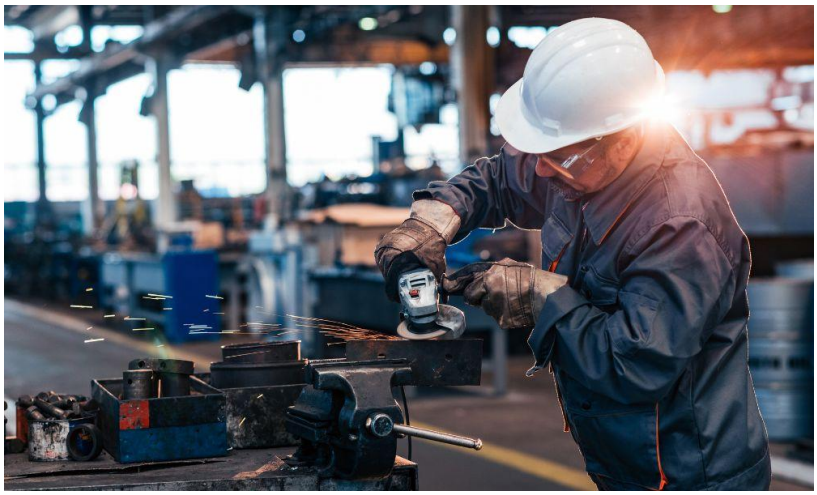
The lesson 2

The Most Common Types of Metal and Some Ways They Are Used

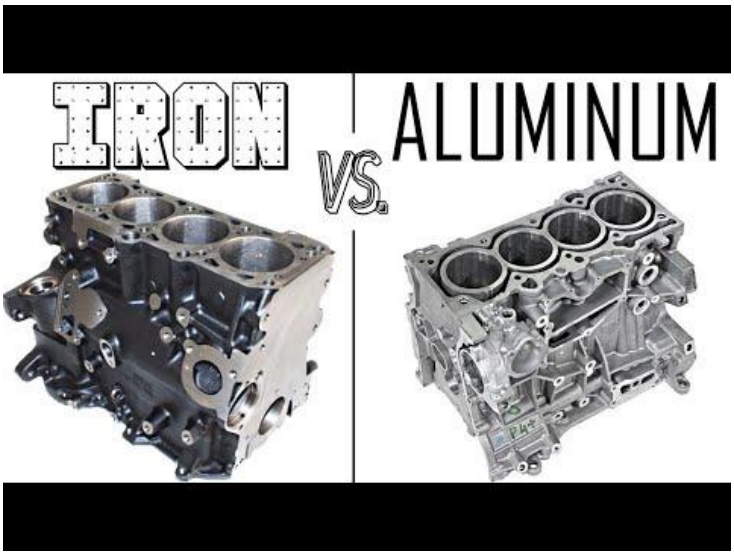
Introduction

Metal is a versatile and durable material that is used in a wide variety of applications. It is an essential component in many of the things we rely on every day. Here, we will take a look at the five most common types of metal and some of the ways they are used in various industries.



1) Iron

Iron (Fe) is a metal, an element of group VIII of the periodic table. It is a lustrous, ductile, malleable, silver-grey in color. It is the tenth most abundant element in the universe. It is found in a major amount at the core of the Earth in a molten form. Long bar iron is commonly used in various industries and applications that require smaller components with high strength and durability. Some examples include automotive and machinery parts, tool and die making, construction equipment, agricultural machinery, and hardware manufacturing. It is also frequently used in the production of small components for the medical and aerospace industries.



Physical Properties of Iron:

1.1) It rusts in damp air, but not in the dry air.

1.2) It dissolves readily in dilute acids.

1.3) At 910°C, it changes to γ-iron, which is much softer in nature.

1.4) It melts at 1536°C and boils at 2861°C.

1.5) Being a metal is magnetic in nature.

2) Steel

Steel is one of the most widely used metals in the world. It is an alloy of iron and carbon, and it is known for its strength and durability. Long bar steel is used in a variety of industries, including aerospace, medical, power generation, industrial, and naval applications. Its versatility and durability make it an ideal choice for critical components in these industries.

The mechanical properties of steel:

The mechanical properties of steel describe how the material will behave and respond when subjected to loads and forces.

2.1) **Ultimate strength or tensile strength**: Ultimate strength is the minimum tensile strength at which the steel would fail.

2.2) **Ductility**: The ability of a material to deform by bending, twisting, or stretching without failure.

2.3) **Toughness**: It is the ability of a material to resist impact without breaking.

2.4) **High-temperature effects**: Steel is not a flammable material. However, its strength reduces with the rise in temperature.

2.5) **Hardness**: The ability of a material to resist indentation, scratching, and wear

2.6) **Fatigue resistance**: Initiation of cracks in a material due to cyclic loading.

3) Aluminium

Aluminum (Al) is a lightweight metal that is known for its strength and durability. Long bar aluminum is used to create various components such as beams, frames, and structural supports. Its lightweight and corrosion-resistant properties make it ideal for applications where weight and durability are important factors, such as in aircraft and automotive manufacturing.

3.1) Mechanical Properties of Aluminum

1) Aluminium can be severely deformed without failure.

2) Alloying, cold working and heat-treating .

3) The tensile strength of pure aluminium is around 90 MPa but this can be increased to over 690 MPa for some heat-treatable alloys.

4) Zinc

Zinc (Zn) is a chemical element that is known for its corrosion resistance and its ability to protect other metals from rust and corrosion. It is often used as a coating on steel and iron, as well as in the manufacturing of brass, bronze, and other alloys. Zinc is also used in the production of batteries and other electronic devices.

What is zinc used for in engineering?

Its excellent thermal and electrical conductivity also make it ideal for engineering components in electronic devices or for heat dissipation. Zinc alloy is commonly used by engineers designing connectors, switches, sensors, and heat sinks because of this useful property.

5) **Bronze**

Bronze is an alloy of copper and tin, and it is known for its strength, durability, and resistance to corrosion. Bronze long bar metal is commonly used for applications that require corrosion resistance, such as marine hardware and fittings. It is also used in the manufacturing of musical instruments and electrical contacts, due to its excellent acoustic and electrical properties. Additionally, bronze long bar metal is used in some specialized machining applications where its unique properties, such as wear resistance and machinability, are advantageous.

Glossary

Versatile: Polyvalent
Lustrous: Brillant
Core: Noyau
Require: Nécessite
Automotive: Automobile
Tool and Die: Outillage et matrice
Hardware Manufacturing: la fabrication de quincaillerie
It rusts in damp air: Il rouille dans l'air humide
It dissolves readily in dilute acids: Il se dissout facilement dans les acides dilués.
Softer: plus doux
It melts at 1536°C and boils at 2861°C: Il fond à 1536°C et bout à 2861°C.
Alloy: alliage
Steel: acier
Tensile Strength: résistance à la traction
Bending : Se Pliant
Twisting : Se Tordant
Stretching : S'étirant
Failure: Rupture
Toughness: Dureté
Indentation : éraflures
Scratching : Rayures
Wear : Usure
Tensile strength: La résistance à la traction
Coat : Revêtement
Copper and Tin: Cuivre et d'Etain
Fittings: a small part on or attached to a piece of furniture or equipment