

**Artificial intelligence**

The ability of a computer or robot to perform tasks commonly associated with human beings.

**Bars**

Long steel products that are rolled from billets. Merchant bar and reinforcing bar (rebar) are two common categories of bars. Merchant bar includes rounds, bulb flats, angles, squares and channels that are used by fabricators to manufacture a wide variety of products, such as furniture, stair railings and farm equipment. Rebar is used to strengthen concrete in highways, bridges and buildings.

**Basic oxygen furnace (BOF)**

A pear-shaped furnace, lined with refractory bricks, that refines molten iron from the blast furnace and scrap into steel through the oxidising action of oxygen blown into the melt under a basic slag. The basic oxygen process is widely used steelmaking method. About 67% of the crude steel in the world is made in BOFs.

**Beneficiation (enrichment, concentration)**

Complex treatment of mined material to make it more concentrated or richer. Uses crushing, grinding and often froth flotation to remove waste rock from ore. The metal content increases as waste is removed.

**Blast furnace (BF)**

A towering cylinder lined with heat-resistant (refractory) bricks and used by integrated steel mills to smelt iron from ore. Its name comes from the 'blast' of hot air and gases forced up through the iron ore, coke and limestone that are charged into the furnace. Under extreme heat, chemical reactions among the ingredients release liquid iron from the ore.

**Bloom**

A semi-finished continuous casted or rolled steel product with a round, square or rectangular cross-section that is used for rolling heavy long products with large dimensions.

**Coils**

Hot or cold flat-rolled products supplied in regularly wound coils. These flat products can also be coated with metallic or organic coatings.

**Coke**

The solid product obtained from the dry distillation of coking coal in the absence of oxygen. Depending on property, coke is known as hard coke, soft coke and metallurgical coke.

**Coking coal**

Coal suitable for making into coke. Coking coal needed to produce blast furnace coke (the correct type of fuel/reductant needed for a blast furnace) is characterised by certain specific properties in terms of appropriate composition: for example, low ash (up to 10%), volatile matter (17% to 26%), low sulphur and phosphorous.

**Cold rolling**

Plastic deformation of a metal at room temperature that might result in substantial increases in strength and hardness. The usual end product is characterised by improved surface, desired thickness and improved mechanical properties compared with hot-rolled steels. Cold-rolled products typically include sheets, coils, strips and rebar, among others.

**Continuous casting**

A method of casting steel into a billet, bloom or slab directly from its molten form. Continuous casting avoids the need for large, expensive mills for rolling ingots into semi-finished products. Continuously cast slabs and billets also solidify in a few minutes, compared with several hours for an ingot. As a result, the chemical composition and mechanical properties are more uniform. Steel from the blast or electric arc furnace is poured into a tundish (a shallow vessel that looks like a bathtub) atop the continuous caster. As steel carefully flows from the tundish down into the water-cooled copper mould of the caster, it solidifies into a ribbon of red-hot steel to form slabs or blooms.

**Crude steel**

Steel in the first solid state after melting, suitable for further processing or for sale. Synonymous with raw steel.

**Crusher and conveyor system**

Equipment for ore size reduction and a transportation system used to move bulk materials from mine shafts and open pits to the surface for further processing.

**Customer relations management (CRM) system**

An information technology system used to manage customer data and support the sales function, delivering analytical insights for improving work with existing and potential clients. An effective CRM system allows companies to improve customer relationships and deliver high-quality service more efficiently.

**Direct reduced iron (DRI)**

The solid metallic iron product obtained through the direct reduction of high-grade iron ore in solid state without being converted into liquid form as happens in a blast furnace. DRI is also known as sponge iron because of its spongy microstructure. Merchant DRI product is delivered mainly in the form of pellets or briquettes.

**Downstream**

In manufacturing, this term refers to processes that happen later in a production sequence or production line.

**Electric arc furnace (EAF)**

A furnace that uses heat generated by an electric arc to melt metals and other materials. In the ferrous metallurgy EAF, together with the basic oxygen process, is one of the two modern ways of making steel.

**Enterprise resource planning (ERP)**

An integrated system of software applications used by companies to monitor all core aspects of their business. These include purchasing to manufacturing to sales, facilitating information sharing and allowing managers to make decisions informed by a global view of the supply chain.

**Environmental impact identification (ENVID)**

A systematic approach designed to identify and reduce the risk of incidents that can damage the surrounding environment, and to limit environmental impact throughout the production process.

**Environmental, social and governance (ESG) reporting**

A system of reporting built around three central factors underlying sustainability. ESG reporting covers both mandatory and best-practice voluntary reporting of non-financial, sustainability aspects of companies. Effective ESG reporting is a central component for a company's adoption of integrated reporting, an emerging global set of standards for demonstrating in company disclosures how financial and non-financial factors contribute to create value in an organisation.

**Fatality frequency rate (FFR)**

An internationally recognised safety indicator (also called the fatal accident frequency rate), the FFR is the ratio of fatalities per million hours worked.

**Fe content**

The chemical symbol for iron, Fe comes from the Latin word 'ferrum'. Fe content refers to the iron content of an ore.

**Ferroalloys**

Alloys consisting of certain elements (such as manganese, silicon, molybdenum, vanadium, nickel, boron, chromium and so on) combined with iron and used in steelmaking to reach the necessary chemical composition and properties of steel products. In some cases, ferroalloys may serve as deoxidisers.

**Finished products**

Products that emerge at the end of a manufacturing process. In metallurgy, they are obtained from hot rolling, cold rolling, forging and other processing of semi-finished steel (blooms, billets and slabs). They cover two broad categories of products, namely long and flat.

**Flat products**

Finished steel products having almost rectangular cross sections, the width being much greater than the thickness. These are supplied in hot-rolled, cold-rolled or in coated condition, depending on the requirement. Flat products include plates, sheets, and wide and narrow strips, that are produced from slabs on rolling mills.

**Forging**

Shaping ferrous and non-ferrous metals and alloys while hot by repeated hammer blows.

**Free cash flow**

Net cash from operating activities less net cash used in investing activities.

**Galvanised steel**

Steel coated with a thin layer of zinc to provide corrosion resistance.

**Greenhouse gas (GHG) reporting**

For a steelmaker, GHG emissions are primarily carbon dioxide (CO<sub>2</sub>), but also consist of methane (CH<sub>4</sub>) output, primarily from blast furnaces, but also from mining, transportation and office energy consumption. Local legislation, a company's own emissions monitoring and international best practices prescribe regular GHG reporting in metric tonnes of the relevant GHG.

**Hard coking coal (HCC)**

A type of coking coal with better coking properties, as traditionally measured by the 'coke strength after reaction' (CSR) of coke made from a specific kind of coal. Usually the CSR for HCC is assumed to be about 60%.

**Hazard and operability study (HAZOP)**

A structured and systematic examination of a planned or existing process or operation, aiming to identify and evaluate problems that may represent risks to personnel or equipment or prevent efficient operation.

**Hazard identification (HAZID)**

A systematic approach designed to identify and reduce the risk of dangerous incidents, and to ensure safety throughout the production process.

**Heavy plate**

Thick, flat finished product with a width from 500 millimetres to 5 metres and a thickness of at least 3 millimetres. Heavy plate is normally produced and supplied in hot-rolled condition with or without specific heat treatment. It is mainly used for construction, machinery, shipbuilding or large-diameter pipe fabrication.

**Hot rolling**

Rolling of steel at above the re-crystallisation temperature (normally above 1,000°C) to produce hot-rolled long and flat products from semis. Ingots are also hot-rolled to obtain semis.

**Human capital management**

An approach to employees that perceives people as human capital consisting of knowledge and skills, as well as assets whose value can be measured and enhanced through continuous investment.

**Human resources (HR)**

The people who make up the workforce of a company. The term also frequently refers to the management function responsible for ensuring the recruitment and retention of qualified employees, managing goal setting and assessments, overseeing the process of training and further education to meet company requirements and employee potential, and other processes required to maintain an effective workforce.

**Ingot**

The primary solid product obtained on solidification of liquid steel in conventional vertical cast iron moulds, which are intended for rolling into intermediate/semi-finished products after re-heating.

**Integrated steelmaking plant**

A plant that converts iron ore into semi-finished or finished steel products. Traditionally, this process required coke ovens, sintering machines, blast furnaces, steelmaking furnaces and rolling mills.

**Iron ore**

A naturally occurring mineral from which iron (Fe) is extracted in various forms, mainly for producing hot metal and direct-reduced iron.

**Iron ore concentrate**

Iron ore containing the valuable minerals of an ore from which most of the waste material has been removed.

**JORC Code**

The code of the Joint Ore Reserves Committee (JORC) of the Australian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Minerals Council of Australia for Reporting of Exploration Results, Mineral Resources and Ore Reserves. It is an internationally recognised reporting standard for mineral exploration results, mineral resources and ore reserves that is adopted worldwide for market-related public reporting and financial investments. The code was first published in 1989 and has been regularly updated since, the last time in 2012.

**Liquid steel**

The immediate hot molten steel product from steelmaking shop.

**Lock out, tag out, try out (LOTOTO)**

A safety procedure that is used to isolate hazardous energy during repair and maintenance work.

**Long products**

Finished steel products produced normally by hot rolling or forging blooms, billets and pencil ingots into useable shapes and sizes (such as rounds, bulb flats, angles, squares, rebars, channels, etc). They are normally supplied in cut length, except wire rods, which are supplied in wound coils. Long products are used in all industrial sectors, particularly in the construction and engineering industries.

**Lost-time injury frequency rate (LTIFR)**

An internationally recognised safety indicator, the LTIFR is the ratio of lost-time injuries per million hours worked. It is calculated using the total number of incidents leading to the loss of one day/shift or more from work.

**Merchant**

Term used to differentiate products sold to third parties from those consumed internally.

**Mineral**

A natural, inorganic substance having a definite chemical composition and physical characteristics, or any chemical element or compound occurring naturally as a product of inorganic processes.

**Mineral resources**

A concentration or occurrence of solid material with geological characteristics known, estimated or interpreted from specific geological evidence and knowledge and having reasonable prospects for economic extraction.

**Non-governmental organisation**

An organisation that is dedicated to achieving social or political aims, but is not controlled by a government.

**Open-hearth furnace (OHF)**

A furnace for melting metal, in which the bath is heated by the combustion of hot gases over the surface of the metal and by radiation from the roof. The furnace is used to derive steel from pig iron and scrap. The open-hearth process has been replaced by the basic oxygen process or electric arc method in most modern facilities.

**Operational efficiency**

The ability of a business to deliver outputs, for example products and services for customers or returns for debt and equity providers, more efficiently by reducing relative costs, often through such processes as automation, centralisation or improved working practices. Also known as operational improvement or operational excellence.

**Ore reserves (proven, probable)**

Proven ore reserves are the part of measured resources that can be mined in an economically viable fashion. They include diluting materials and allowances for losses that occur when the material is mined. Proven ore reserves represent the highest confidence category of a reserve estimate.

Probable ore reserves are the part of indicated and, in some circumstances, measured mineral resources that can be mined in an economically viable fashion. They include diluting material and allowances for losses, which may occur when the material is mined. Probable ore reserves have a lower level of confidence than proven ones but are of sufficient quality to serve as the basis for a decision to develop a deposit.

**Overburden**

Used in mining to describe material that lies above a zone of economic interest: for example, the rock and soil above an iron ore body. Overburden is removed during surface mining, but is typically not contaminated with toxic components and may be used to restore a mining site to a semblance of its appearance before mining began.

**Pelletising**

The process of compressing or moulding a product into the shape of a pellet. When doing so with iron ore concentrate, spheres of typically 8-18 millimetres (0.31-0.71 inches) in diameter are produced. The process combines agglomeration and thermal treatment to convert the raw ore into pellets with characteristics appropriate for use in a blast furnace and DRI processes.

**Pelletising machine**

Specific equipment designed for production of pellets (see Pelletising).

**Pellets**

An enriched form of iron ore shaped into small balls that are used as raw material in the iron making process (see Pelletising). There are two types of pellets: BF-grade pellets, which are used in blast furnaces, and DR-grade pellets, which have a quality suitable for use in the direct iron reduction process.

**Permit-to-work procedure**

A process used to control work that is identified as possibly hazardous.

**Pickling line**

Specialised equipment for the chemical removal of surface oxides (scale) and other contaminants such as dirt from steel product by immersion in an aqueous acid solution. The most common pickling solutions are sulphuric and hydrochloric acids.

**Pig iron**

High-carbon (above 2.14%) iron alloy made by reducing iron ore in a blast furnace. A product in solid form obtained on solidification of hot metal in a pig casting machine.

**Public relations (PR)**

Communications between an organisation and external stakeholders, in particular members of the general public, aimed at communicating both a positive impression of the organisation and its activities and identifying and addressing negative perceptions. PR uses mass and targeted media as well as public events and other outreach.

**Pulverised coal injection (PCI)**

Technologies whereby pulverised/ granulated/ dust coal is injected into a blast furnace through the tuyeres along with the blast to replace natural gas and a part of the coke requirement.

**Resale**

The act of selling third-party products.

**Roasting machine**

One type of equipment used in the process of thermal treatment of iron ore pellets.

**Rolled products**

Products obtained from hot rolling semi-finished steel (blooms, billets and slabs) or cold rolling hot-rolled steel.

**Scrap**

Steel waste that is not usable in its existing form and is re-melted to produce crude steel or sold. Depending on its form and type, it is classified as heavy melting scrap, light melting scrap or turnings/borings and other categories.

**Sections**

Hot-rolled long products obtained by rolling blooms or billets. They include angles, channels, girders, joists, I-beams, H-beams, rails and so on. Some sections can also be produced by welding together pieces of flat products. They are used for a wide variety of purposes in the construction, machinery and transportation industries.

**Semi-finished products**

Intermediate solid steel products obtained by hot rolling or forging ingots or by continuously casting liquid steel. They are intended for further rolling or forging to produce finished steel products.

**Sinter**

An aggregate that is normally produced from relatively coarse fine iron ore, mixed with coke breeze, limestone dolomite fines and various metallurgical return wastes used as an input/raw material in blast furnaces. Sinter improves blast furnace operation and productivity and reduces coke consumption.

**Slab**

A semi-finished rectangular steel product used to make finished hot-rolled flat products such as plates, sheets and coils.

**Square billet**

A semi-finished steel product with a square cross section of up to 200 millimetres x 200 millimetres. This product is used as input material to make finished long steel products such as bars, rods and light sections.

**Stakeholder**

According to the Global Reporting Initiative, this term is defined as an entity or individual that can reasonably be expected to be significantly affected by the reporting organisation's activities, products and services, or whose actions can reasonably be expected to affect the organisation's ability to successfully implement its strategies and achieve its objectives. Namely, stakeholders can include those who are invested in the organisation (such as employees and shareholders), as well as those who have other relationships to the organisation (such as other workers who are not employees, suppliers, vulnerable groups, local communities, and non-governmental organisations or other civil society organisations, among others).

**Tails and tailings**

A waste stream generated by mine processing plants as part of their normal functioning and consist of ground rock and effluent and stored as tailings in special ponds or dumps secured behind dams. The flow between the plants and tailings is maintained as a closed cycle of clarified water to prevent contamination of nearby ground and river water. Tailings ponds and dams must be regularly monitored to ensure their stability and the safety of surrounding facilities and communities.

**Water intake**

Withdrawal from water bodies for consumption or storage.

**Wire**

A broad range of products produced by cold-reducing hot-rolled wire rod through a series of dies or through rolls to improve surface finish, dimensional accuracy and physical properties. Typical applications include nets, screws, rivets, upholstery springs, furniture wire, concrete wire, electrical conductors, rope wire and structural cables.

**Wire rod**

Hot-rolled coiled plain bar and rods of up to 18.5 millimetres in diameter. Wire rod is normally used to make steel wire, cold-rolled rebar and hardware.