

## Unit 3

### Properties of Materials

Materials we can see around us and those used in civil engineering have various properties. The word “property” can be used in many different ways. We are going to use it with the meaning of a quality or feature of something.

All the things we can see around us are made of some kind of materials or, in most cases, of a combination of various materials.

**A. Match the object with the best possible material it can be made of.  
There are a few possibilities for some of the objects.**

Object	Material
1. car	a) plastic
2. window	b) wood
3. electrical wire	c) glass
4. bottle	d) silver
5. cutlery	e) concrete
6. telephone	f) metal
7. table	g) copper
8. pre-made building blocks	

We use particular materials to produce certain objects because of their properties. How do we find out what the properties of some materials are? The answer is very simple. We can see the materials or touch them; we can try lifting them or applying force to them. The materials will perform in a certain way. When we touch the material, we can feel if it is **smooth** or **rough**. Some vandals take a nail or other sharp object and scratch walls or elevator booths to find out if the material they are made of is **soft** or **hard**. We need a crane to lift a concrete block as it is really **heavy**, but things we can lift with our hands are obviously **light**. We use concrete blocks for building constructions because they are **rigid**. But car wheels should be **flexible**; therefore, we use rubber for their production. We want to see through windows, so we use glass to make them. Glass is **transparent**, but **brittle**, so it can be easily broken. Glass is not **tough** at all. Plastics are tough, but they are either **translucent** or **opaque**, so we cannot see clearly through objects made from them. There are fire-resistant doors in office or residential buildings. They are made of **non-combustible** materials. Unfortunately, most of the materials we have in our households or offices are **combustible**, and in the case of a fire, we can hardly save anything but our lives.

**B. Match the adjectives with their meanings.**

- |                |  |
|----------------|--|
| a. combustible | a) not easily broken or made weaker                                |
| b. transparent | b) hard and can easily break into pieces                           |
| c. brittle     | c) easy to press or shape, pleasant to touch, not rough or stiff   |
| d. rough       | d) able to burn easily   |
| e. rigid       | e) clear and thin enough to see things through                     |
| f. translucent | f) a surface which is not smooth                                   |
| g. tough       | g) stiff, hard, and difficult to bend or move                      |
| h. soft        | h) clear enough for light to pass through but not completely clear |

**C. What are the opposite meanings of these adjectives?**

- Flexible \_\_\_\_\_
- Soft \_\_\_\_\_
- Rough \_\_\_\_\_
- Brittle \_\_\_\_\_
- Transparent \_\_\_\_\_
- Heavy \_\_\_\_\_
- Combustible \_\_\_\_\_

**D. Choose the right answers.**

- Why is glass used for windowpanes?
  - Because it is brittle.
  - Because it is transparent.
  - Because it is waterproof.
- Why do we use chalk to write on a blackboard?
  - Because it is white.
  - Because it is brittle.
  - Because it is soft.
- Why do we need a special drill to make holes in a concrete wall?
  - Because concrete is hard.
  - Because concrete is heavy.
  - Because concrete is rigid.
- What kind of material should a fire-proof door be made of?
  - Combustible material.
  - Non-combustible material.
  - Plastic material.
- Why do builders need cranes to lift concrete panels?
  - Because concrete panels are square in shape.
  - Because concrete panels are rigid.
  - Because concrete panels are heavy.
- Why will a glass break into pieces when we drop it?
  - Because it is brittle.
  - Because it is smooth.
  - Because it is tough.
- Why is aluminium used to construct aircraft?

- a) Because aluminium is soft.
- b) Because aluminium is easy to shape.
- c) Because aluminium is light.

**E. Choose the correct properties of the following materials**

glass:	a) rigid	b) permeable	c) brittle
wood:	a) combustible	b) brittle	c) transparent
lead:	a) light	b) hard	c) heavy
concrete:	a) flexible	b) rigid	c) combustible
chalk:	a) rigid	b) soft	c) flexible

**F. Answer the following questions:**

1. Why is glass used for windowpanes?
2. Why is glass wool used in roof structures to keep heat in the attic?
3. Why is some steel covered with a thin layer of zinc?
4. Why is concrete used for the columns of a building structure?
5. Why is steel used in concrete as reinforcement?

**G. Complete the sentences with the correct properties:**

1. Various coatings are applied to protect iron from chemical reaction. This means that iron becomes \_\_\_\_\_.
2. A wooden house burnt down, but the windows remained undamaged, i.e., wood is \_\_\_\_\_ and glass is \_\_\_\_\_.
3. We need a special drill to make a hole in a concrete wall. This means concrete is \_\_\_\_\_.
4. Electric repairmen use leather gloves, because leather is \_\_\_\_\_.
5. Concrete panels are lifted by a crane, which means that a concrete panel is \_\_\_\_\_.
6. Vertical blinds are used in modern offices to prevent sunrays from penetrating into the room, i.e., blinds are \_\_\_\_\_.

**H. What are the properties of the following materials?**

concrete, wood, rubber, glass, stone, plastics, lead, clay, chalk, sandpaper.

## Vocabulary

aluminium	hliník
apply, v.	použiť, aplikovať, požiadať, týkať sa
brittle	krehký
chalk	krieda
column	stĺp
combustible	horľavý
compressive	stlačujúci, tlakový
concrete	betón
copper	meď
corrosion	korózia, hrdzavenie

crane	žeriav
cutlery	príbor
drill	vŕtačka
elastic	pružný, elastický
feature	črta, znak
fire resistant	ohňovzdorný
flammable, inflammable	zápalný, horľavý, zapalujúci sa
flexible	pružný
force	sila
fragile	krehký, slabý, nepevný
hard	tvrdý
heavy	ťažký
hole	diera
insulation	izolácia
layer	vrstva
lead	olovo
leather	koža
lift, v.	zdvihnúť, zodvihnúť
light	ľahký
moisture	vlhkosť (zo zrazenej pary)
opaque	nepriehľadný, nepriesvitný
particular	konkrétny, jednotlivý, špecifický
penetrate	vniknúť
perform	vykonať, uskutočniť, účinkovať
permeable	priepustný
plastic	plastický
property	vlastnosť, charakter; vlastníctvo, majetok
residential	obytný, bytový
resistant	odolný, vzdorný, vzdorujúci
rigid	tuhý, pevný, nepoddajný
roof	strecha
rough	drsny
rubber	guma
rust	hrdza
sheet	plech, plát, fólia, plachta, hárok
smooth	hladký
soft	mäkký
strength	sila, pevnosť
tensile	ťahový, ťažný
tough	tuhý, tvrdý, pevný
translucent	priesvitný
transmit	prenášať, prepúšťať
transparent	priehľadný
vapour	para, výpar, opar
water-proof	vodotesný
windowpane	okenná tabuľa
windshield, windscreen	predné okno motorového vozidla
wire	drôt, vedenie (elektrické)
wood	drevo

