the challenges and opportunities faced by the industry as whole to engage our employees and stakeholders through a new and exciting way for us was met with success - 'Futurising' series two reached over 9,548 listens in over 42 countries by June 2023.

Excellence in communications programmes

JSW Steel Limited



Earth Care Awards 2022

In 2008, a unique initiative was born through the strategic collaboration of JSW Steel and one of India's leading media houses, The Times of India: the Earth Care Awards (ECA).

The mission was clear: to identify, honour, and promote the commendable efforts of individuals, communities, and organisations committed to climate change mitigation and adaptation.

In the past 15 years since it was launched, 10 editions of the ECA have been run and we have recognised and honoured over 79 individuals / organisations / entities across the nation who have done exemplary work in the area of climate change mitigation.

We have showcased the 10th and the 11th edition of our Earth Care Awards. The 10th edition ran between November 2021- June 2022. And the 11th edition commenced in April of 2023 and will culminate in an award ceremony in November of 2023.

Excellence in communications programmes

POSCO Holdings



'Miracle of 135 Days'

'Miracle of 135 Days' is an inspiring story of resilience achieved through effective risk & crisis communication tools. Last September, one of our steel mills was pummeled by an unprecedented flood event that devastated our operations. Press reports estimated that restoration would take a full year at the least. However, by putting our effective risk & crisis communication strategies to work, we pulled ourselves out of the damage and fully restored the steelworks in a mere 135 days. The communication strategies are rooted in the principles of speed, transparency, sincerity, and continuity.

Speed: We coordinated a rapid communication response before the flood occurred. Right after our operations came underwater, we published daily breaking news stories to fight initial negative public opinion.

Transparency: To dispel rumours and win the trust of stakeholders, we kept internal and external stakeholders up to date on recovery progress with complete transparency.

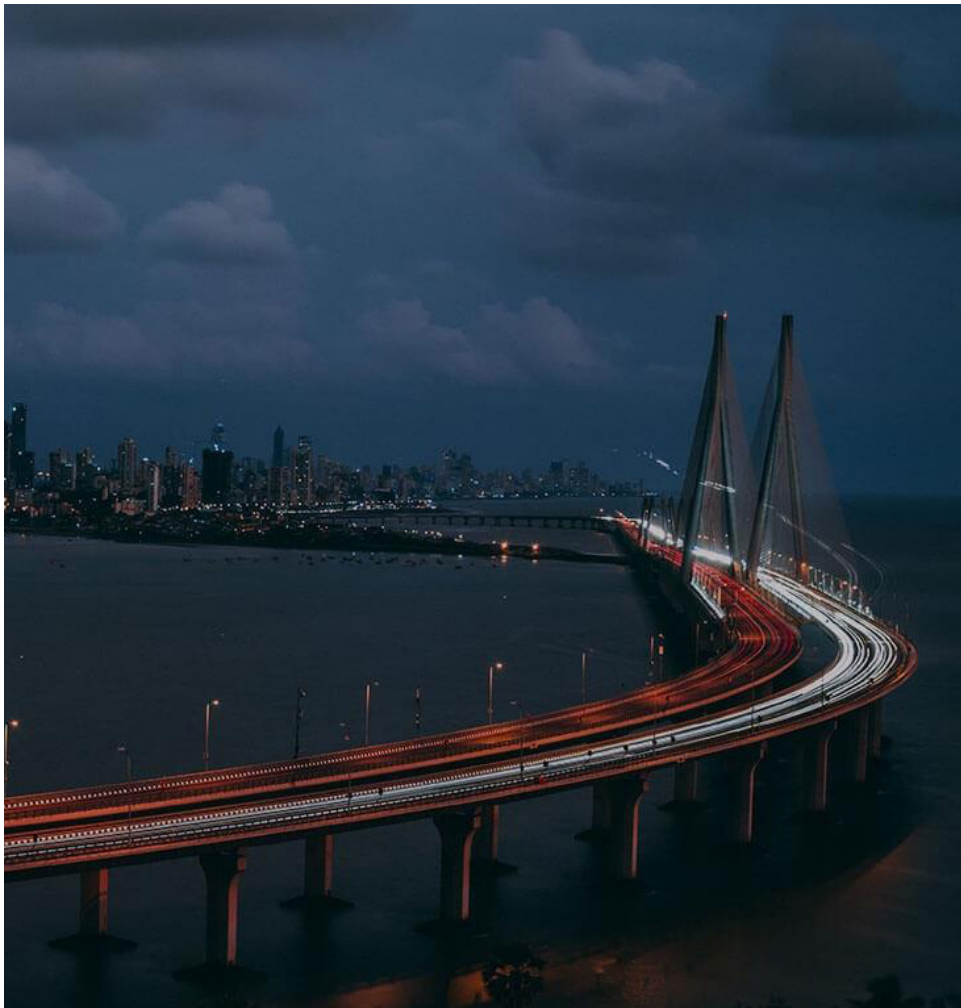
Sincerity: An honest display of dedication from the leadership and compassion expressed to suppliers and customers helped us win the support of our stakeholders and foster solidarity.

Continuity: After the recovery work was complete, we continued to share our experience with our stakeholders and the general public by compiling documentaries, books, and whitepapers.

Our speedy, transparent, sincere, and continuous communication initiatives garnered support from both the staff and the general public. A total of 1.4 million people from our workforce, group affiliates and partners joined the recovery efforts. 151 organisations including customers, suppliers, civic groups, the National Fire Agency, the armed forces, and local communities came to our aid. They generously offered urgently needed supplies, e.g., submersible pumps, generators, food trucks. Our careful and emphatic communication approach created a genuine connection with our diverse stakeholders. Our staff and the public were motivated to participate in our recovery effort, and we reciprocated by recognising their contribution through appreciation dinners and media campaigns. The experience set a powerful precedent of stakeholder engagement and highlighted the industry's resilience and resourcefulness in the face of a crisis.

Excellence in communications programmes

Tata Steel



Tata Steel on campus - connecting with the makers of tomorrow

Tata Steel's cadre program has been successful in recruiting from top engineering and management institutes for decades, but competition from other sectors on campus has been a challenge. To address this, Tata Steel started student engagement programmes regionally and expanded to all-India campuses initially, diversifying to a broader base of tech schools in 2022, including women, transgender people, researchers, and designers. As per IMRB Research Study of 2022, Tata Steel's perception score has improved significantly with 74% respondents (from 36% in 2018) considering us a 'best-in-class' company.

In 2022, Tata Steel's Corporate Communications, HRM, R&D, and Strategy teams have collaborated far more extensively on case studies to showcase our technology-driven products and solutions to the widest and most diverse range of students to date. Our campus initiatives have been updated to engage the younger generation in addressing new-age problems in the steel industry. The initiatives include case studies on making steel products, processes, and technologies sustainable, as well as exploring newer alternate materials and other relevant topics. These initiatives are designed to help young people understand the impact of the steel industry on the environment and society, and to encourage them to find innovative solutions to these challenges. The program structure allows for deeper engagement between leadership and students and provides riveting experiences at our plants and research facilities. These initiatives are changing young people's perceptions of the steel industry and the opportunities available within it by exposing them to the real world. We have also forged new tie-ups with professional student-focused implementation partners, introduced campus ambassadors, proactively engaged with on-campus committees and SPOCs, had our senior bench as part of campus drives/mentorship, used targeted digital communication, and presented attractive prizes and PPO opportunities.

As a result, our reach has expanded to over 270 campuses in India over the last year. These programmes have produced remarkable results for Tata Steel, which has consistently ranked high in independent industry rankings such as Randstad and Unstop. We secured the third spot in the Randstad Employer Brand Research ranking 2023 and the 12th spot in the Top 25 Dream Companies by Unstop awards. Additionally, we were recognised as the Global Diversity Equity & Inclusion (DEI) Lighthouse 2023 by the World Economic Forum, making us the only Indian company in the list of eight global companies. Lastly, we were awarded the IWEI Gold Standard Employee for 2020, 2021, and 2022.

Excellence in communications programmes

Tenaris



Tenaris for Energy Transition

Tenaris set a clear agenda to further reduce its environmental footprint in accordance with global decarbonisation objectives, with efforts focused both on decarbonising its processes and developing a solid product portfolio to accompany the energy transition.

To ensure consistent communications aiming at positioning Tenaris brand in energy transition market niches, while avoiding any greenwashing tendencies, an omnichannel communications plan has been rolled out worldwide, combining innovative approach with technical aspects and commercial needs.

For these reasons both Tenaris product engineers and sales teams were involved as thought leaders in articles both for Tenaris website and trade magazines, webcasts, podcasts, presentations at technical conferences and main events, videos and social media posting.

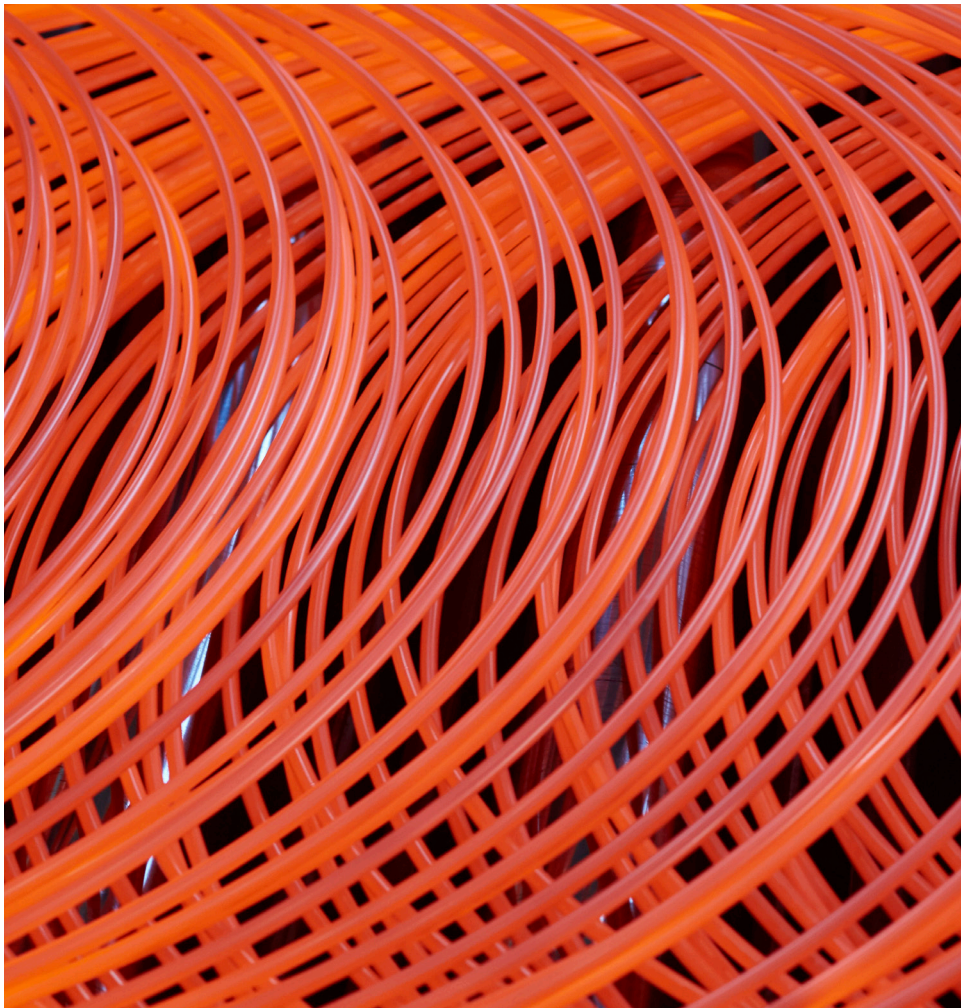
With the aim of raising awareness in the hydrogen, CCUS, geothermal market niches and scientific communities about Tenaris's advanced offer of products and services and maintaining a constant visibility throughout the year to support commercial teams in getting new contacts and expanding the business, the energy transition communications plan has been deployed through several initiatives. To be highlighted in particular:

- Society of Petroleum Engineers (SPE) Tech Talks series and related podcasts production.
- #TenarisInAction video series dedicated to energy transition projects.
- Consistent calendar of participations to reference events/trade-shows worldwide.
- Thought leadership actions with our experts present in technical conferences/panel discussions.
- Constant editorial production to cover main ET projects/initiatives/research activities.

Excellence in communications programmes

United States Steel Corporation

Steel Stories by U. S. Steel Podcast



Steel Stories by U. S. Steel is a podcast promoting thought leadership and innovation within the steel industry. Hosted by technology and business journalist, David Kirkpatrick, each episode features compelling discussions with industry experts and visionaries as we delve into the critical events that are shaping the future of the steel industry, including decarbonisation, net-zero steel products, green steel, technological advancements, and more.

Steel Stories has released five episodes since launching in March 2023, each weaving together engaging narratives, expert insights, and first-hand accounts to provide a comprehensive understanding of the steel industry's future.

To establish a strong foundation, Steel Stories weaves historical narratives that highlight the pivotal moments in the steel industry's evolution. By examining landmark projects, and technological advancements, Steel Stories aims to highlight the industry's resilience and transformation over time.

With a focus on sustainability and eco-consciousness becoming more critical than ever, each episode also explore how the steel industry is adapting to meet the challenges of a rapidly changing world.

Finally, to make the steel industry relatable to a broad audience, we reserve a portion of each conversation to how steel remains an integral part of modern society and a driving force behind progress.

In addition to traditional episodes, Steel Stories incorporates interactive elements, such as the links to resource websites and images of projects being discussed, all posted in the episode notes.

Through its captivating blend of storytelling, expert interviews, and forward-thinking discussions, Steel Stories seeks to redefine the narrative surrounding the steel industry, shedding light on its transformative power and vital role in shaping a sustainable and prosperous future.

World Steel Association

Avenue de Tervueren 270
1150 Brussels
Belgium

T: +32 (0) 2 702 89 00
F: +32 (0) 2 702 88 99
E: steel@worldsteel.org

C413 Office Building
Beijing Lufthansa Center
50 Liangmaqiao Road
Chaoyang District
Beijing 100125
China

T : +86 10 6464 6733
F : +86 10 6468 0728
E : china@worldsteel.org

worldsteel.org



Printed on FSC certified paper

worldsteel
ASSOCIATION