

# 4

## Modern Building Materials

### Steel

1 Read the text and complete the sentences with words from the text.

Steel is resistant to corrosion, rusting and general deterioration. It can be used both for exterior as well as internal infrastructure. Compared to conventional concrete buildings, steel buildings offer a longer lifetime and they cause less harm to the environment thanks to the resistance and durability. Because steel buildings are usually pre-fabricated or made in sections and parts that are assembled on the construction site, they are cheaper than conventional buildings.



The quantity of carbon contained in steel determines whether the alloy is hard or soft. Nowadays steel buildings are often appreciated for their design. In fact, the flexibility of this material allows different forms and shapes. More than any other building material, steel has a high strength-to-weight ratio. This means that it is easy and cheap to span large distances elegantly eliminating columns. Thanks to this, it is easier to subdivide and customise office and warehouse space.

- 1 Steel can be used both for the exterior and the interior \_\_\_\_\_ of a building.
- 2 Steel is \_\_\_\_\_ to corrosion, rusting and general deterioration.
- 3 Steel buildings have a longer \_\_\_\_\_ compared to conventional concrete buildings.
- 4 Steel buildings are usually \_\_\_\_\_ than \_\_\_\_\_ buildings.
- 5 It is easy and cheap to span large \_\_\_\_\_ elegantly.
- 6 By eliminating \_\_\_\_\_, it is easier to subdivide and customise office and warehouse space.

2 Read the text again and match the words to their definitions.

- |                 |   |
|-----------------|---|
| 1 rusting       | a <input type="checkbox"/> a composite metal made by mixing other metals together   |
| 2 flexibility   | b <input type="checkbox"/> the period of time for which a building is expected to last                                    |
| 3 alloy         | c <input type="checkbox"/> when a metal becomes reddish brown because of air and water                                    |
| 4 deterioration | d <input type="checkbox"/> to change the appearance or characteristics of something according to someone's taste or needs |
| 5 lifetime      | e <input type="checkbox"/> becoming worse in quality or condition   |
| 6 to customise  | f <input type="checkbox"/> being bent easily without breaking   |



## Glass and metals

### 3 Read the text and match each paragraph with a heading.

- A Advantages and disadvantages of different kinds of metals  
 B Transparent buildings: problems and possible solutions  
 C An interesting experiment

1 \_\_\_\_\_

Glass is a fashionable material in contemporary architecture. Transparent buildings and structures are very popular in contemporary architecture. Structural glass components such as columns and beams are often required, but this material seems structurally unsafe because of its brittleness. For this reason a new construction technique has been developed using:

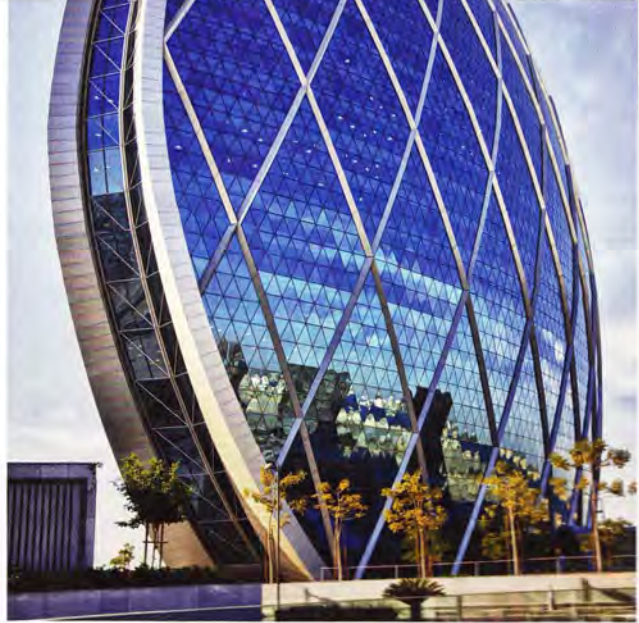
- very long overlapping glass segments to create glass beams. These are made by bonding the segments adhesively;
- a small stainless steel profile that has been added to the layout of the glass beam to reinforce it.

2 \_\_\_\_\_

To prove that glass structures can be as safe as reinforced concrete, an experimental transparent pavilion has been designed (with dimensions  $9 \times 9 \times 3.6 \text{ m}^3$ ) that combines a number of innovative ideas. Many different kinds of glass and glass systems have been used. The outermost and the triple-layered insulating glass units have been tempered and sometimes laminated and some glass has also been coated with solar control glass to reflect some of the unwanted sunshine outwards. In other cases glass that can be heated electrically and glass panes free of iron oxide have been used to make the inside light more natural.

3 \_\_\_\_\_

Painted, stainless, hot dip galvanised and weather resistant steel, as well as aluminium, have also been used for supporting structures. Aluminium has some advantages (it is light, resistant to corrosion and easy to work) but also some disadvantages (its thermal expansion and conductivity are high and it has low elastic modulus and fire resistance). Stainless steel also offers some advantages (it has good fire resistance and it is easy to keep) but its high price is a major disadvantage. Both hot dip galvanised and painted steel are not as expensive, but they are difficult to work on site and are not resistant to corrosion.



### 4 Read the text again and decide if these statements are true (T) or false (F).

- 1 Glass is very popular in contemporary architecture. \_\_\_\_\_
- 2 There is no way to create a glass structure that is as safe as reinforced concrete. \_\_\_\_\_
- 3 A transparent pavilion has been recently designed as an experiment that uses some innovative ideas. \_\_\_\_\_
- 4 There is only one type of glass in this pavilion. \_\_\_\_\_
- 5 Glass has also been used for supporting structures. \_\_\_\_\_
- 6 Hot dip galvanised steel is not resistant to corrosion. \_\_\_\_\_

### 5 Match the words with their definitions.

- |                   |   |
|-------------------|---|
| 1 outermost       | a <input type="checkbox"/> a metal made from steel that does not rust |
| 2 stainless steel | b <input type="checkbox"/> fragility                                  |
| 3 galvanised      | c <input type="checkbox"/> external                                   |
| 4 brittleness     | d <input type="checkbox"/> flat sheet of glass                        |
| 5 pane            | e <input type="checkbox"/> coated with zinc to protect it from rust   |