

Building Construction and Drawing

(Final Term)

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Lecture: 01: 10/11/08:

Dampness and DPC:

Def.: The access or penetration of moisture content into building through its walls, floor, roof etc is called Dampness.

All Effect:


- (1) Cause rotting of wood.
- (2) ~~at~~ Causes corrosion of metallic fixtures.
- (3) deteriorate electric installations.
- (4) deteriorate carpets, furnitures etc.
- (5) Causes spots on floors and walls.
- (6) Causes peeling off and removal of plaster.
- (7) Causes bleaching and blistering of paint.
- (8) Causes efflorescence.
- (9) Dangerous for the health of occupants.
- (10) Reduces the life of structure.

Causes of dampness

- (1) Rain Penetration
- (2) Level of Site
- (3) Drainability of soil
- (4) Climate Condition.
- (5) Defective Orientation.
- (6) Moisture entrapped during construction.

- porous bricks.
- (8) Defective construction → Joint of Structure
- (9) Moisture which originate in building itself. For example during the leakage of drainage pipe.

Method of Preventing Dampness:

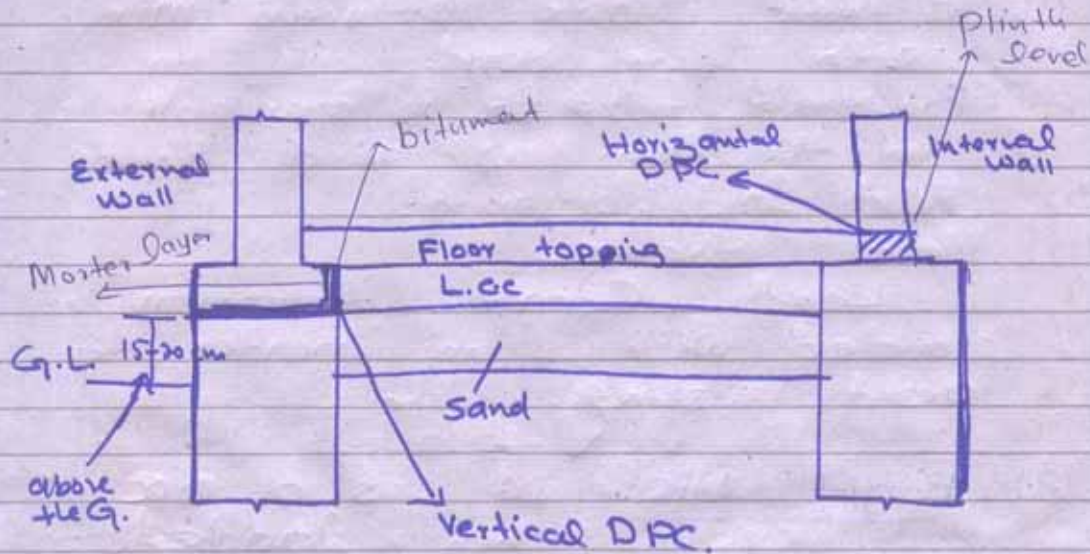
- (1) By providing DPC. (Damp Proof Course).
- (2) By surface treatment. i.e. Providing water proof paint.
- (3) By Integral Water proofing Method. This can be done by Mechanical Method or by some chemicals.
- (4) By ~~Special~~ special devices:
 - ⇒ By providing Chajras.
 - ⇒ By providing 13.5" instead of 9" wall.
 - ⇒ By providing cavity wall. 
 - ⇒ Cavity may be filled with some insulating material.

Corbels: This is provided in internal side of roof.

- ⇒ For decoration
- ⇒ Prevent dampness.

DPC: (Damp proof Course):

It is continuous layer of impervious material.



It prevent water to penetrate from G.

⇒ For internal wall we only provide Horizontal DPC.
 17519 kg/cm^2 (Standard pressure for bitument).

⇒ Three layers of bitument is provided.

⇒ You should provide a mortar layer before D.P.C (bitument) etc.

DPC:

Two types:

(1) flexable DPC ⇒ It is a DPC when loaded, It can be easily

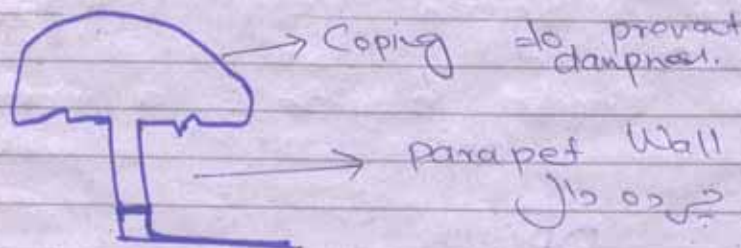
For example Polythine or bitument.

Three layers:

- (1) Bitument Mastic: bitument mix with fine sand.
- (2) Bitument felt: It is available in the form of roled Sheets.
- (3) Hard laid bitument:
- (4) Metal Sheets: Lead, Copper, Aluminisim is provided with lime mortar, to avoid rusting.

(2) Rigid DPC: It is a DPC when loaded, It cracks.
For example Rich Cement Concrete 1:2:4.

→ That lies. Bamboos provided with bitumat.



Window Cell is also provided

Date: 17-11-08:

Floors: The surfaces with necessary supports to provide accommodation is called floor.

Necessary supports may be beams, slab etc.

Types:

- * Ground floor: It is provided above the ground level.
- * Basement floor: It is provided below the ground level.
- * Upper floor: It is provided above the level of ~~the~~ ground floor are also called suspended floor. When it is not in use it is just called roof.

Terms:

- * Base Course (Sand Filling + Base):

Base is called base concrete,

It L.C.C. (1:8:16).

It is also Lime Concrete with a ratio 1:4:8. \Rightarrow but this we do not use in routine.

For safety we use L.C.C with a ratio 1:4:8.

\Rightarrow Sand Filling \Rightarrow to prevent dampness.

\Rightarrow Base \Rightarrow to provide solid base.

- * Under layer:

These are the general steps for floors.

① Compaction

(2) Sand filling

(3) L.C.C

(4) Topping

⇒ If the soil condition are not good, we provide an under layer between base and topping. This layer is called under layer.

* **Topping:-** The topmost layer of a floor provided over the under layer or over base course in the absence of under layer is ~~call~~ called topping.

Thickness = 4cm (1:2:4)
But if some one not afford then provide in two layer.

⇒ 2.5cm (1:2:3)
⇒ 1.5cm (1:3:6)

* **Floor Finish:-** The top surface of floor is called floor finish.

* **Screeds:-** The narrow strips of wood, bands of plaster or ~~topping~~ or pieces of tiles, laid on floor, to act as guide for bringing the topping to a true and even surface are known as screeds.

* **Screeding:-** The art of bringing the floor to a true and level surface.

screeds ~~are~~ is called screeding.

* **Pointing** → It is a process to fill the joints in bricks or stone masonry.

Types:

(1) **Flush pointing**:- When the joints are completely filled, this is called flush pointing.



(2) **Recessed pointing** → In this case some space is left in joints and some is filled.



(3) **Weather pointing**:-

It is used in stone masonry. Mortar projection is bulging out of the joints.



Types OF GROUND FLOOR:

Types of floor depends upon method of construction.

(1) **Murum or mud floors**:- The ground floor having its topping consisting of murum or mud is called murum or mud floor.

These floors are cheap and easily repairable. But these floor do not provide an impervious surface.

⇒ Compact the earth.

⇒ 20 cm stone ballast.

Broken Bats are also used.

It is then packed and rammed.
⇒ After ramming a layer of murum or good earth, about 15cm thick is laid.

⇒ After this layer, a layer of a powdery variety of murum earth, 2.5cm thick is uniformly spread.

* The whole surface is then well watered and rammed until the cream of the murum come to the surface.

* After 12 hours the surface is again rammed for about three days.

⇒ Then the surface is smeared with a thick paste of cowdung and rammed for about two days.

⇒ Finally a thin coat of mixture 4 parts of cowdung and 1 part of Portland cement is evenly applied. And the surface is wiped clean by hand.

⇒ For properly maintaining this type of floor, gubri leaping is done once a week.

Suitability:-

These floors are generally used for unimportant buildings in rural areas.

(2) **Brick floors:-** The floor having its topping consisting of bricks is known as ~~br~~ brick floor.

⇒ These floors can be easily constructed and repaired. But this type of floor give a rough surface. They easily absorb moisture from the surrounding areas and may cause dampness in the building.

Method of Construction:-

⇒ First of all the top surface of earth is properly compacted.

⇒ Then a layer of clean sand is evenly spread.

⇒ Then a layer of ~~lean~~ lean Cement Concrete is spread, compacted and cured.

⇒ Over this base concrete, well soaked bricks are ~~laid~~ laid in cement mortar (1:4).

⇒ Do pointing.

*: Thickness of joints should not be more than 2mm if the pointing is not to be done.

* And thickness of joints should not be less than 6mm if pointing is to be done.

(3) **Tile floors:-**

The floor having its topping consisting of tiles

The tiles used in tile floor may be of any desired, quality, shape, thickness and colour.

Sizes: The following sizes of floor tiles are commonly used


- (a) $15\text{ cm} \times 15\text{ cm} \times 1.8\text{ cm}$.
- (b) $20\text{ cm} \times 20\text{ cm} \times 2\text{ cm}$.
- (c) $22.5\text{ cm} \times 22.5\text{ cm} \times 2.2\text{ cm}$.

Method of Construction:

- ⇒ First the surface is properly compacted.
- ⇒ Then a layer of base coarse is laid. ~~Sum~~ Such that, sand layer is laid, and L.C.C is laid.
- ⇒ Over the ~~ce~~ base coarse, a thin layer of lime or cement mortar is spread, with the help of screed battens.
- ⇒ When the surface mortar becomes hard, then a layer of 6mm thick bed of wet cement mortar (1:5) is laid.
- ⇒ Then tiles of required dimension is laid.
- ⇒ The surplus mortar which comes out of the joints is cleaned off.
- ⇒ Use hard corborandom stone to knocked off projection.
- ⇒ Then do polishing with soft corborandom stone.

Finally washed with soap.

Suitability: These floors are used for paving courtyards of buildings. Glazed tile floors are used in modern buildings where high class finish is required.



(4) Flag stone floors:

The floor having its topping consisting of stone slabs is known as flag stone floor.

⇒ The stone slabs to be used in such floors may or may not be of same size but these slabs should not be more than 75cm in length and not less than 35cm in width and 3.5cm in thickness.

Method of Construction:

- ⇒ The soil is properly compacted.
- ⇒ Then a layer of sand is laid, and then L.C.C is laid, which is combinedly called Base Course.
- ⇒ Thin layer Cement mortar (1:5) is spread uniformly.
- ⇒ When the mortar surface become hard, then 6mm thick layer of Cement mortar (1:5) is spread as bed.

⇒ The thickness of joints should not exceed 4mm and they should be ~~be~~ struck off with a trowel while laying in position.

Suitability: These floors are suitable for sheds, workshops, godowns, stores etc.

(5) Cement Concrete floors:

The floor having its topping consisting of cement concrete is called a cement concrete or conglomerate floor.

⇒ The concrete floors consist of 2 to 5cm (generally 4cm) thick cement concrete (1:2:4) topping laid over 10cm base concrete, which is in the form of L.C.C. The base concrete in turn rests over 10cm thick clean sand which is laid over a compacted earth.

Advantages:

- (i) Concrete floors are hard and durable.
- (ii) They provide a smooth and non-absorbent surface.
- (iii) They are more fire-resisting.
- (iv) They can be washed and cleaned easily.
- (v) They can be finished.

TYPES OF CEMENT CONCRETE FLOORS:

According to the method of finishing of the topping, cement concrete floors are classified in the following types.

(a) Non-monolithic or bonded finish Concrete floors:

§ The cement concrete floor in which the topping is not laid monolithically with the base concrete is known as non-monolithic concrete floor.

⇒ In this type, the topping is laid, on the third day of laying the base concrete. Thus the floor provides a non-monolithic construction. The base concrete consist of L.C.C which is laid over thick clean sand spread over compacted earth.

⇒ The topping of such a concrete is laid by the following two methods.

(1) Topping laid in a single layer:

In this case, the topping consisting of cement concrete (1:2:4) about 4cm thick in single layer is laid.

(2) Topping laid in two layers:

In this case, the wearing (top) layer consist of 1.5cm thick cement concrete (1:2:3) is laid

2.5cm thick cement concrete (1:3:6).

(b) Monolithic finish concrete floor:

The cement concrete floor in which the topping consisting of 2cm thick Cement concrete (1:2:4) is laid monolithically with the base concrete is known as monolithic finish concrete floor.

⇒ In these floors, the topping is laid within 45 minutes to 4 hours after placing the base concrete. The base concrete is laid directly over 5 to 10cm thick hard core of rubble filling of dry brick or stone ballast which is usually laid over 10cm thick sand filling over compacted earth.

⇒ Granolithic floor finish:

⇒ In situations where the floor is withstand ~~has~~ heavy wear i.e. in factories, stores, garages etc. granolithic floor finish may be provided. This type of finish consist of a mixture of crushed granite which is well graded, and mix with cement so as to form a dense mass. The usual proportions of the ~~mix~~ mix are 1 part of

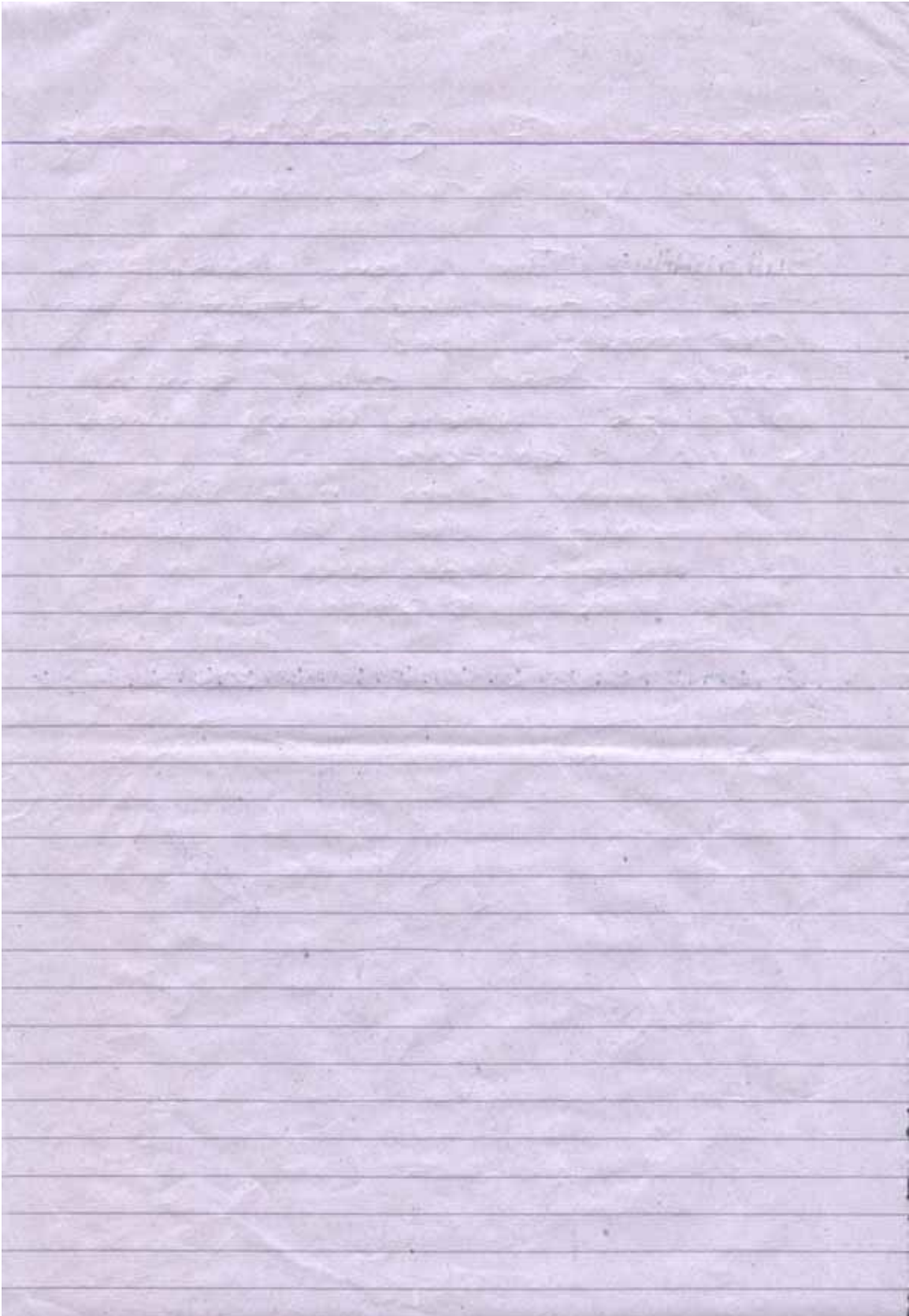
Thickness of granolithic topping varies from 2.5 cm to 5 cm.

Suitability: The floors with 2.5 cm to 3.8 cm thick topping are mostly used for residential office, and other similar buildings, where heavy wear is not expected.

Whereas floor with 5 cm thick topping, are very suitable for colleges, factories, for all such places subjected to heavy wears.



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Zubairudin. Date: 01-03-2009



LECTURE No#03:-

6- Terrazzo floors:

Those floors having their topping consisting of terrazzo finish are known as terrazzo floors.

Method of Construction:-

* Compaction:-

First of all the earth surface is properly compacted.

⇒ Base Course:-

After preparing the base earth surface, we provide base course, i.e. 1st sand layer is laid, then a layer of lean cement concrete is provided.

⇒ Rich Cement Concrete layer:

After laying the base concrete, an under layer 3.2cm thick or 4cm of rich cement concrete (1:2:4) is evenly spread, and the surface is left without troweling.

⇒ Fixing of dividing strips:-

After this layer the metal strips of aluminium, brass, glass marble etc are inserted in this layer before the concrete gets hardened. These strips are provided to prevent cracking at the topping.

are fixed in position according to the pattern desired. They should be ~~cut~~ extend 0.75 mm above the finishing level, so that they can be ground down flush with the floor surface, when the terrazzo finish is being ground.

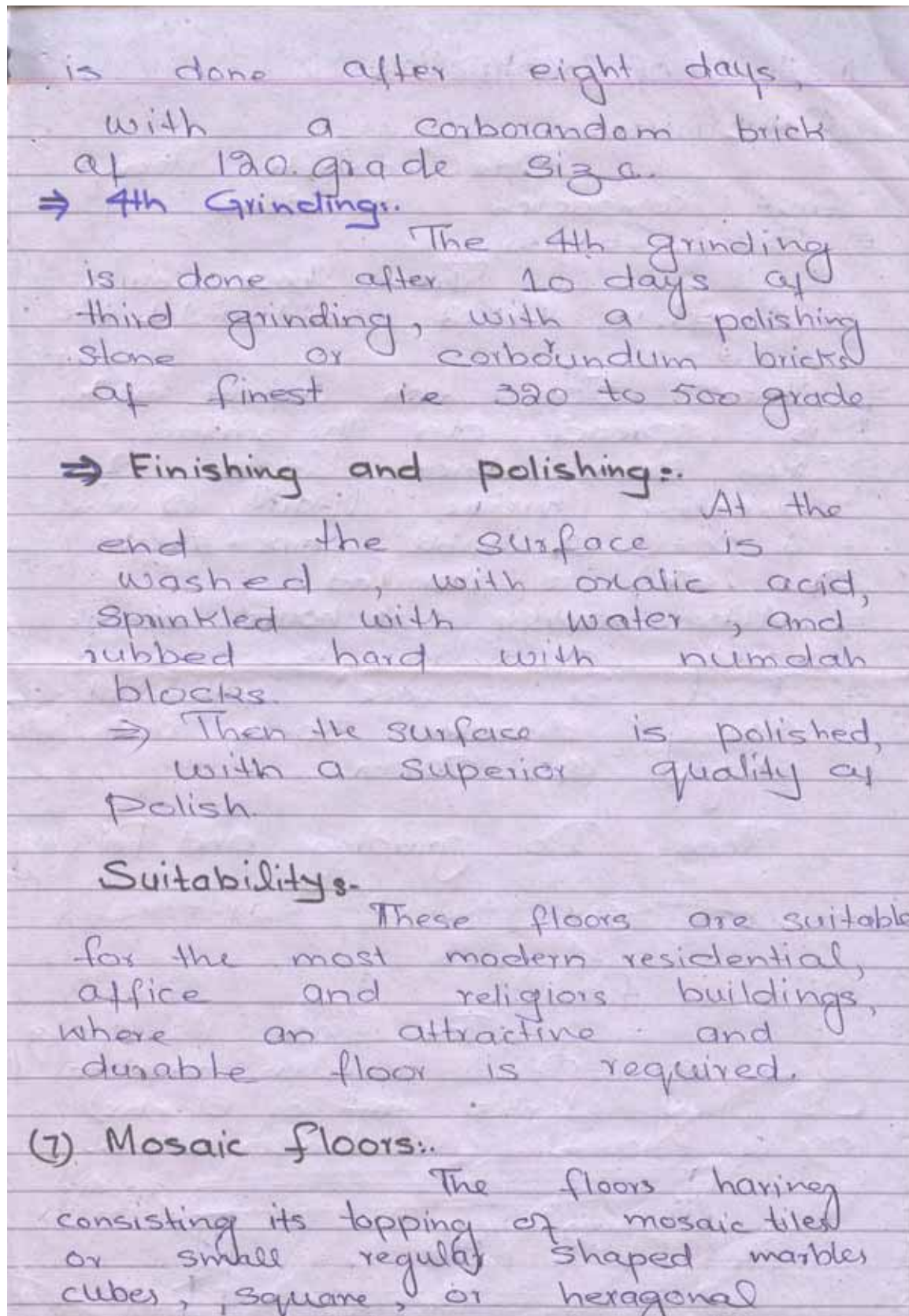
⇒ **Laying of topping of terrazzo mix:-**
After this, a layer of terrazzo mix is laid and leveled with the top of the ~~the~~ dividing strips. Then they are screeded and trowelled.

⇒ **Grinding:-**
After one or two days when the terrazzo mixture becomes hard, then it is grinded, in the presence of water. It is grinded four times.

⇒ **1st Grinding:-**
The first grinding should be done, with a rough corborandum brick of 60 grade size. All the holes which are visible, are filled with grout of cement, and colouring matter of similar colour.

⇒ **2nd Grinding:-** The second grinding is done, after four days, with 80 grade corborandum brick.

⇒ **3rd Grinding:-** The 3rd grinding



Method of Construction:

⇒ **Compaction:**

Like concrete floor, first compaction is done.

⇒ **Base Course:**

Then base course is layed, i.e. that of sand and L.C.C.

⇒ Then 5cm rich cement mortar (1:2) is spread over the surface.

⇒ Then 3cm thick layer of cementing mixture (1 part of cement + 1 part of marble chips + 2 part of lime) is provided.

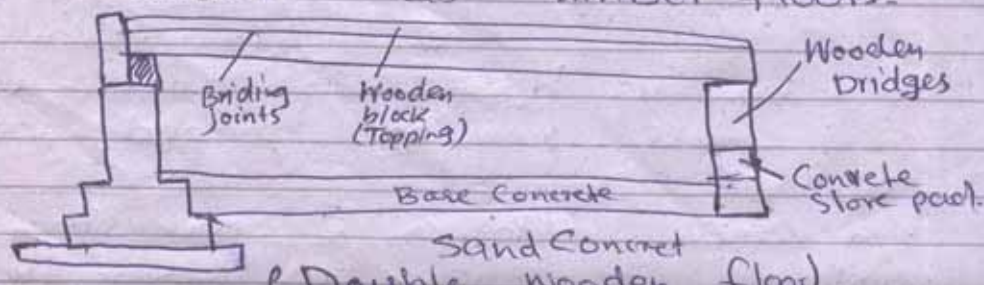
⇒ After nearly 4 hours, mosaic marbles or tiles is embedded.

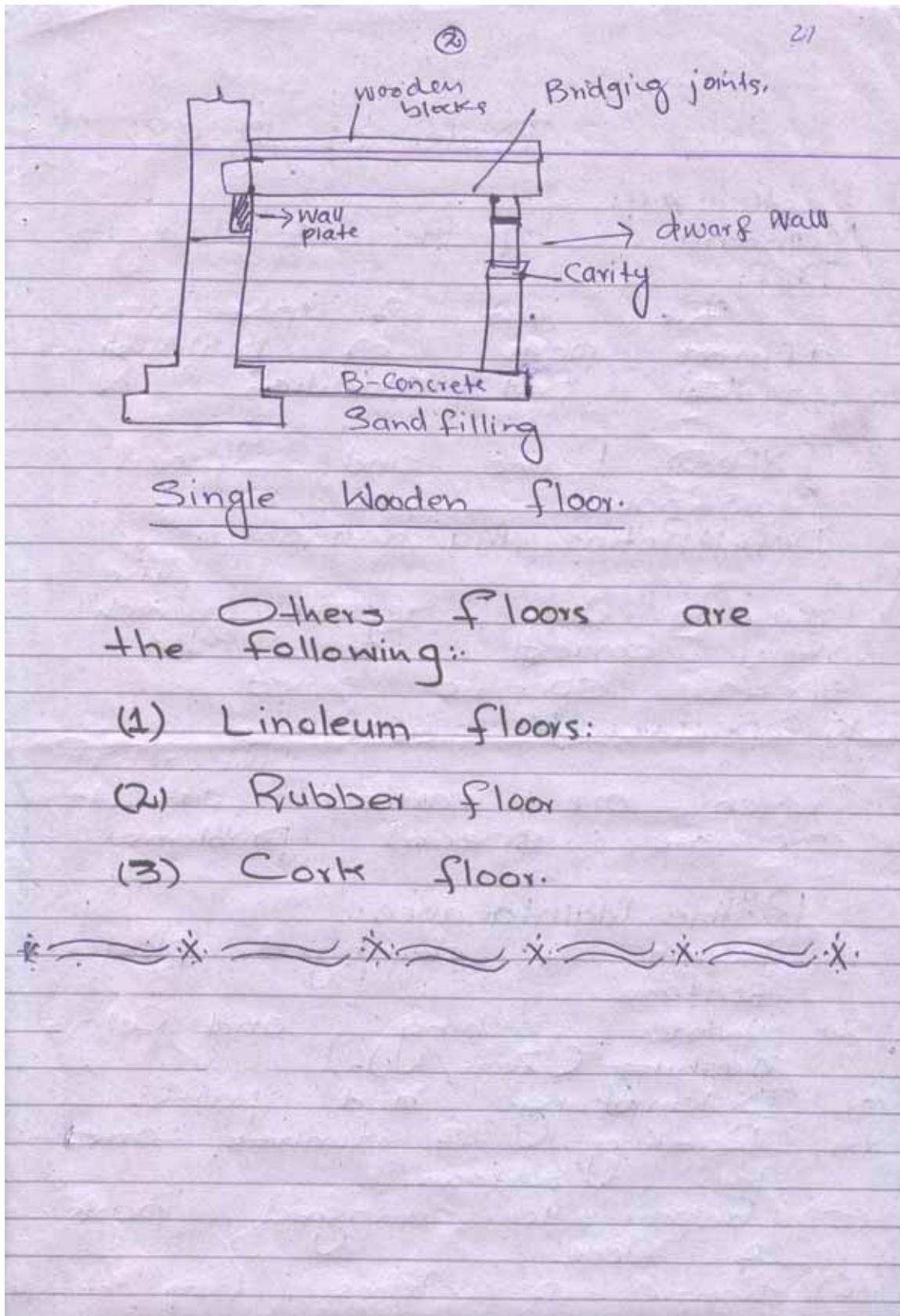
⇒ Level the surface with rod having diameter 30cm and length of 50cm.

⇒ Then Do grinding and Polishing.

Timber floors:

The floor its topping consisting of wooden members (Strips, planks and or blocks) are known as timber floors.





Lecture: #4:

Maintenance of the Building:

Def:

The art of upkeeping different parts of building in their best condition.

Types: Routine and Special Maintenance.

Def: * Routine Maintenance:

The day to day repairs which are carried out after special specific period.

* Special Maintenance:

The repairs which are carried out to overcome special problems.

Routine Maintenance:

- (1) Repair of damaged plaster surface.
- (2) White washing and Colour washing (Zinc/White)
- (3) Distemppling and paints.
- (4) Painting of timbers and steel surfaces.
- (5) Repair to damaged parts of floor.
- (6) Removal of stains from concrete / Terrazo / mosaic floor.
- (7) Repolishing a terrazo / Marble / Mosaic floor.

(8) Repairs to worn out timbers.

*** Special Repairs:**

- (1) Strengthening of foundation, and foundation of soil.
- (2) Rectification of leaking roof.
- (3) Repair to damaged concrete surface.
- (4) Providing DPC in existing ~~surface~~ structures.
- (5) Anti termite treatment.
- (6) Repairs to expansion joints.

