

# FLOORING AND DPC

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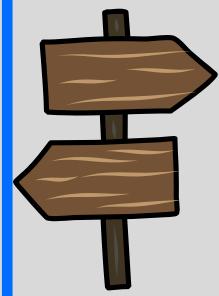


# FLOORING

# WHAT IS FLOORING ?

**A permanent covering over the floor structure with a finish material to provide a walking structure is termed as flooring. The purpose of flooring is to get a good hard, level, and beautiful surface for living. The floors directly resting on the ground are known as ground floors while the floors of every storey are called upper floors.**





# COMPONENTS OF FLOORING

## 1. Sub Floor or Floor Base:

The structural component which supports the floor covering is known as subfloor or base course. For every floor, the floor base object is to give proper support to the floor covering so that it does not settle down, and also it provides thermal insulation and damps resistance.

## 2. Floor Covering or Flooring:

Over the floor base, a covering is done with finishing materials for residential and commercial buildings and each material has its own advantages and disadvantages. Mostly common floor covering materials are mud, bricks, Wood or timber, flagstones, asphalt, concrete, mosaic, tiles, marbles, P.V.C, etc.



# **Characteristics Of Good Flooring:**

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A good quality floor should possess the following Characteristics:

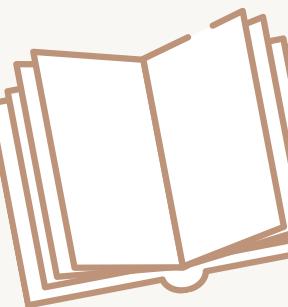
- It should be durable.
- The floor should be easy to clean.
- It should not produce any sound on walking or should be noiseless.
- Flooring must have a good appearance.
- It should be free from dampness.
- It should heat resistant and fire-resistant.
- The maintenance cost of a floor should cheap



# Types Of Flooring:

The most common types of flooring are as follows:

1. Mud Flooring
2. Brick Flooring
3. Stone Flooring
4. Tiled Flooring
5. Cement Concrete Flooring
6. Mosaic or terrazzo flooring
7. Timber Flooring



# 1. Mud Flooring:

This type of flooring is mostly found in villages and in low-cost residences for poor people. Mud flooring is hard, cheap, and it is cool in summer.

## Construction steps :

- First earth is filled up with sand up to the plinth level and by adding water it rammed to consolidate the well.
- Suitable earth in crushed form is mixed with little water.
- Prepared earth is spread over the base to the thickness of 25-50 mm blend by ramming without water.
- The finished surface is then given a wash of any dung and water mixture.



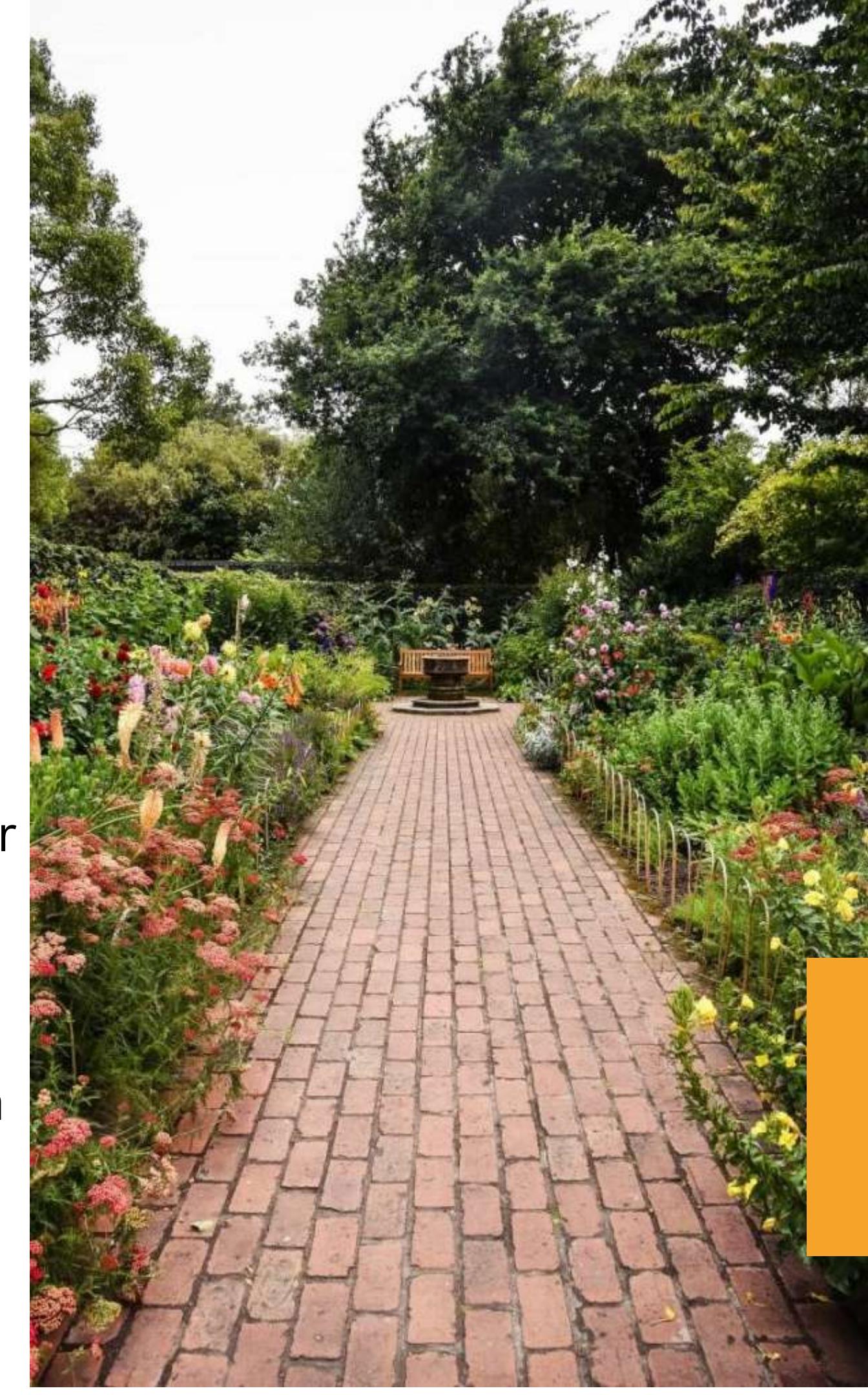
**Mud Flooring**

## 2. BRICK FLOORING:

This flooring is suitable for garden paths and garages. It is very economical durable and easy to construct and is not slippery. Bricks are arranged in diagonal or zigzag bonds.

### Method of Construction:

- Up to the plinth level sand or earth is filled in layers and compacted well with water.
- And after this, a base coarse of cement concrete of ratio 1:4:8 or 1:5:10 is laid all over the entire floor. And in this base coarse a slope is required for proper disposal of water used for washing.
- After this, bricks are laid in the desired shape( maybe in parallel rows or herring-bond pattern) on a layer of mortar about 2.5 cm thick.
- The entire floor should be cured for 7 days



### **3. STONE FLOORING:**

This stone flooring is hard, durable, economical, easy to construct, and repaired easily. There are two types of stone flooring.

1. Polished Stone Flooring:
2. Unpolished Stone Flooring



**Unpolished Stone Flooring**



**polished Stone Flooring**

#### **Method of Construction:**

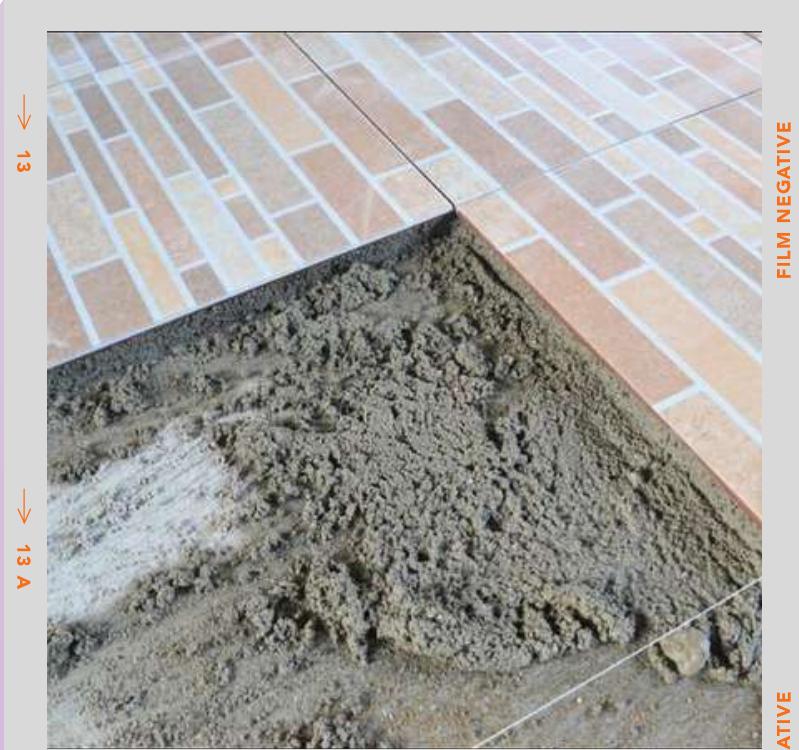
1. First the plinth filling is done and consolidated well.
2. Then the sub base of lean cement concrete of 1 :4:8 or 1:5: 10 proportion. is laid to a thickness of 10 to 15 cms and consolidated well.
3. Proper slope should be provided in the sub base itself for draining out wash water.
4. When it is sufficiently hard cement mortar of 1:5 ratios is spread to a thickness of 15 to 20 mm and the stone slabs are fixed and levelled.
5. The joints are raked to a depth of 20 mm and are flush pointed with cement mortar 1:3.

# 4. Tiled Flooring:

This type of flooring is easy to clean, elegant in appearance but costs high. One Of the demerit is that it is slippery when wet. And the merit of using tile flooring is that it can be moved to an upper floor.

## Method of construction:

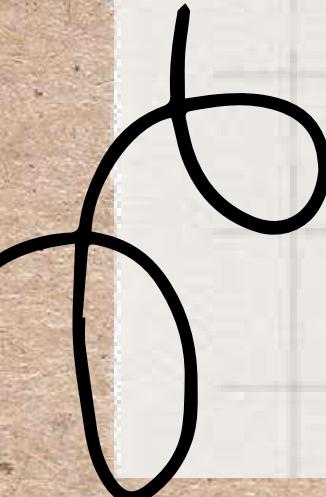
- Cement concrete is laid as a sub-base and allowed to harden. To provide a key to future layers the surface should be scratched.
- 1:3 of cement mortar is laid over the subgrade to a thickness of 10 to 12 mm and for a day it is allowed to harden
- On the next day, cement slurry is put on the bedding mortar course, and after that, the tile is put on that position and tapped gently with a mallet. Care should be taken to see the joints are straight.
- As thin as possible joints should be there and after that surface is wiped clean.
- The entire flooring should be cured for 7 days.





## 5. Cement Concrete Flooring:

It is one of the commonly used types of flooring and is best suited for all types of rooms. Cement concrete flooring is durable, smooth, pleasing in appearance, possesses good wear properties, and is economical.



## Method of Construction:



- plinth filling by morum or earth is done up to 10cm below the floor level and compacted well. Over this compacted surface a layer of sand to a thickness of 10cm is spread and compacted. Or if sloped is required provide the slope.
- The cement concrete of ratio of 1:4:8 ( cement, aggregate and over burnt brick aggregate is led to the thickness of 10cm and compacted well. For sufficient time it is allowed to harden.
- When the area is totally hardened, the entire area is been cleaned and the entire area is divided into 1\*1 m to 2\*2 m by using glass and aluminum strips of thickness 3mm
- After this, the water is sprinkled to the surface and a smooth coat slurry of cement is applied to it.
- Curing should be done for 7 days.

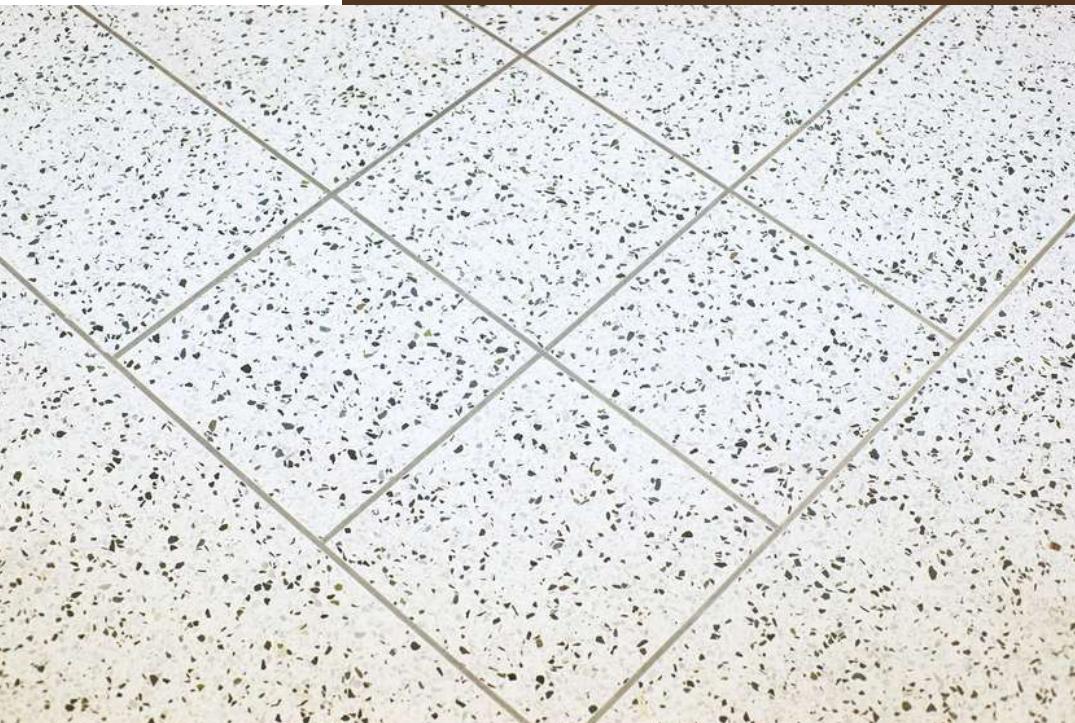


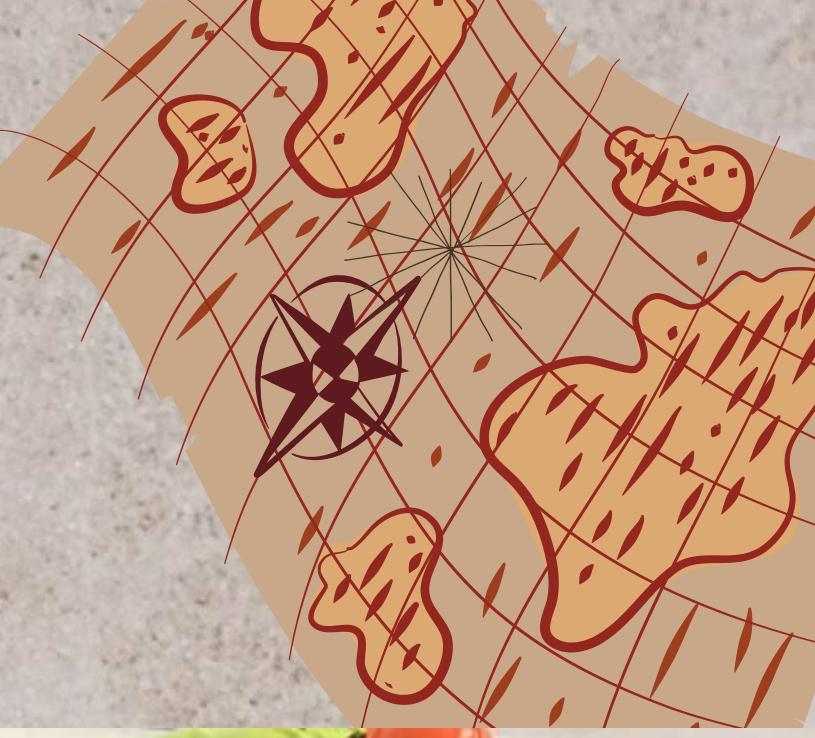
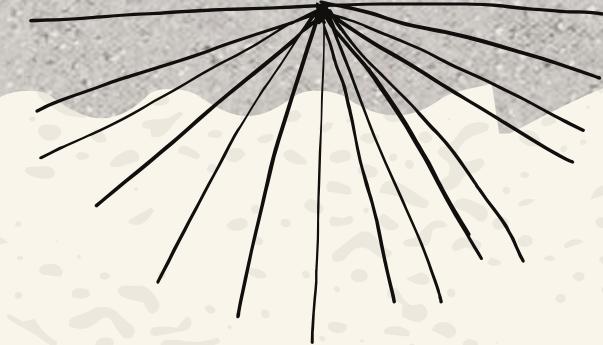
# 6. Mosaic or Terrazzo Flooring

Terrazzo is the most common type of flooring, but when compared to plain cement concrete cement flooring it is more expensive. It is easy to clean elegant in look and has a glossy and smooth finish.

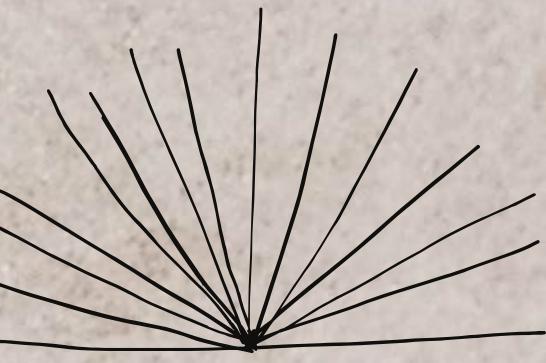
## Method of Construction:

1. The preparation of sub-base and laying of base concrete will be carried out as same we have constructed cement concrete flooring.
2. As similar to cement concrete flooring the entire area is divided into panels with aluminum or glass strips.
3. The surface of the cement concrete base should be clean of all dirt, mortar, dust plastics, etc. then we put a wash of neat cement slurry





- The bottom layer of cement concrete of ratio 1:2:4 is laid to a thickness of 20 to 25mm compacted and leveled .
- A 6mm layer of terrazzo topping would be placed on top of concrete layer. after compacting and rolling the surface allow it to dry for approx. 18 hours
- it needs to heal for few days generally upto 6 days after curing the surface must be hone using carborundum stones then recure the surface after filling grout
- apply an oxalic acid solution to the surface following the third round of gringing



# 7. Timber Flooring

Timber flooring is normally used in halls, auditoriums, dance halls, etc., but nowadays the use of wooden flooring in residential buildings is becoming popular. In hilly areas, timber flooring is becoming popular due to its low cost and easy availability.

The main drawback of the timber flooring is dampness. To avoid dampness in the timber flooring, a damp-proof course (D.P.C) should be provided.



wooden blocks

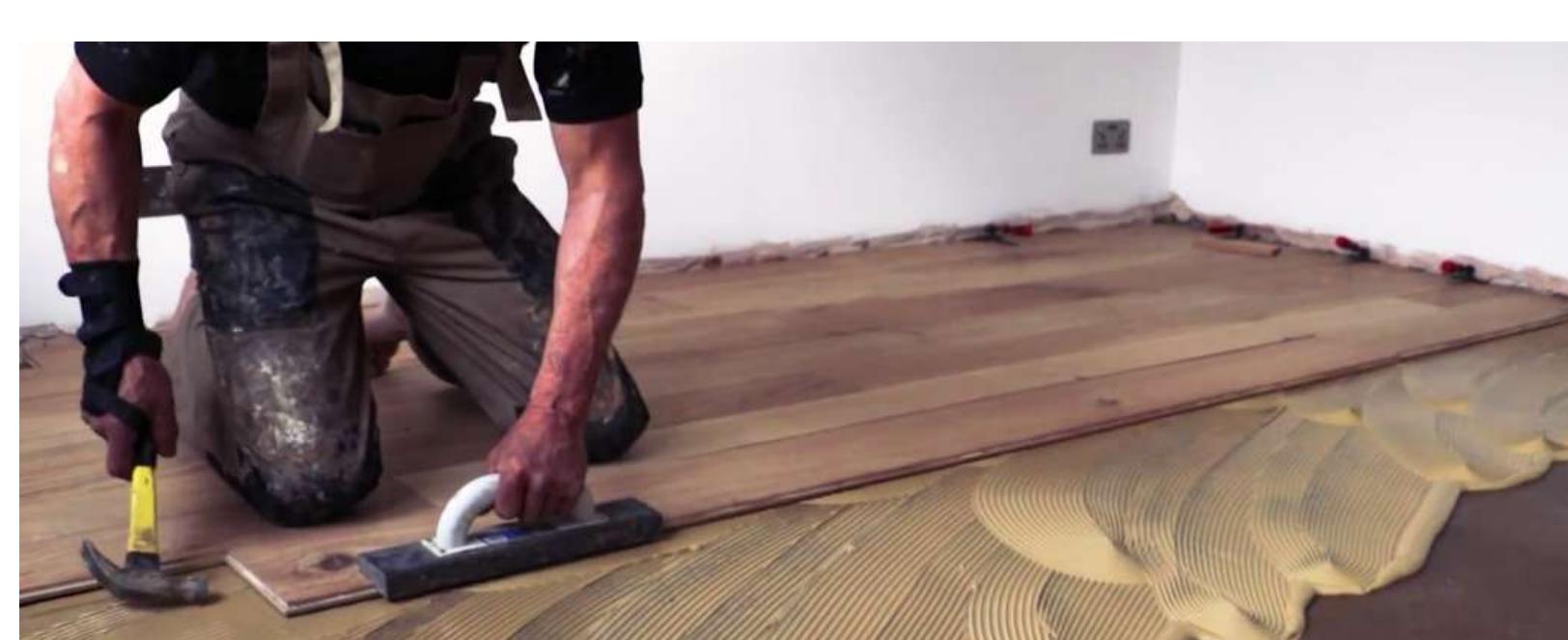


wooden plank

# Construction methods



**Nailing to a Subfloor**



**Glueing to a Subfloor**

# What Is Dampness In Building?

The presence of gravitational or hygroscopic moisture is known as dampness. One of the basic requirements of good construction is that a building or a structure should be free of dampness. It should not allow moisture to enter the building through the wall, roofs, or floors.

The moisture entering through the cracks of walls, roofs, and floors gives rise to unhygienic conditions such as deterioration of the structure and its components as well.



# Causes Of Dampness In Structures

- Moisture Rising Up The Wall From Bottom (Ground)
- Rainwater Traveling From Wall Tops
- Rain Beating Against The External Wall
- Poor drainage at the building.
- Improper orientation of walls.
- Improper slope of roof.
- Poor construction, etc.



# What is DPC?

The most important factor to make the building long life is to maintain it to be dry or free from moisture traveling through walls roofs, or floors. So, “damp-proofing” or “damp proof courses (DPC)” is a prevention method applied in buildings walls and floors to the entry of moisture in the building, it should be a perfect design.

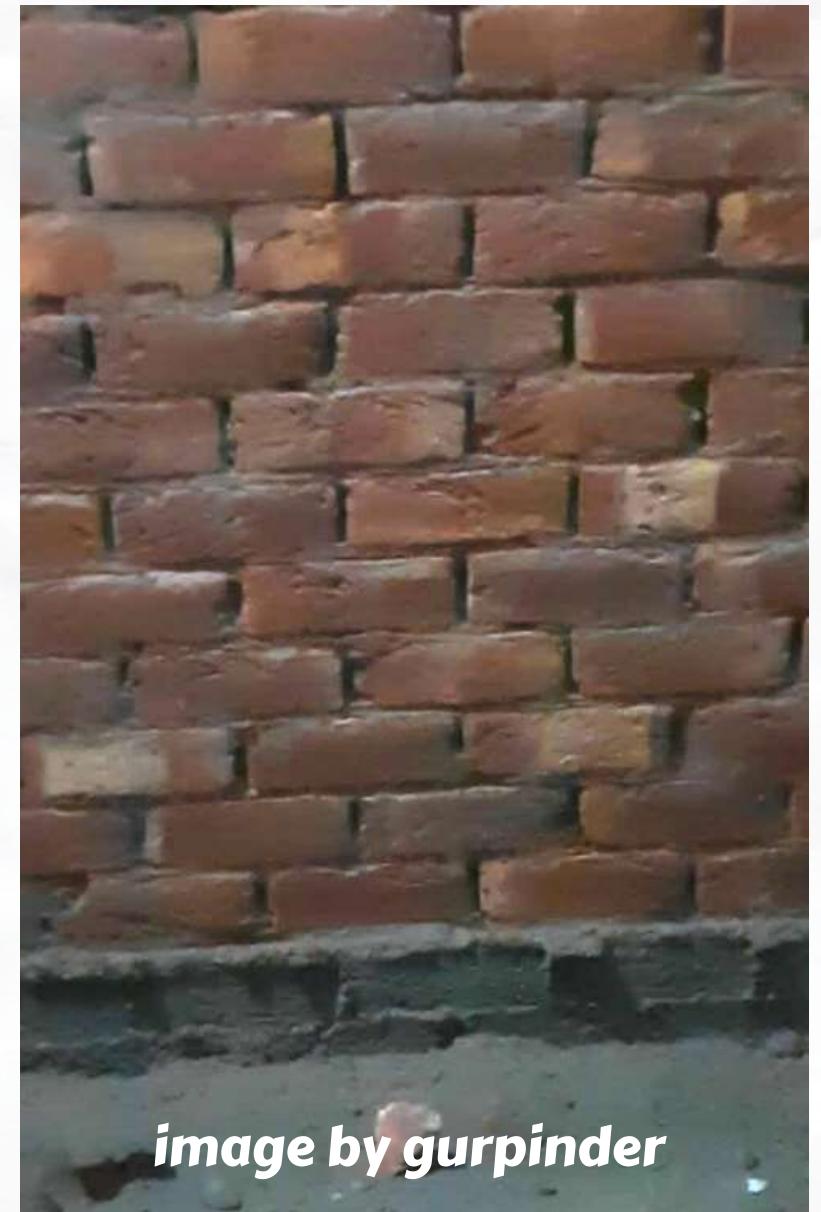
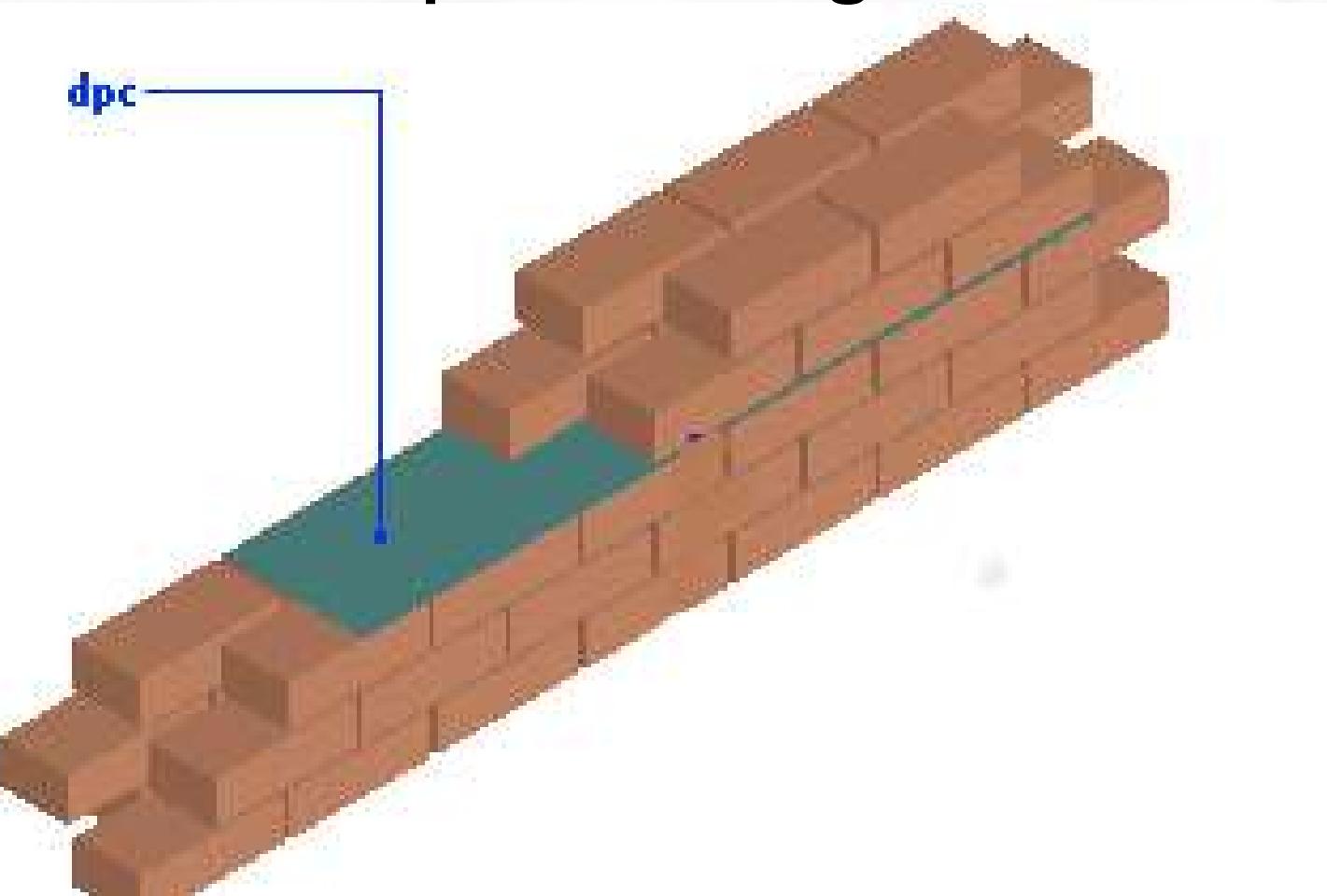


image by gurpinder

# Properties of Materials used

An effective damp proofing material should have the following properties

1. It should be impervious.
2. It should be strong and durable and should be capable of withstanding both dead as well as live loads without damage.
3. It should be dimensionally stable.
4. It should be free from deliquescent salts like sulfates, chlorides, and nitrates.

# Types of Materials for Damp Proof Course

The materials commonly used to check dampness can be divided into the following three categories:

- 1 **Flexible Materials:** Materials like bitumen felts, Hot laid Bitumen, Metal sheet, plastic sheeting (polythene sheets), etc.
- 2 **Semi-rigid Materials:** Materials like mastic, asphalt, or a combination of materials or layers.
- 3 **Rigid Materials:** Materials like first-class bricks, stones, slate, cement concrete, etc.

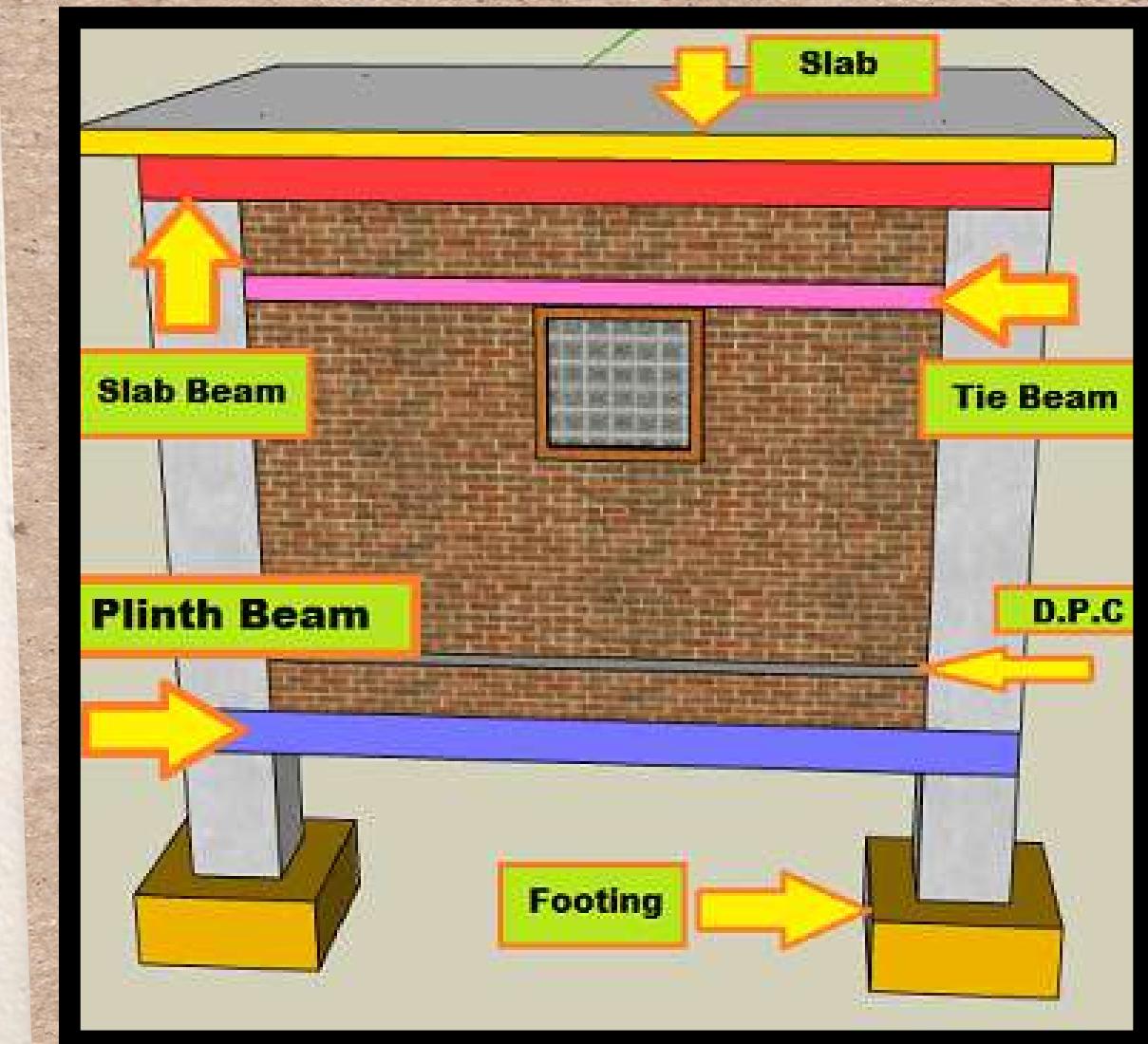


# DPC ABOVE GROUND LEVEL



Generally cement concrete is used as DPC above ground level. This type of DPC is applied at plinth level. For normal climatic conditions a 25 to 50 mm thick layer of cement concrete of grade M15 (1:2:4) can be used.

While designing concrete; waterproofing materials like Pudlo or Impermo etc can also be added to make the concrete more impervious. DPC must be at least 150mm above the level of the adjoining ground if it is in an external wall.



# DPC FOR FLOORS AND ROOFS

In case of flat or large areas (such as floor and roofs) or walls having thickness more than 40 cm, it is advised to use flexible or semi rigid types of DPC materials. Because in this type of material provide lesser number of joints.

Any flexible materials such as mastic Asphalt, bitumen felt or plastic sheets can be used. When using these materials as DPC, make sure that they bonded properly with the surface and all the joints are lapped and sealed properly.



**Floor DPC**



**Roof DPC**

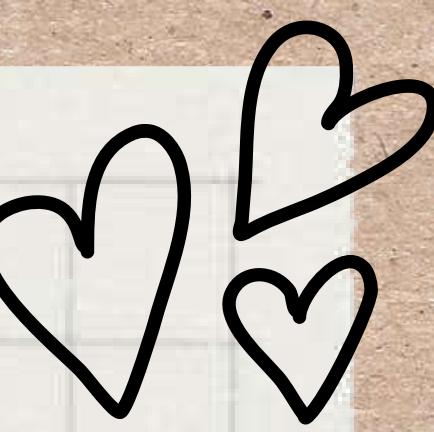
# DPC above ground level

**Prepare the surface:** Ensure the surface where you will install the DPC is clean and free of debris, and make sure there are no cracks or holes in the surface that could allow moisture to seep through.

**Choose the type of DPC:** There are different types of DPCs available, including chemical DPCs, physical DPCs, and cavity wall DPCs. Choose the type of DPC that best suits your needs and the building's design.

**Measure and cut the DPC:** Measure the length and width of the area where you will install the DPC and cut the DPC to the correct size.





**Install the DPC:** Place the DPC in the correct position and ensure it is level. If you're using a chemical DPC, follow the manufacturer's instructions to apply it correctly.

**Seal the edges:** Once the DPC is in place, seal the edges to prevent moisture from seeping through. Use an appropriate sealant to seal the edges of the DPC to the surrounding structure.

**Check for leaks:** After the DPC is installed, check for leaks or areas where moisture could be entering the structure. If you find any areas of concern, seal them with an appropriate sealant or patch.

**Finish the area:** Once the DPC is in place and any leaks have been addressed, finish the area according to the building's design.



# 1. DPC Injection

This system of the Damp Proof Course involves fluid or liquid being injected into the wall to stop the dampness from the ground from rising above the damp proof course acting as a water-repelling layer. This is generally also known as a chemical damp proof course injection.

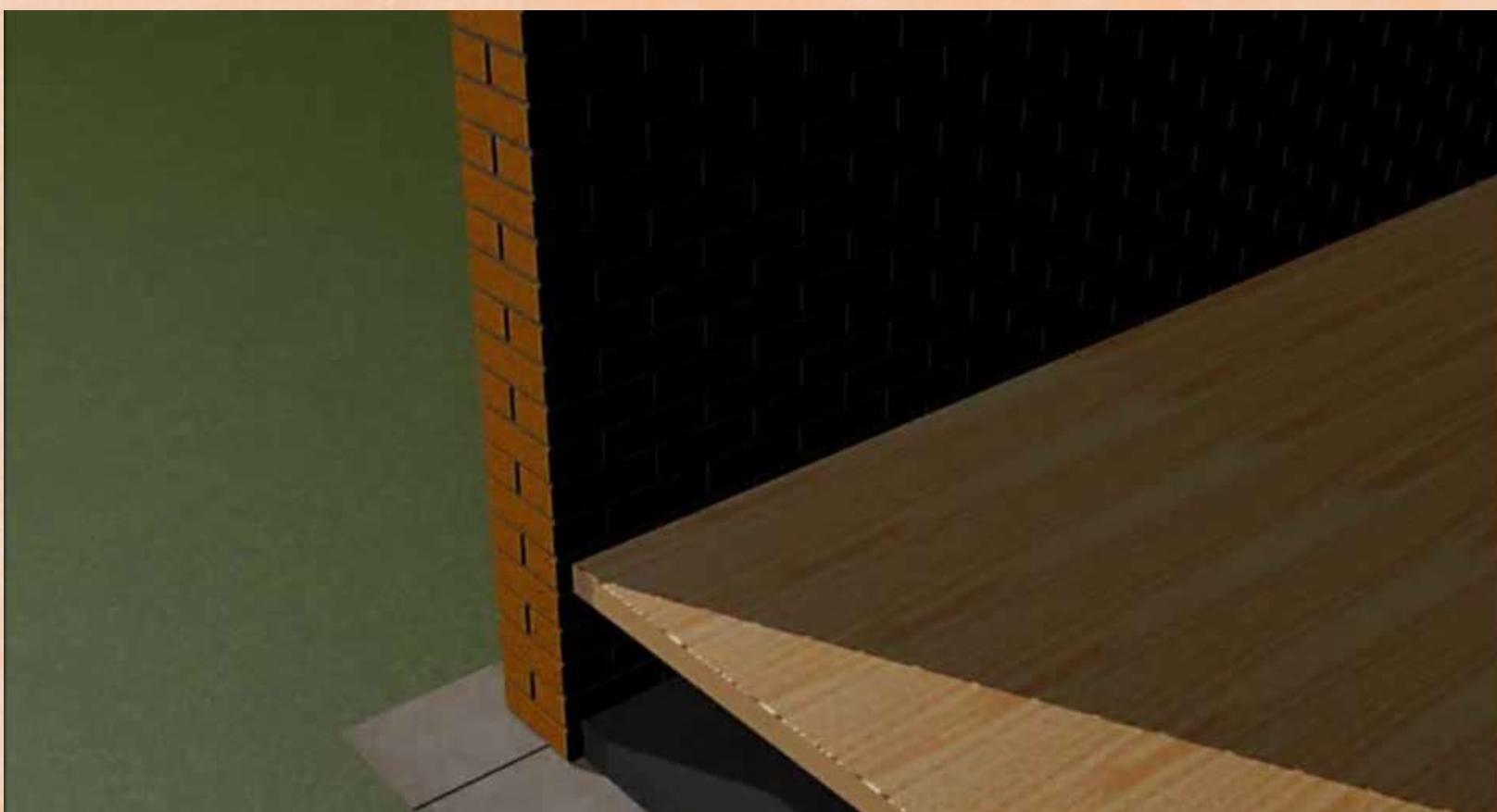
The fluid used for injecting involved in the system is injected in holes that are drilled into the wall at least 150mm above the external ground level.

## Steps

- Holes are drilled into the mortar joints
- The cream is then injected into the holes.
- The cream creates a water repellent barrier that provides full protection against rising damp.



# Video demonstration of DPC injection

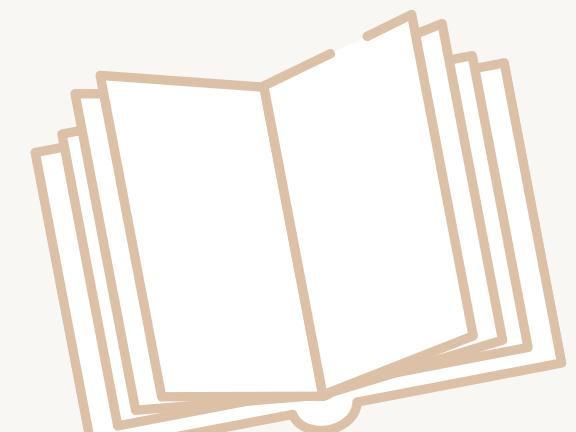
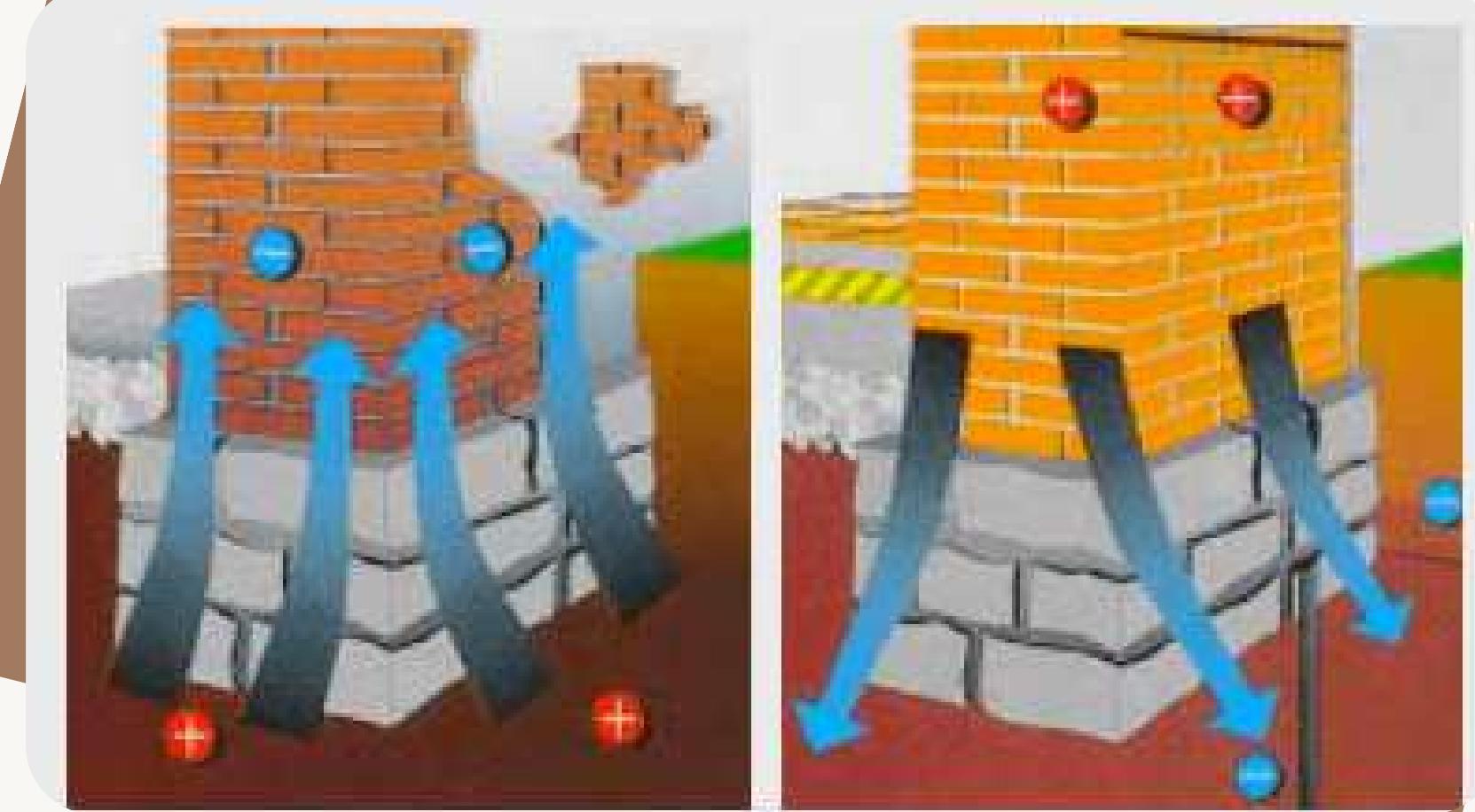


<https://youtu.be/MCcz3e7Gv8I>

# Electro Osmotic DPC

Electro Osmotic Damp Proof Course is used where chemicals are not appropriate or the client requests a non-chemical damp proof course alternative.

In this method, copper and titanium wiring are used to install a small electric charge into the wall which results in reversing the polarity of the capillary in the wall hence pulling the rising damp way below the level of the new damp course



# Video demonstration of Electro Osmotic DPC

**Electro-Osmosis Damp Proofing**  
*The scientific, non-chemical DPC system*

<https://youtu.be/ZG23TbLUrps>



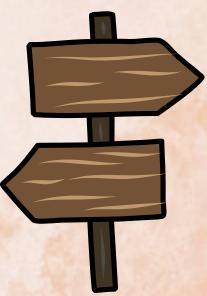
**Which of the below is not an advantage of brick flooring?**

- a) Fire proof
- b) Cost effective
- c) Slip resistant
- d) Water proof



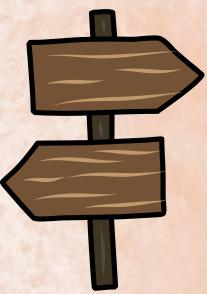
**Cement concrete floor is laid in a ratio of:**

- a) 1:8:16
- b) 1:1:2
- c) 1:4:8
- d) 1:1.5:3



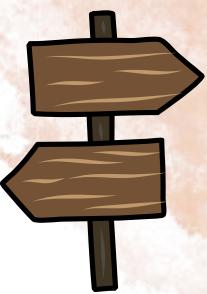
**Which of the below is an example of semi rigid DPC material?**

- A. Plastic Sheeting**
- B. Cement Concrete**
- C. Asphalt**
- D. Stone**

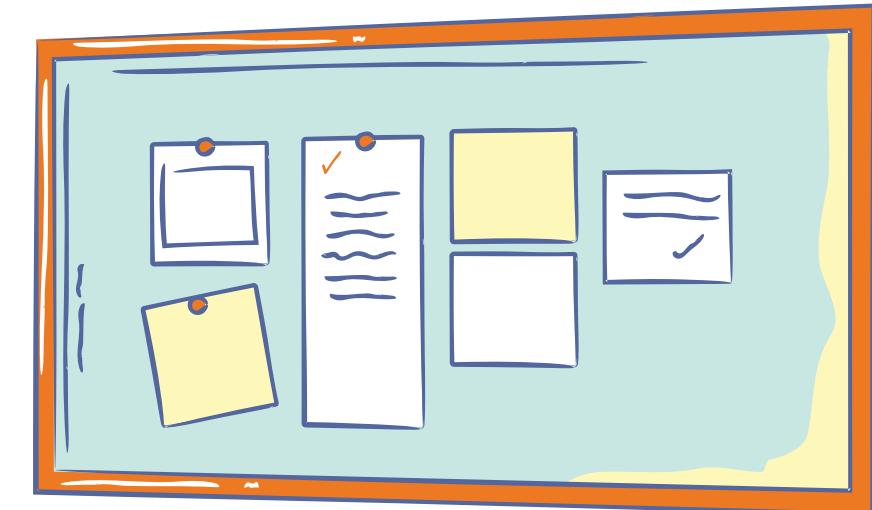


**For DPC at plinth level ,which grade of concrete is used**

- A.M15**
- B.M25**
- C.M30**
- D.M10**



**Why should DPC be 150mm above ground level ?**



**Thank You**