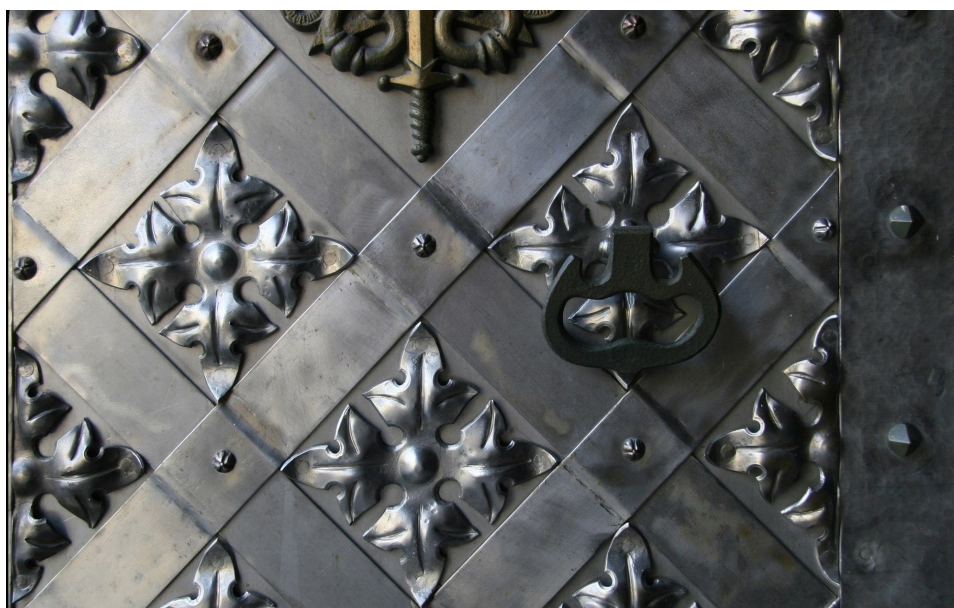


## 15 amazing facts about steel

On 6 June 2021, Metinvest Group celebrates its 15th anniversary. Over the years, the Group has built its business around steel. Despite the great amount of experience and knowledge that we have accumulated, we never tire of learning new facts about steel production. We are always excited to discover new properties of this amazing alloy that has evolved to underpin the development of human civilisation.



### 1

Steel cannot be made without iron. Did you know that iron is one of the ten most widespread elements in the Universe? The Earth's ecosystem contains more iron than oxygen. After all, our planet's core and crust mostly consist of this element. That said, in the Earth's crust it is present as iron ore. To obtain a purer metal, it must be concentrated and smelted.

The ore smelting process was discovered as far back as 2,000 BC. This moment marked the end of the Bronze Age and the dawn of the Iron Age. Researchers believe that the transition from bronze to iron happened because of the extreme abundance of iron ore deposits. By the end of the Bronze Age, the deposits of tin – which is used to make bronze – that were known at the time had been depleted.



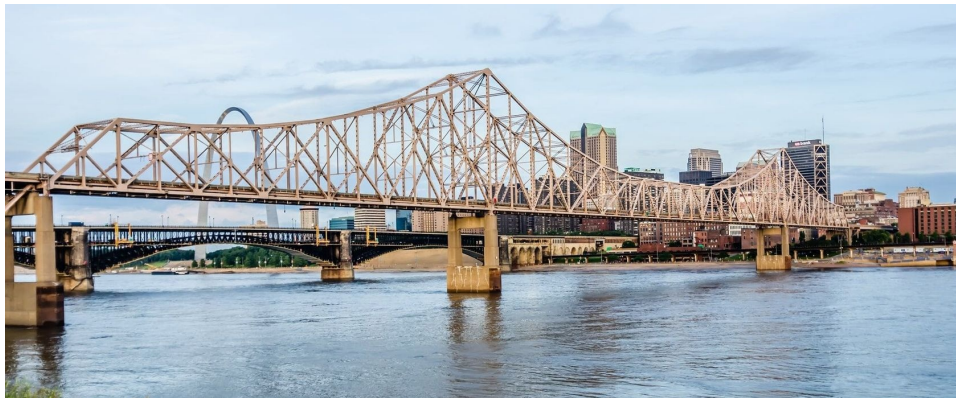
Sir Henry Bessemer.

## 2

By the mid-19th century, the English pioneer Henry Bessemer figured out how to make steel by blowing compressed air through pig iron. His landmark invention gave mankind a cheap, fast technology to mass produce steel. The Bessemer process sparked the industrial revolution.

However, historians and archaeologists have discovered that this technology was known to the ancient Chinese as early as the 2nd century BC. By the time of the Tang dynasty – in the 7th-10th centuries AD – steel agricultural tools were already widespread.

India also became famous for its early steel production. The first mentions of Wootz steel, an alloy whose physical qualities are still admired by experts, date back to the 3rd century BC. The legendary Damascus swords – the production secrets of which have since been lost – were made from Indian Wootz steel. India and China have been powerful players in the global steel market since ancient times. Facts about steel production in China can be found in the writings of Pliny the Elder. The ancient Roman author confirmed that the Celestial Empire was the main steel producer in the world long before Europeans began to glorify Bessemer.



## 3

The world's first major piece of infrastructure made of steel was the Eads Bridge, named after the project's designer, James B. Eads. It was commissioned by steel magnate Andrew Carnegie, one of the richest Americans in history and one of the country's greatest philanthropists.

The steel Eads Bridge connected the banks of the Mississippi River in 1874. The bridge's construction was a turning point in architectural history. As the popularity of forge iron as a structural material declined, steel took its place.

There was a boom of steel construction in the US during the early 20th century, right up to the beginning of the Great Depression. The Rockefeller Center, George Washington Bridge, Golden Gate Bridge, Chrysler Building and Empire State Building were among the first steel bridges and Art Deco skyscrapers to become integral parts of the American landscape.



4

The two world wars fought in the 20th century brought more than just misery and destruction. They also birthed the military industrial complex, which has become a driver for the development of all branches of heavy industry, including steelmaking. Gunmakers, railways and navies needed strong, cheap steel. Tankers put great trust in steel, and it did not disappoint them.

On the battlefields of World War II, tanks were protected by rolled and cast armour. The steel plating was intended to deflect projectiles flying at rapid speeds. The power of the guns of that time was determined by the thickness of the steel armour that they could penetrate. Today, high-alloy, high-strength steels and composite materials are used to make tank armour. And still, the ability to break through rolled steel armour is an indicator of the effectiveness of antitank weapons.



5

While steel infrastructure projects, automobiles and household goods were shaping the patterns of everyday life, the major industrial powers were shaping a new political agenda. In 1951, in post-war Paris, delegations from Belgium, Italy, Luxembourg, the Netherlands, France and the Federal Republic of Germany signed an agreement establishing the European Coal and Steel Community (ECSC). The goal of this new political union was to create a common coal and steel market for participating countries. A non-competitive environment and common economic interests were meant to guarantee a peaceful future in post-war Europe. The four supranational bodies created within the ECSC served as the prototypes of the future European Commission, European Parliament, EU Council and European Court of Justice. The ECSC initiated the unifying processes that led to the formation of the EU forty-one years later.





6

Steel is an alloy of iron and carbon with an iron content of at least 45%. The percentage of carbon in steel is significantly lower, ranging from 0.02% to 2.14% (an alloy containing 0.6-2.14% carbon is considered high-carbon). Carbon content, alloying elements and other impurities determine the physical properties and performance of each steel grade. The World Steel Association estimates that there are now more than 3,500 steel grades. Remarkably, three-quarters of them were developed in the 21st century.



7

In just under seven decades – from 1950 to 2019 – global steel production expanded by an order of magnitude. The World Steel Association has calculated that in the middle of the last century, the global steel industry made 189 million tonnes of steel. By the end of 2019, this figure had increased to 1.869 billion tonnes.

Since 2000, global steel production has expanded by 1 billion tonnes. China is the largest steel producer at 996.3 million tonnes. India ranks second at 111.2 million tonnes. Third place belongs to Japan, which produced 99.3 million tonnes of this product in 2019. Ukraine is among the top 20 steel producers in the world. In 2019, the country produced 20.8 million tonnes of steel, taking 13th place in the global ranking. The 50 largest steel producing countries make more than 99% of the world's steel.



## 8

The World Steel Association reports that in 2019, the global steel industry made nearly US\$1.7 billion in social investments. Steelmakers build schools, kindergartens and stadiums, make and repair roads, and sponsor the construction of other important facilities in the regions where they operate. The owners of steel mills also implement educational projects. In addition, since the beginning of the global COVID-19 pandemic, they have provided tests, medicines and medical equipment for their employees and other residents of these regions.

The global steel industry currently employs 6 million people. Each steel industry job creates more than eight jobs in related industries. In other words, the industry provides honourable, well-paid jobs for almost 50 million people worldwide.



## 9

The Bureau of International Recycling (BIR) has found that the global economic slowdown caused by the COVID-19 pandemic has led to a reduction in the use of scrap metal around the world. In the first half of 2020, the use of steel scrap in key countries and regions decreased by more than 10.5% to nearly 210 million tonnes (compared with 243.5 million tonnes in the first half of 2019).

Decreases were recorded in China, the EU countries, the US, Russia, Japan and South Korea. China remains the largest consumer of steel scrap in the world, while the EU countries are the leading exporters of this recyclable material.

As part of the EU, the UK was the most active shipper of steel scrap to foreign markets: 2.5 million tonnes in January-June 2020. This is more than 25% less than the volume it shipped in the first half of 2019. Turkey remains the world's largest importer of steel scrap. Despite the broader economic downturn, the country increased purchases abroad by almost 8% (in 2019, scrap metal accounted for 83% of Turkey's total steel production).