

Synthetic or man-made materials

Synthetic or man-made materials are manufactured in industries after human manipulation, such as plastics and **petroleum-based** products which are mostly used as finishing materials.

■ Concrete

This is a building material made from the combination of **aggregate** and a **binder** such as **cement**. The most common form of concrete is **portland cement concrete**, which consists of mineral aggregate (gravel and sand), portland cement and water. After mixing, the cement **hydrates** and then **hardens** into a stone-like material. This material is known as concrete.



The Gherkin (London)

As concrete has a rather low **tensile strength**, it is generally strengthened with steel **rods** or bars (called rebars). It is then called reinforced concrete. To avoid any air bubbles, that would **weaken** the structure, a vibrator is used to eliminate trapped air when the liquid concrete mix is poured around the ironwork. Concrete has been the predominant building material in the modern age because it is durable and can be easily shaped and transported.

Ibere Camargo Foundation (Porto Alegre, Brazil)



■ Metal

This is used as a structural framework for larger buildings (skyscrapers), or as an external covering surface. There are different types of metals used in building. The only danger resulting to the long life of metals is corrosion.

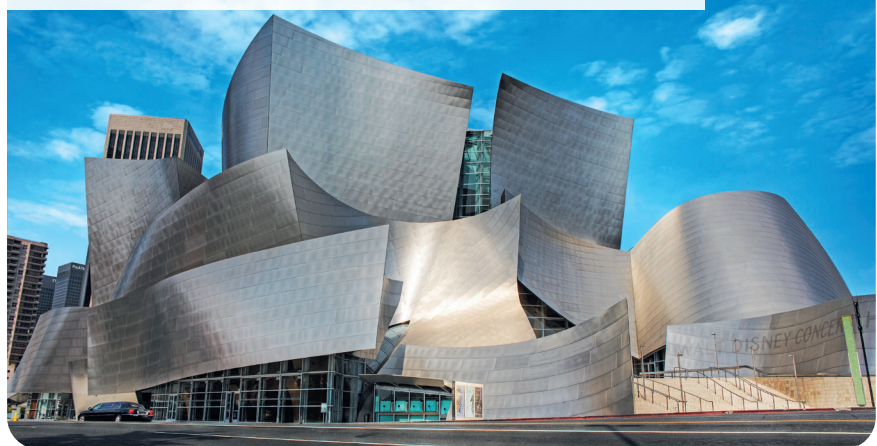
■ Steel (a metal alloy with a prevalence of iron)

It is the usual choice for metal structural building materials. It is strong, flexible, and – if well refined and/or treated – lasts a long time. **Aluminium alloys** and **tin** have a lower density and higher resistance to corrosion and this sometimes justifies their higher cost. Other metals used include **titanium**, which can be used for structural purposes but is much more expensive than steel.

aggregate:
aggregato
sabbia, ghiaietto
ed acqua
alloy: lega
binder:
aggregante,
legante
cement: cemento
concrete:
calcestruzzo
façade: facciata
frame: telaio
to harden:
indurire
hollow: cavo,
forato

to hydrate:
inumidirsi
kiln: fornace
mould: stampo,
forma
petroleum-based:
a base di petrolio
portland cement
concrete: cemento
(portolano)
rod: barra
tensile strength:
tensione di
snervamento
tin: stagno
to weaken:
indebolire

Walt Disney Concert Hall (Los Angeles): a stunning example of steel building



■ Glass

The use of glass in buildings has become very popular in the modern age. Glass “walls” can be used to cover the whole **facade** of a building, or over a wide roof structure. These uses require some sort of **frame** to hold the sections of glass together.

■ Bricks

These building items are manufactured from a mixture of clay and water which is then pressed into rectangular **moulds**. They are finally “baked” and dried in a special oven, called a **kiln**. They can be solid or with holes, depending on what they are used for and are not particularly expensive, except those used for facades, called facing bricks. This kind of building material has properties such as fire resistance, durability, flexibility, as well as good acoustic and thermal insulation. When bricks are used for building a wall, they are joined by mortar.



Bricks



Concrete block

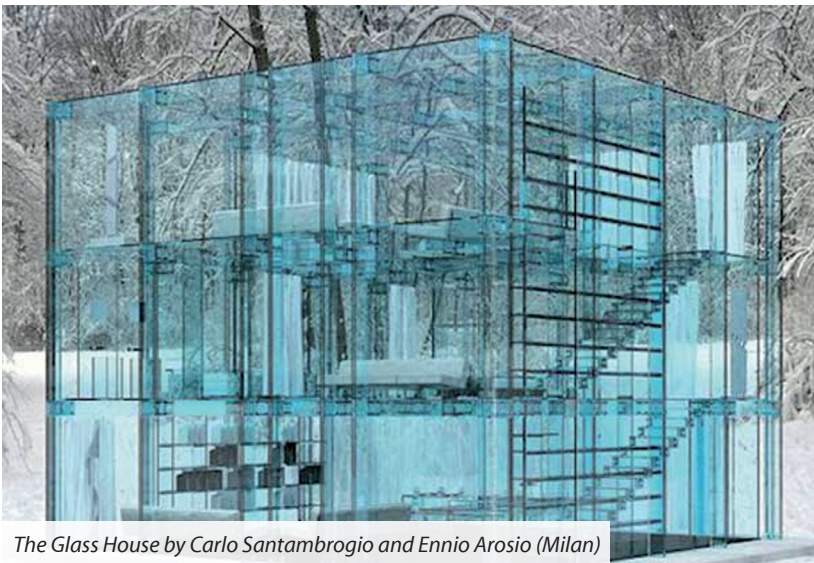
■ Blocks

Blocks are large **hollow** units, generally made of concrete. The holes in the blocks can be filled with fluid concrete and reinforced with rods. It is obviously faster to build using concrete blocks than using bricks, and the quantity of mortar is also reduced.

1 Answer the questions.

1. What is concrete made up of?
2. What are its characteristics?
3. How can it be reinforced?
4. What are its advantages as a building material?
5. How can metal be employed in construction?
6. What is its main drawback?
7. What is steel?
8. What are the advantages of steel?
9. Why are aluminium alloys often preferred despite their higher cost?
10. Was glass popular as a building material in older times?
11. Why are bricks good as building units?
12. What are blocks?

2 Write a short description of the photo below.



The Glass House by Carlo Santambrogio and Ennio Arosio (Milan)

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