

Dampness in Buildings
Causes of Dampness in
Buildings
Remedial measures

Topics

- Definitions
- Causes of Dampness
- Effects of Dampness
- Remedial measures
- Classification of Damp proofing material

Definitions

- Dampness

The access or penetration of moisture inside a building through its

- Floors
- Walls
- Roof

is called Dampness.

Dampness is dangerous both for

Occupants

Building Structure and Finishes

- Due to dampness the building become unhygienic.
- Dampness in buildings is a risk for human health.

Definitions

- Peeling off
 - This term is related to plaster and it means that the plaster surface get disfigured.
- Blistered and Bleached
 - These term are related to Painting
- DPC (Damp proof course)
 - It is a layer of impervious material between source of dampness and building component

III-Effects of Dampness

- It causes dry rot to the wooden members provided in the building.
- It causes corrosion of metals used in the construction of a building.
- It causes peeling off and removal of plaster and paint.
- It causes the appearance of the floors ugly.
- Carpets remain damp.
- Electric installations get deteriorated. There are also chances of short circuiting of electric wiring.
- It causes efflorescence which affects the exposed brickwork to disintegrate and fall to powder.
- It reduces the life of the structure.
- It causes unhygienic conditions for the occupants of the building and affects their health.

Dampness in buildings is a risk factor for health effects

Moisture is the prime breeding ground for bacteria.

Associations have been found with cough, asthma, tiredness, air infection

Causes of Dampness

- Following are the main causes of dampness in a building
 1. Rain penetration
 2. Level of site
 3. Drainability of the Soil
 4. Climatic conditions
 5. Defective Orientation
 6. Entraped moisture in the building
 7. Defective construction material
 8. Defective construstion
 9. Moisture originates in the building.

Causes of Dampness

- Rain penetration:
 - Slow rain for longer duration is more dangerous for structures as compared to heavy rain for short duration of time.
 - This is because water is more likely to stay on structure in slow/light rains.
 - Properly constructed walls, bricks of good quality offer considerable resistance to penetration of moisture.
 - Moisture can also penetrate through joints of slabs and walls, top exposed surfaces of parapets and cracks in walls and roof.
- Level of the site:
 - Structures built on higher ground can be drained off easily.
 - Low laying areas will have more severe dampness if not properly controlled.
- Drainability of the soil:
 - Gravel and sandy soil allow water to pass through easily
 - Clayey soil retains moisture and also cause dampness due to capillary rise.

Causes of Dampness

- Climatic Condition:
 - Dampness is also related to the atmospheric moisture content.
 - Similarly in colder areas air moisture is condensed and drops can be found on walls and roofs.
- Defective Orientation:
 - The walls or part of the building which are getting heavy splashes of water from some natural source and not getting adequate sunlight would have dampness problem.
- Defective Materials:
 - Defective materials such as porous bricks, soft stones if are used in the areas subjected to moisture will absorb and retain more moisture. Similarly they would release moisture for longer time.

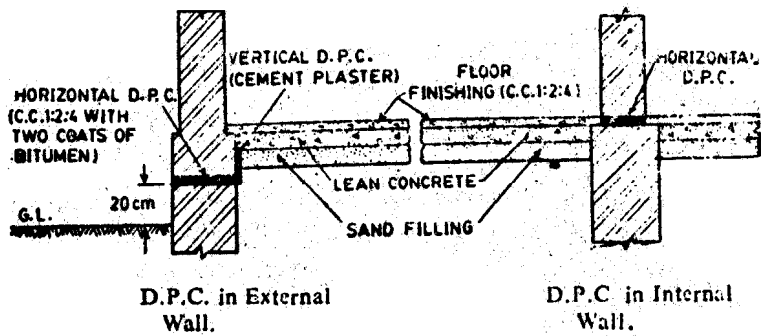
Causes of Dampness

- Moisture source inside of the building:
 - In case there is a leakage from sewers or water pipes etc. in kitchens and washrooms, it will cause dampness.
- Moisture at the time of Construction:
 - Walls, while being constructed are in wet condition, if the bricks are of bad quality(not properly burnt), then it would cause dampness in buildings for a long time.
- Defective Construction
 - If expansion or construction joints are not properly treated during construction.
 - If coping tiles are not provided over brick masonry parapet walls.

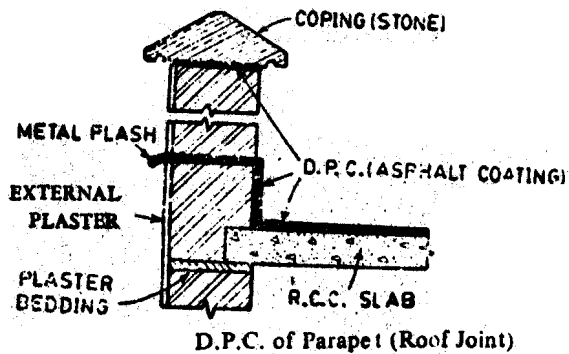


DPC at different locations

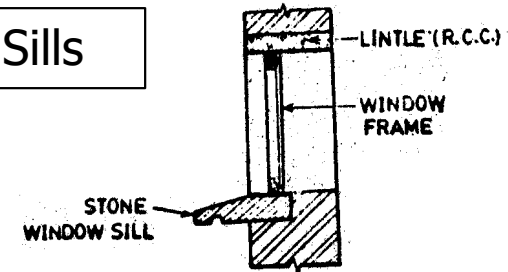
1- At Plinth Level



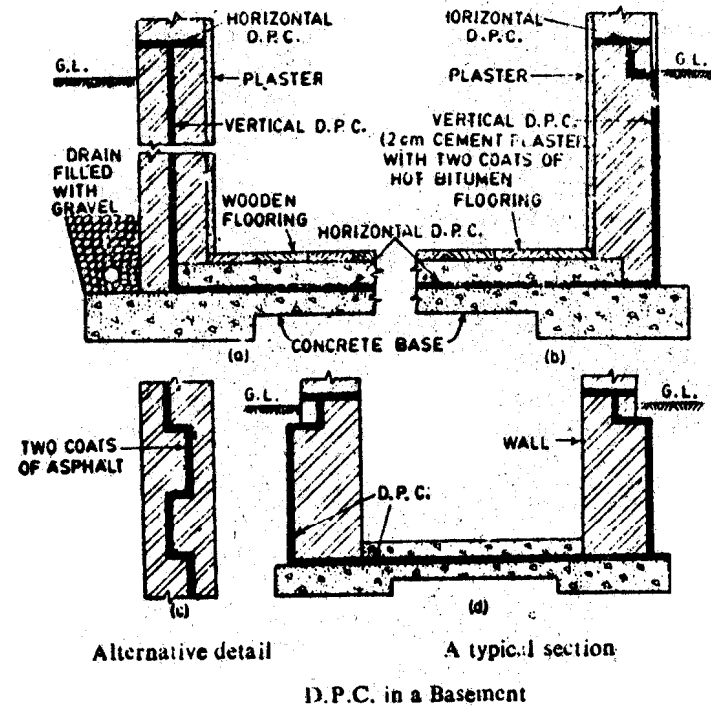
2- At Parapet Walls



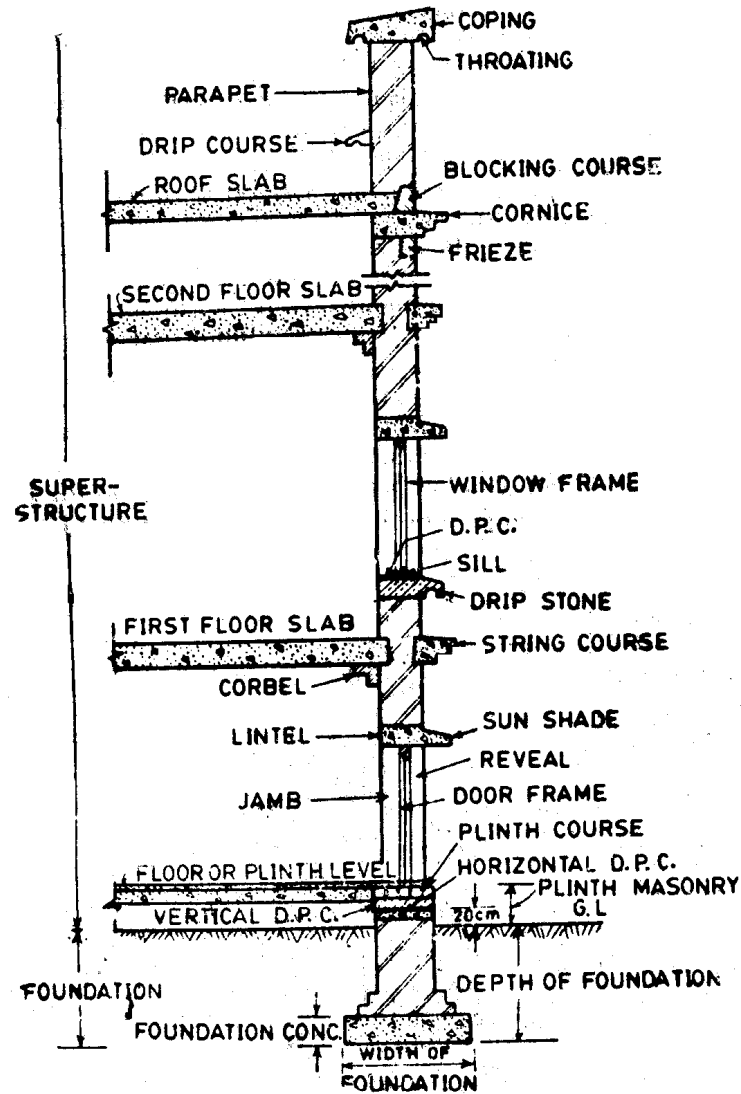
3- At Window Sills



4- Basements & Under Ground Floors

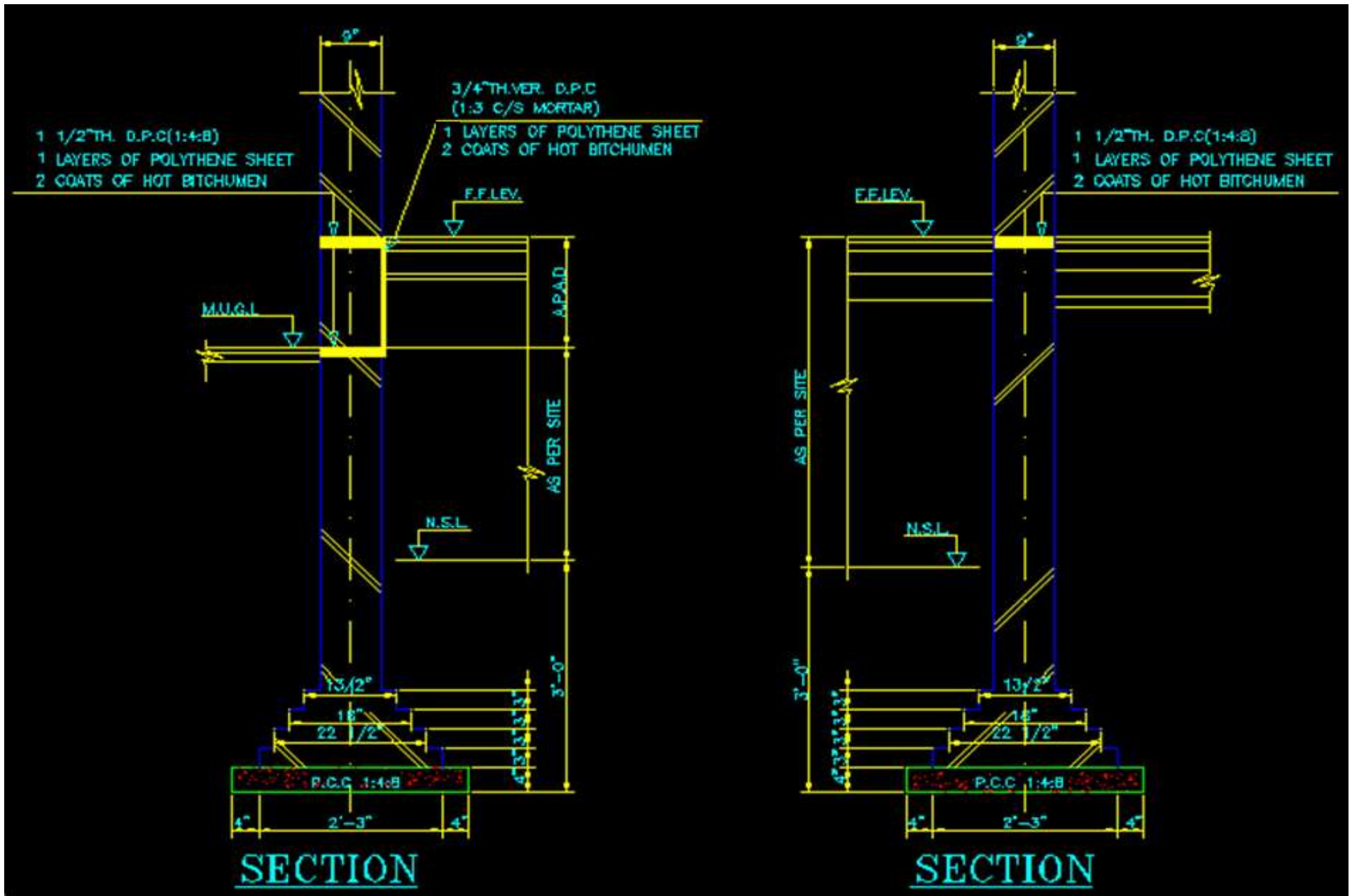


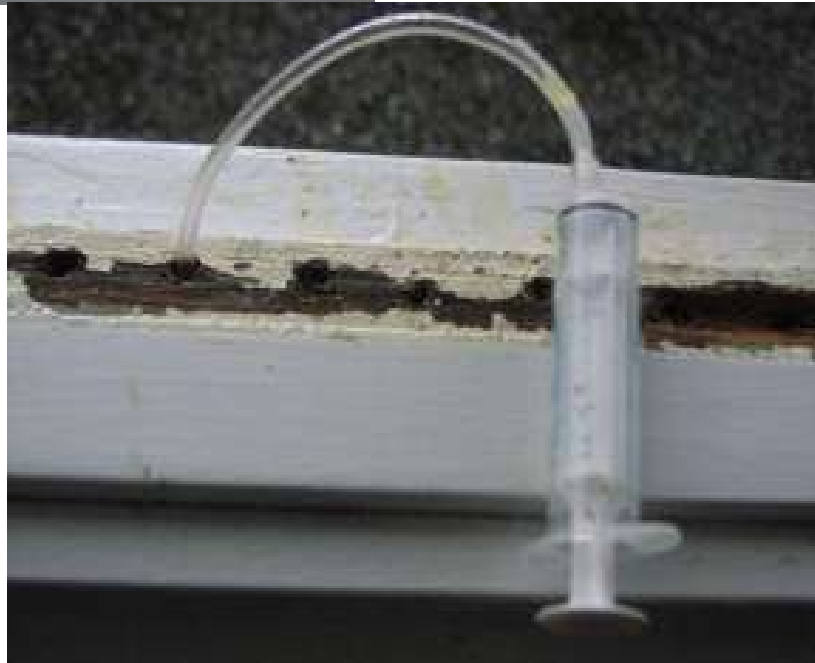
Typical section of Wall



Section through an External Wall of a Building showing its different Parts.

Typical section of Wall





Remedial Measures

- By Damp Proofing Courses (DPC)
- By surface treatment
- By water proofing construction
- By special devices/techniques

By
Damp Proofing Courses
DPC

Damp proofing material

- Classification of Damp proofing material
- Qualities of a good Damp proofing Material
- Important places for Damp proofing materials.

Classification of Damp proofing material

- Flexible Materials

- Material which do not crack and deform due to loadings.
 - Bitumen Mastic (Mastic Asphalt)
 - Bitumen felt
 - Hot Bitumen
 - Metal Sheets
 - Polythene Sheets

- Rigid Materials

- Materials that cannot resist transverse stresses and are liable to cracks due to severe loading.
 - Rich Concrete
 - Mortar
 - Bricks
 - Stone Slabs

Flexible Materials

- Bitumen Mastic (Mastic Asphalt)
 - Hot Bitumen or Asphalt + Sand
 - Applied in hot state in 1" to 2" (2 cm to 5 cm)
- Bitumen felt
 - 6 mm thick bitumen sheet available in roll form
- Hot Bitumen
 - It is sprayed at @ 1.75 kg/m²
- Metal Sheets
 - Lead, copper, Aluminum sheets can be used
 - Lead can react chemically with cement so should be laid in lime mortar.
 - Minimum thickness of copper sheets should be 3 mm.

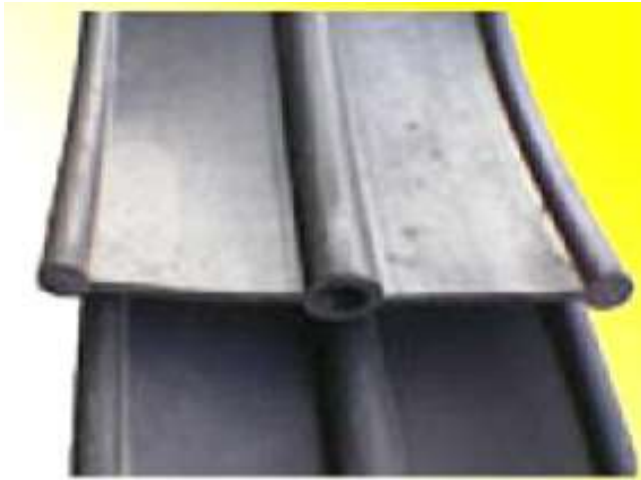
Rigid Materials

- Rich Concrete
 - 1" to 3" thick layer of P.C.C (1:2:4) painted with two coats of hot bitumen is applied.
- Mortar
 - Rich or fat cement mortar CS(1:3) is laid in $\frac{3}{4}$ " thickness (2 cm) as vertical DPC.
 - Painted with bitumen
- Bricks
 - Over burnt bricks are used in two layers in CS(1:3) mortar
- Stone Slabs
 - Two layers of stone slabs in lime, cement and sand mortar (1:1:6) is provided in areas where stone is easily available.

Qualities of a good Damp proofing Material

1. Impervious
2. Durable
3. Non disintegratable
4. Stable under the loading
5. Level finish
6. Full coverage of wall thickness
7. Availability
8. Economical

Water Stoppers & Bitumen Felt



Important places for Damp proofing materials

- At Plinth Level (in walls) (external & Internal)
- Parapet walls
- Window sill
- Basements and Under ground Floors

Practical Advice for Reducing Excessive Moisture

- Fix roof and plumbing leaks right away
- Check for standing water (e.g., basement & refrigerator drip pan)
- Make sure rain drains away from house
- Ensure adequate ventilation and circulation. Use fans that vent air to the outside when bathing, showering, and cooking
- After flooding, remove any wet or damp material right away and start drying (with fans). Pull up carpets.

