66451 **Construction Process –II**

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AIMS

After completion of the course the students will be able to:

- Understand the construction process of arch and lintel.
- Understand the construction process of different types of floor.
- Understand the construction process of stairs.
- Understand the construction process of different types of roof.
- Understand the different finishing works in building.
- Understand the construction process of doors and windows.
- Understand the different operation and maintenance construction equipment.
- Understand the construction of bridge, culvert, canals etc.

SHORT DESCRIPTION

Arches; Lintels; Ground floors; Upper floors; Damp proofing; Termite treatment; Stairs; Roof; Pitched roof; Plastering and pointing; Doors; Windows; Carpentry and joinery; Scaffolding; Form works, Pointing & Varnishing, construction equipment, Building Services, Insulation, bridge/culverts and canals etc.

DETAIL DESCRIPTION

1. Understand the different type of arches and lintels.

1.1 State the meaning of arch and lintel.
1.2 Mention the functions of arch and lintels.
1.3 List the common terms used in arches and lintels.
1.4 Mention the different type of arches according to their shape, center and material.
1.5 Describe the correct procedures of construction of arches and lintels.

2. Understand the floor.

2.1 Mention the components of a floor.
2.2 Mention the essential requirements of a floor.
2.3 Name the suitable materials used for the construction of floor.
2.4 Describe the construction procedure of the following type of floors:
Brick floor, Brick concrete floor, Terrazzo floor, Mosaic floor, Tiled floor, Marble floor, Timber floor, Reinforced Glass floor, Cork floor, Glass floor, Plastic floor, Ribbed floor, Solid floor, Hollow floor, Composite floor, Rubber paint floor, Epoxy paint floor

3. Understand the dampness of building.

3.1 Mention the causes and ill effects of dampness in building.
3.2 Describe the methods of damp proofing of building.
3.3 Define efflorescence.
3.4 Describe remedial measures against efflorescence.
3.5 Mention the requirements of an ideal damp proofing material.
3.6 Describe the damp proof course (DPC) treatment for wall with sketches.
3.7 Mention the function of PVC felt used in basement.
3.8 State the function of rubber stopper to prevent the leakage of water.

3.9 State the function of water proofing agent.

4. Understand the damages due to termite in building.

4.1 Identify different type of termites.
4.2 Explain the damages due to termite in building on economic point of view.
4.3 Name the chemicals used for anti-termite treatment.
4.4 Describe the methods of pre-construction anti-termite treatment.
4.5 Describe the methods of post-construction anti-termite treatment.

5. Understand the stairs.

5.1 Differentiate between stairs and staircase.
5.2 Mention the functions and location of stairs.
5.3 Define the technical terms used in stairs.
5.4 Mention the requirements of a good stair.
5.5 Express the relationship between tread and riser.
5.6 List the suitable materials for construction of stairs.
5.7 Mention the classification of stairs.
5.8 Make a Plan of a staircase for a building from a given stair hall and room height.

6. Understand the roofs.

6.1 List the different kind of roofs.
6.2 Mention the functions of a roof.
6.3 Mention the essential requirements of a good roof.
6.4 Define the technical terms used in roofs.
6.5 Compare the advantages and limitations of flat roof over pitched roof.
6.6 Describe the construction procedure of a lean-to-roof.
6.7 Distinguish between king post truss and queen post truss.
6.8 Mention the advantages of steel trusses over wooden trusses.
6.9 Materials required for buildup section and rolled section.

7. Understand the plastering and pointing finishing works.

7.1 Describe the various types of plaster on the basis of their suitability and uses.
7.2 Name the different kinds of pointing with sketches.
7.3 State the purpose of plastering and pointing.
7.4 Mention the common tools used for plastering and pointing works with their functions.
7.5 Describe the process of applying plaster on new surface and old surface.
7.6 Mention the common defects in plastering and pointing.
7.7 State how the defects of plastering and pointing can be rectified.
7.8 Distinguish between plastering and pointing.
7.9 State the meaning of acoustics tiles, aluminum cladding panel (ACP), rustic tiles.

8. Understand the doors.

8.1 Identify the technical terms used in doors.
8.2 Mention the factors to be considered in determining the size, shape, location and number of doors in a room.
8.3 Describe the various types of doors on the basis of their suitability and uses.
8.4 Mention the advantages and limitations of the followings:
Panel door, Flush door, Glazed door, Fire proof door, Auto censor door, Composite door, Louvered door, Mild steel sheet door, Sliding door, Swing door, Collapsible door, Rolling shutter door, Revolving door, Plastic door.
8.5 Describe the methods of fixing door frames.

9. Understand the windows.

9.1 Mention the factors to be considered to determine the size, shape, location and number of windows in a room.

9.2 Describe the various types of windows on the basis of their suitability and uses.

9.3 Mention the advantages and limitations of the followings:
Fixed window, Pivoted window, Steel casement window, Sliding window, uPVC channel window, Louvered window, Bay window, Glazed window, Corner window, Dormer window, Gable window, Lantern window

9.4 State the functions of skylight, sunlight, fanlight and ventilator.

9.5 Describe the methods of fixing windows.

9.6 Compare among the wooden, steel and aluminum glazed window.

10. Understand the importance of scaffolding.

10.1 State the meaning of scaffolding.

10.2 Explain the necessity and uses of scaffolding. 10.3 Name the different types of steel scaffolding.

10.4 Name the different components of scaffolding.

10.5 Advantages of ringlock scaffolding as compared with general steel scaffolding. 10.6 Advantages of cuplock scaffolding as compared with general steel scaffolding. 10.7 Installation process of ringlock scaffolding.

10.8 Installation process of cuplock scaffolding.

10.9 Compare the advantages and limitations of timber scaffolding over steel scaffolding.

10.10 Differentiate between shoring and scaffolding.

10.11 Describe the safety requirements for scaffolding works.

11. Understand the significance of form works.

11.1 State, form works, centering and shuttering.

11.2 Explain the necessity and uses of form works.

11.3 Name the different components of form works.

11.4 Mention the essential requirements of a good form work.

11.5 Describe the process of making form works of the followings:

a. Column b. Beam and slab c. Stair
d. Wall e. Lift core g. Share wall

11.6 Describe the specifications for cleaning & treatment of forms and scrapping of form works.

11.7 Describe the removal technique of form works.

11.8 Describe the methods for fair face concreting.

12. Understand the process of painting & Varnishing.

12.1 State the purpose of painting & varnishing.

12.2 Name the ingredients of paint & varnishes.

12.3 Mention the specific function of each ingredient of paint & varnishes.

12.4 Describe the characteristics of good paints & varnishes.

12.5 State the various defects in painting & varnishing.

12.6 Describe the factors that should be considered during the supervision of quality painting & varnishing work.

12.7 Differentiate between the properties and ingredients of the following:

a. White wash and color wash. b. Distemper and snowcem wash.
c. Weather coat and white wash. d. oil based paint and water based paint
e. Weather coat and distemper f. plastic emulsion paint and synthetic enamel paint

12.8 Describe the procedure of application of the following on new and old surfaces:
a. White wash b. Color wash c. Distemper d. Weather coat
e. Epoxy paint f. Rubber paint g. Plastic emulsion paint h. Synthetic enamel paint
i. Snowcem (cement based paint)

13. Understand the necessity of equipment in construction works.

13.1 List the equipment required for construction works.
13.2 Mention the specific use of the each equipment required for construction works.
13.3 Describe the operation and maintenance of different pumps used in construction works.
13.4 Describe the operation and maintenance of earth excavating machine, bulldozer machine, roller machine, brick cutter machine, crushing (brick/stone) machine, concrete pump machine, concrete hoisting equipment.
13.5 Describe the operation and maintenance of different conveyor used in construction works.
13.6 State the function of vibrator machine.
13.7 Describe the operation and maintenance of plate compactor, hammer/frog hammer, Compactor.

14. Understand the necessity of different building services.

14.1 State the necessity of different building services.
14.2 Classify different kinds of building services.
14.3 Describe the procedure of gas line installation in building.
14.4 Describe the layout of electrical wiring with various fittings in building.
14.5 Describe the process of installation of mechanical ventilation and air- conditioning system in building.
14.6 Describe the method of installation of elevator or lift and escalator system in a building.
14.7 Describe the fire protection and detection system in a building.
14.8 Define smoke detector, heat detector and fire alarm.
14.9 Describe the procedure of smoke detector, heat detector and fire alarm in firefighting system.

15. Understand building codes and building by laws.

15.1 State different codes followed in construction methodology.
15.2 State the main features of Bangladesh National Building Code (BNBC), 2015 and Building Construction Rules-2015 by Public Works Department (PWD) Bangladesh with latest update in construction industry.
15.3 Define building bye laws.
15.4 Explain the municipal regulation in building planning.
15.5 Describe the importance of building bye laws.
15.6 Describe the economical planning of a residential building.
15.7 Define orientation of a building
15.8 Describe the effects of orientation of building on the basis of local climates.

16. Understand the different insulation in building.

16.1 Define thermal and sound insulation.
16.2 State the necessity of thermal and sound insulation in building.
16.3 List various types of materials used for thermal and sound insulation.
16.4 Describe the general methods of thermal and sound insulation in building.
16.5 Describe the process of thermal insulation of the following with neat sketches:
a. Floor. b. Roof. c. Exposed wall. d. Exposed door and window.

17. Understand the construction process of dam, embankment and irrigation and drainage c anal.

17.1Define levee, dyke, spur, groyne, dam and embankment.
17.2State the necessity of dam and embankment.
17.3Describe the procedure of selection of alignment.
17.4Describe the factors to be considered in designing dam and embankment.
17.5Describe the process of maintenance of dam and embankment.
17.6Describe the procedural steps of construction of irrigation and drainage canal.
17.7Describe the process of maintenance of irrigation and drainage canal.

18. Understand the construction process of bridge and culvert.

18.1State different types of bridge and culvert.
18.2Distinguish between bridge and culvert.
18.3Mention different components of bridge and culvert.
18.4Describe the process of setting out plan of bridge and culvert.
18.5Describe the procedural steps of construction of bridge and culvert.
18.6Explain the necessity of inspection of bridge and culvert for maintenance.
18.7Describe the factors to be considered for inspection of bridge and culvert.

PRACTICAL:

1. Construct a semi-circle/segmental brick arch.

1.1 Select the required tools and raw materials.
1.2 Make form works with suitable materials.
1.3 Prepare cement mortar as required.
1.4 Place the bricks on proper position with cement mortar.
1.5 Do the curing of the brick work properly.
1.6 Remove the form works.

2. Construct any one of the following floors with suitable materials.

Brick floor; Brick concrete floor; Terrazzo floor; Mosaic floor; Tiled floor; Timber floor; RCC solid floor; RCC ribbed floor

2.1 Select the required tools and raw materials.
2.2 Prepare the floor according to standard specification.
2.3 Clean the work site.
2.4 Deck floor using steel deck sheet with RCC toping.

3. Perform a case study of dampness in building.

3.1 Identify a damped building.
3.2 Investigate the reasons of dampness for major affected areas and causes.
3.3 Select the method of damp proofing.
3.4 Estimate the materials to be needed for damp proofing.
3.5 Prepare a report on the specified case of dampness in building.

4. Construct the form work of a stair.

4.1 Collect the required tools and raw materials.
4.2 Draw a neat sketch of stair (at least ten nos. steps) with waist slab shutter.
4.3 Make the bottom supports and erect inclined way.

4.4 Fix the steps and side of steps.
4.5 Check the accuracy of the works in all respects.

5. Construct a wooden lean-to-roof, queen post roof truss, king post roof truss.
5.1 Collect the required tools and raw materials.
5.2 Draw the neat sketch with dimensions.
5.3 Make the joints and assemble the members.
5.4 Erect the proper position.
5.5 Check the accuracy of the work.

6. Perform cement plastering to brick walls.
6.1 Collect the required tools and raw materials.
6.2 Clean the loose materials from the surface.
6.3 Raking out all the joints up to required depth.
6.4 Wash the surface with water.
6.5 Prepare cement mortar as required proportion.
6.6 Provide dots and check the thickness of cement plaster.
6.7 Provide the screed properly.
6.8 Apply mortar (top to bottom and left to right).
6.9 Plain / level the surface as possible.

7. Perform pointing works to a boundary wall.
7.1 Collect the required tools and raw materials.
7.2 Clean the loose materials from the surface.
7.3 Raking out all the joints up to required depth.
7.4 Wash the surface with water.
7.5 Prepare cement mortar as required proportion.
7.6 Apply mortar to the joints and press (top to bottom and left to right).
7.7 Check the joints accordingly.
7.8 Do curing accordingly.

8. Construct a single layer and double layers scaffolding.
8.1 Collect the required tools and raw materials.
8.2 Erect the vertical members.
8.3 Place the horizontal members and tied with jute rope.
8.4 Place the boards for platform.
8.5 Provide the bracings accordingly.
8.6 Check the properness of the scaffolding work.
8.7 Disassemble all the members and store the materials used.

9. Prepare form works for columns/ beams, lift cores /share walls.
9.1 Collect the required tools and raw materials.
9.2 Make the boards according to required size.
9.3 Erect the boards and attached accordingly so that they can easily remove.
9.4 Check the dimensions of the column/beam.
9.5 Disassemble the form works and store the materials used.

10. Perform white washing/ color washing/ distempering/ snowcem washing/ weather coating/ plastic emulsion painting on new/old surface.
10.1 Collect the required tools and raw materials.
10.2 Prepare the surface as necessary.
10.3 Prepare white wash as required.
10.4 Apply first coat of white wash and allow to drying.

10.5Apply second coat of white wash and allow to drying.
10.6Apply the final coat of white wash.

11. Perform varnishing on new and old wooden surface.

11.1 Collect required tools and raw materials.
11.2 Prepare the surface as necessary.
11.3 Prepare varnish as required.
11.4 Apply first coat and allow to drying.
11.5 Apply second coat and allow to drying.
11.6 Apply the final coat of varnish.

12. (a) Draw plan and sectional elevation of on irrigative and drainage canal.

(b) Prepare a typical model of a drainage canal with suitable materials.

13. (a) Draw plan and sectional elevation of a RCC bridge or culvert.

(b) Prepare a typical model of a RCC bridge with or culvert

suitable materials. 14.Make a site visit/field trip.

15. Field visit for steel scaffolding for construction site.

REFERENCE BOOKS

1. Building Construction - B C Punmia
2. A Text Book of Construction - S P Aurora & S P Bindra
3. Building Construction - G J Kulkarni
4. Building Construction - S C Rangwala
5. Construction and Foundation Engineering - Dr. J Jha, S K Sinha
6. Building Construction